May 27, 2010
Project No. 10-217

Mr. Dennis Dang
Berkeley Public Library
2031 Bancroft Way
Berkeley, California 94704

Subject: Final Report
Geotechnical Investigation
New Library Building
Berkeley Public Library, South Branch
Berkeley, California

Dear Mr. Dang:

We are pleased to present our geotechnical report, dated May 27, 2010, for the proposed new Berkeley Public Library, South Branch building to be constructed at 1901 Russell Street in Berkeley, California. Our services were provided in accordance with our proposal dated February 11, 2010 and our Personal Services Contract with the City of Berkeley, dated March 18, 2010.

The project site is a relatively level parcel on the northeast corner of the intersection of Russell Street and Martin Luther King, Jr. Way. It is currently occupied by a single-story, concrete-block building constructed around 1960. The proposed improvements will consist of the demolition of the existing building and the construction of a new approximately 9,000-square-foot, one-story building.

On the basis of our investigation, we conclude the proposed improvements may be constructed as planned, provided the recommendations presented in the attached report are incorporated into the project plans and specifications. The primary geotechnical issues to be addressed in the design and construction of the proposed building are the presence of existing fill, a shallow groundwater table, and the presence of existing drilled pier foundations within the footprint of the proposed structure. We conclude the most appropriate foundation system for the proposed building consists of a well-reinforced concrete mat foundation underlain by at least 12 inches of compacted on-site soil
The recommendations contained in our report are based on a limited subsurface exploration. Consequently, variations between expected and actual subsurface conditions may be found in localized areas during construction. Therefore, we should be engaged to observe grading and foundation installation during which time we may make changes in our recommendations, if deemed necessary.

We appreciate the opportunity to provide our services to you on this project. If you have any questions, please call.

Sincerely yours,
ROCKRIDGE GEOTECHNICAL, INC.

Craig S. Shields, P.E., G.E.
Principal Geotechnical Engineer

Enclosure

cc: Mr. Steven Dewan, Kitchell
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1.0 INTRODUCTION

This report presents the results of the geotechnical investigation performed by Rockridge Geotechnical for the proposed new Berkeley Public Library South Branch building to be constructed at 1901 Russell Street in Berkeley, California. The project site is a relatively level parcel on the northeast corner of Russell Street and Martin Luther King, Jr. Way, as shown on the Site Location Map (Figure 1). It is currently occupied by a single-story, concrete-block building.

The proposed improvements will consist of the demolition of the existing building and the construction of a new approximately 9,000-square-foot, one-story building. Constructed around 1960, the existing building is supported on drilled, cast-in-place concrete piers that reportedly range in length from 11 to 15 feet. An addition constructed on the north side of the existing building is also supported on drilled piers ranging in length from 7 to 9 feet. According to Mr. Gordon Yagisawa with Tipping Mar, the project structural engineer, the design floor loads for the new building will range from 50 to 150 pounds per square foot (psf), with the heaviest loading in the stack areas. In addition, there will be concentrated loads ranging from approximately 1,000 to 2,000 pounds throughout the building.

A geotechnical investigation was previously performed at the site for the existing building by Woodward-Clyde-Sherard & Associates (WCSA), the results of which were presented in a report titled *Soil Investigation for the Proposed Berkeley Public Library Building, South Branch, Grove and Russell Streets, Berkeley, California*, dated May 23, 1960. We used the data in the WCSA report in our evaluation of subsurface conditions at the site. The site plan and boring logs from the WCSA report are presented in Appendix C of this report.
2.0 SCOPE OF WORK

Our investigation was performed in accordance with our proposal dated February 11, 2010 and our Personal Services Contract with the City of Berkeley, dated March 18, 2010. Our scope of work consisted of exploring subsurface conditions at the site by drilling two test borings, performing laboratory testing on selected soil samples obtained from the test borings, and performing engineering analyses to develop conclusions and recommendations regarding:

- The most appropriate foundation type(s) for the proposed building
- Design criteria for the recommended foundation type(s), including vertical and lateral capacities for each of the foundation type(s)
- Estimates of total and differential foundation settlement
- Design criteria for retaining walls, including active, at-rest, and passive pressure, and coefficient of sliding friction
- Subgrade preparation for slab-on-grade floors and walkways
- Flexible and rigid pavement design
- Site grading and excavation, including criteria for fill quality and compaction
- Site seismicity and seismic hazards, including the potential for liquefaction and liquefaction-induced ground failure
- 2007 California Building Code (CBC) site class and design spectral response acceleration parameters
- Corrosion potential of near surface soil
- Construction considerations.

3.0 FIELD INVESTIGATION AND LABORATORY TESTING

Subsurface conditions at the site were investigated by drilling two test borings and performing laboratory testing on selected soil samples. Prior to drilling the test borings, we obtained a permit from the City of Berkeley Planning and Development Department Toxics Management Division and contacted Underground Service Alert (USA) to notify them of our work, as required by law. We also retained Precision Locating, LLC, a private utility locator, to check
that the boring locations were clear of existing utilities. Details of the field exploration and laboratory testing are described below.

### 3.1 Test Borings

We supplemented the available subsurface data by drilling two test borings, designated as B-1 and B-2, at the approximate locations shown on the Site Plan (Figure 2). The borings were each advanced to a depth of 25 feet below the existing ground surface (bgs) on April 1, 2010 by Exploration Geoservices, Inc. of San Jose, California. The borings were drilled using a truck-mounted drill rig equipped with eight-inch-outside-diameter hollow-stem augers.

During drilling, our field engineer logged the soil encountered and obtained representative samples for visual classification and laboratory testing. The logs of the borings are presented on Figures A-1 and A-2 in Appendix A. The soil encountered in the borings was classified in accordance with the classification chart shown on Figure A-3.

Soil samples in the borings were obtained using a Sprague and Henwood (S&H) split-barrel sampler with a 3.0-inch-outside diameter, 2.5-inch-inside diameter, and lined with brass tubes with an inside diameter of 2.43 inches. The S&H sampler was driven with a 140-pound, down-hole, safety hammer falling 30 inches. The blow counts required to drive the S&H sampler the final 12 inches of an 18-inch drive (N-values) were converted to approximate SPT N-values using a conversion factor of 0.6 and are shown on the boring logs. Upon completion of drilling, the borings were backfilled with cement grout.

### 3.2 Laboratory Testing

We examined each soil sample in the office to confirm the field classification and select representative samples for laboratory testing. Soil samples were tested to measure moisture content, dry density, shear strength, Atterberg Limits, and corrosivity. The test results are presented on the boring logs, except for the corrosivity test results which are presented in Appendix B.
4.0 SITE AND SUBSURFACE CONDITIONS

The site consists of a relatively level parcel on the northeast corner of the intersection of Russell Street and Martin Luther King, Jr. Way. It is bordered by residential properties to the north and east. The site is currently occupied by a single-story, concrete-block building constructed around 1960. A topographic survey performed by Logan Surveying in September 2009 indicates the finished floor elevation for the existing building is 115.5 feet (City of Berkeley datum).

The WCSA report indicates there was an old filled-in basement on the site prior to construction of the existing library building in 1960. The outline of the former basement, as shown on Figure 1 of the WCSA report, is plotted on Figure 2 of this report. Because of the presence of up to seven feet of fill in the filled-in basement, as well as up to four feet of fill in other portions of the site, WCSA recommended the proposed building be supported on drilled, cast-in-place concrete piers taking support through skin friction below the fill. Based on this information, we conclude the fill in the basement area probably still exists.

The borings drilled for our investigation and the previous WCSA borings indicate the site is predominantly underlain by stiff to very stiff clay with varying sand and gravel content that extends to the maximum depth explored of 25 feet bgs. Atterberg limits tests indicate the near-surface clay has low to moderate expansion potential. Fill was encountered in all four WCSA borings, ranging in thickness from approximately 1-1/2 to 7-1/2 feet. The two borings drilled in the former basement area encountered between 7 and 7-1/2 feet of fill. We did not encounter soil that appeared to be fill in our two borings; however, the upper two feet of clay in Boring B-2 had relatively low moist unit weight, indicating this material may be fill.

Groundwater was initially measured during drilling at depths of 8 and 13 feet bgs in Borings B-1 and B-2, respectively. Measurements taken shortly after drilling was completed showed the groundwater level had risen in both borings to depths of approximately 4-1/2 and 6 feet bgs in Borings B-1 and B-2, respectively. These latter groundwater levels are consistent with the groundwater levels measured by WCSA in May 1960.
5.0 SEISMIC CONSIDERATIONS

5.1 Regional Seismicity

The major active faults in the area are the Hayward, Calaveras, and San Andreas faults. For these and other active faults within a 40-kilometer radius of the site, the distance from the site and estimated maximum Moment magnitude\(^1\) [Working Group on California Earthquake Probabilities (WGCEP) (2008) and Cao et al. (2003)] are summarized in Table 1.

\(^1\) Moment magnitude is an energy-based scale and provides a physically meaningful measure of the size of a faulting event. Moment magnitude is directly related to average slip and fault rupture area.
### TABLE 1
Regional Faults and Seismicity

<table>
<thead>
<tr>
<th>Fault Segment</th>
<th>Approximate Distance from Site (km)</th>
<th>Direction from Site</th>
<th>Maximum Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Hayward</td>
<td>2</td>
<td>East</td>
<td>6.5</td>
</tr>
<tr>
<td>Total Hayward</td>
<td>2</td>
<td>East</td>
<td>6.9</td>
</tr>
<tr>
<td>Total Hayward-Rodgers Creek</td>
<td>2</td>
<td>East</td>
<td>7.3</td>
</tr>
<tr>
<td>South Hayward</td>
<td>6</td>
<td>East</td>
<td>6.7</td>
</tr>
<tr>
<td>Mt Diablo-MTD</td>
<td>21</td>
<td>East</td>
<td>6.7</td>
</tr>
<tr>
<td>Total Calaveras</td>
<td>23</td>
<td>East</td>
<td>6.9</td>
</tr>
<tr>
<td>Concord/Green Valley</td>
<td>24</td>
<td>East</td>
<td>6.7</td>
</tr>
<tr>
<td>San Andreas-1906 Rupture</td>
<td>27</td>
<td>West</td>
<td>7.9</td>
</tr>
<tr>
<td>San Andreas – Peninsula</td>
<td>27</td>
<td>West</td>
<td>7.2</td>
</tr>
<tr>
<td>San Andreas – North Coast South</td>
<td>28</td>
<td>West</td>
<td>7.5</td>
</tr>
<tr>
<td>Rodgers Creek</td>
<td>29</td>
<td>Northwest</td>
<td>7.0</td>
</tr>
<tr>
<td>Northern San Gregorio</td>
<td>32</td>
<td>West</td>
<td>7.2</td>
</tr>
<tr>
<td>Total San Gregorio</td>
<td>32</td>
<td>West</td>
<td>7.4</td>
</tr>
<tr>
<td>West Napa</td>
<td>34</td>
<td>North</td>
<td>6.5</td>
</tr>
<tr>
<td>Greenville</td>
<td>39</td>
<td>East</td>
<td>6.9</td>
</tr>
</tbody>
</table>

Since 1800, four major earthquakes have been recorded on the San Andreas Fault. In 1836, an earthquake with an estimated maximum intensity of VII on the Modified Mercalli (MM) scale occurred east of Monterey Bay on the San Andreas Fault (Toppozada and Borchardt 1998). The estimated Moment magnitude, $M_w$, for this earthquake is about 6.25. In 1838, an earthquake occurred with an estimated intensity of about VIII-IX (MM), corresponding to an $M_w$ of about 7.5. The San Francisco Earthquake of 1906 caused the most significant damage in the history of
the Bay Area in terms of loss of lives and property damage. This earthquake created a surface 
rupture along the San Andreas Fault from Shelter Cove to San Juan Bautista approximately 470 
kilometers in length. It had a maximum intensity of XI (MM), an $M_w$ of about 7.9, and was felt 
560 kilometers away in Oregon, Nevada, and Los Angeles. The most recent earthquake to affect 
the Bay Area was the Loma Prieta Earthquake of 17 October 1989 with an $M_w$ of 6.9. This 
earthquake occurred in the Santa Cruz Mountains about 92 kilometers southwest of the site.

In 1868, an earthquake with an estimated maximum intensity of X on the MM scale occurred on 
the southern segment (between San Leandro and Fremont) of the Hayward Fault. The estimated 
$M_w$ for the earthquake is 7.0. In 1861, an earthquake of unknown magnitude (probably an $M_w$ of 
about 6.5) was reported on the Calaveras Fault. The most recent significant earthquake on this 
fault was the 1984 Morgan Hill earthquake ($M_w = 6.2$).

The U.S. Geological Survey’s 2007 Working Group on California Earthquake Probabilities has 
compiled the earthquake fault research for the San Francisco Bay area in order to estimate the 
probability of fault segment rupture. They have determined that the overall probability of 
moment magnitude 6.7 or greater earthquake occurring in the San Francisco Bay Region during 
the next thirty years is 63 percent. The highest probabilities are assigned to the 
Hayward/Rodgers Creek Fault and the northern segment of the San Andreas Fault. These 
probabilities are 31 and 21 percent, respectively (USGS, 2008).
5.2 Geologic Hazards

Because the project site is in a seismically active region, we evaluated the potential for earthquake-induced geologic hazards including ground shaking, ground surface rupture, liquefaction, lateral spreading, and cyclic densification. We used the results of the borings to evaluate the potential of these phenomena occurring at the project site.

5.2.1 Ground Shaking

The seismicity of the site is governed by the activity of the Hayward Fault, although ground shaking from future earthquakes on other faults, including the Calaveras and San Andreas faults, will also be felt at the site. The intensity of earthquake ground motion at the site will depend upon the characteristics of the generating fault, distance to the earthquake epicenter, and magnitude and duration of the earthquake. We judge that strong to very strong ground shaking could occur at the site during a large earthquake on one of the nearby faults.

5.2.2 Liquefaction and Associated Hazards

When a saturated, cohesionless soil liquefies, it experiences a temporary loss of shear strength created by a transient rise in excess pore pressure generated by strong ground motion. Soil susceptible to liquefaction includes loose to medium dense sand and gravel, low-plasticity silt, and some low-plasticity clay deposits. Flow failure, lateral spreading, differential settlement, loss of bearing strength, ground fissures and sand boils are evidence of excess pore pressure generation and liquefaction.

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2 Liquefaction is a phenomenon where loose, saturated, cohesionless soil experiences temporary reduction in strength during cyclic loading such as that produced by earthquakes.

3 Lateral spreading is a phenomenon in which surficial soil displaces along a shear zone that has formed within an underlying liquefied layer. Upon reaching mobilization, the surficial blocks are transported downslope or in the direction of a free face by earthquake and gravitational forces.

4 Cyclic densification is a phenomenon in which non-saturated, cohesionless soil is compacted by earthquake vibrations, causing ground-surface settlement.
The California Geological Survey (CGS) has prepared a map titled *State of California, Seismic Hazard Zones, Oakland West Quadrangle, Official Map*, dated February 14, 2003, that shows areas where geologic conditions warrant a detailed evaluation of liquefaction potential. As shown on Figure 3, the site is *not* within a designated liquefaction hazard zone. Our borings and the previous WCSA borings indicate the soil underlying the site has sufficient cohesion to resist liquefaction and, therefore, we conclude the potential for liquefaction at the site is low. Considering the low potential for liquefaction at the site, we conclude the potential for lateral spreading is also very low.

### 5.2.3 Cyclic Densification

Cyclic densification (also referred to as differential compaction) of non-saturated sand (sand above groundwater table) can occur during an earthquake, resulting in settlement of the ground surface and overlying improvements. We did not encountered granular soils above the groundwater table, therefore, we conclude the potential for cyclic densification is nil.

### 5.2.4 Ground Surface Rupture

Historically, ground surface displacements closely follow the trace of geologically young faults. The site is not within an Earthquake Fault Zone, as defined by the Alquist-Priolo Earthquake Fault Zoning Act, and no known active or potentially active faults exist on the site. We therefore conclude the risk of fault offset at the site from a known active fault is very low. In a seismically active area, the remote possibility exists for future faulting in areas where no faults previously existed; however, we conclude the risk of surface faulting and consequent secondary ground failure from previously unknown faults is also very low.
6.0 CONCLUSIONS AND RECOMMENDATIONS

From a geotechnical standpoint, we conclude the site can be developed as planned, provided the recommendations presented in this report are incorporated into the project plans and specifications and implemented during construction. The primary geotechnical issues to be addressed in the design and construction of the proposed building are the presence of existing fill, a shallow groundwater table, and the presence of existing drilled pier foundations within the footprint of the proposed structure. Our conclusions and recommendations to address these issues are presented below.

6.1 Site Preparation and Grading

Demolition of the site should include removal of all existing grade beams, slabs, asphalt pavement, and concrete flatwork. The existing drilled pier foundations should be cut off at least 18 inches below the bottom of the proposed mat foundation, which is described below in Section 6.2. Any vegetation and organic topsoil should be stripped in areas to receive improvements (i.e., building, pavement, or flatwork). Removed asphalt concrete should be taken to an asphalt recycling facility. Tree roots with a diameter greater than 1/2 inch within two feet of subgrade should be removed. If it is not possible to remove tree roots at a particular location because it may damage a tree that will remain, we should evaluate the potential impact on the new construction. Excessively dry soil at tree removal locations, as determined in the field by the Geotechnical Engineer, should also be excavated and replaced with engineered fill.

In general, abandoned underground utilities should be removed to the property line or service connections and properly capped or plugged with concrete. Where existing utility lines are outside of the building footprint and will not interfere with the proposed construction, they may be abandoned in-place provided the lines are filled with lean concrete or cement grout to the property line. Voids resulting from demolition activities should be properly backfilled with engineered fill following the recommendations provided later in this section.
After demolition and site clearing is complete, potholing should be performed to investigate the lateral extent and depth of the existing fill in the former basement area. The existing fill should then be excavated and stockpiled for reuse as engineered fill. Drilled piers exposed in the excavation should be cut off to the bottom of the excavation. Dewatering of the excavation will be necessary to allow access for equipment and placement of fill. After the fill has been removed, a layer of geotextile (Mirafi HP370 or equivalent) should be placed on the excavation bottom. A minimum of 12 inches of open-graded, ¾-inch drain rock should then be placed over the geotextile and static-rolled with a small smooth drum roller. The resulting surface should be proof-rolled with a fully loaded water truck or 10-wheel dump truck to confirm the subgrade is adequately stabilized. Additional drain rock should be added if the proof-rolling indicates the subgrade is not adequately stabilized. After it is confirmed the subgrade is adequately stabilized, the drain rock should be covered with a filter fabric (Mirafi 140NC or equivalent) to minimize the potential for migration of fines into the drain rock. Engineered fill can then be placed in lifts above the filter fabric. The fill should be compacted with a sheepsfoot-type compactor without use of vibratory energy.

In other areas to receive improvements or fill, the soil exposed by stripping should be scarified to a depth of at least 12 inches, moisture-conditioned to at least two percent above optimum moisture content, and compacted to at least 90 percent relative compaction. The soil subgrade should be kept moist until it is covered by fill or concrete. If the subgrade is not kept moist, the contractor will be required to scarify and recompact. Because of the high groundwater table, we anticipate the soil subgrade over much of the proposed building footprint will be too wet to achieve the recommended minimum relative compaction. Therefore, the grading contractor should be prepared to scarify and aerate the subgrade to dry it prior to attempting compaction. The subgrade should be scarified to a depth of at least 12 inches; the scarified material should be turned at least twice a day to promote uniform drying. Once the moisture content of the aerated

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5 Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density of the same material, as determined by the ASTM D1557 laboratory compaction procedure.
soil has been reduced to acceptable levels, the soil should be compacted in accordance with our recommendations above. Aeration is typically the least costly subgrade stabilization alternative; however, it generally requires the most time to complete and may not be practical if warm weather is not expected when grading is performed. If aeration is not practical, we recommend treating the upper 12 inches of subgrade with a minimum of four percent hi-calcium quicklime.

The excavated on-site soil can be reused for engineered fill; however, the material will likely be too wet to compact the recommended minimum relative compaction. Therefore, the grading contractor should be prepared to aerate the excavated material, as described in the previous paragraph, to lower its moisture content. Alternatively, the excavated material can be treated with quicklime or off-hauled and replaced with imported fill. If material to be used as fill is imported to the site, it should meet the requirements of select fill given in Section 6.1.1. A summary of the compaction requirements for the various types of fill that may be used at the site is presented in Table 2.
TABLE 2
Summary of Compaction Requirements

<table>
<thead>
<tr>
<th>Location</th>
<th>Required Relative Compaction (percent)</th>
<th>Moisture Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building pad subgrade- native soil</td>
<td>90+</td>
<td>2+% above optimum</td>
</tr>
<tr>
<td>General fill - select fill/lime-treated on-site soil less than five feet thick</td>
<td>90+</td>
<td>Above optimum</td>
</tr>
<tr>
<td>General fill - select fill/lime-treated on-site soil more than five feet thick</td>
<td>95+</td>
<td>Above optimum</td>
</tr>
<tr>
<td>General fill - native soil less than 5 feet thick</td>
<td>90+</td>
<td>2+% above optimum</td>
</tr>
<tr>
<td>General fill - native soil more than 5 feet thick</td>
<td>93+</td>
<td>2+% above optimum</td>
</tr>
<tr>
<td>Utility trench backfill - native soil</td>
<td>90+</td>
<td>2+% above optimum</td>
</tr>
<tr>
<td>Utility trench backfill - select fill/lime-treated on-site soil</td>
<td>90+</td>
<td>Above optimum</td>
</tr>
<tr>
<td>Utility trench - clean sand or gravel</td>
<td>95+</td>
<td>Near optimum</td>
</tr>
<tr>
<td>Exterior slabs – native soil subgrade</td>
<td>90+</td>
<td>2+% above optimum</td>
</tr>
<tr>
<td>Exterior slabs – select fill/AB</td>
<td>90+</td>
<td>Above optimum</td>
</tr>
</tbody>
</table>

6.1.1 Select Fill

Select fill should consist of imported soil that is free of organic matter, contain no rocks or lumps larger than three inches in greatest dimension, have a liquid limit less than 40 and plasticity index less than 12, and be approved by the Geotechnical Engineer. In addition, the select fill should contain at least 20 percent fines (particles passing the No. 200 sieve) to reduce the potential for surface water to infiltrate beneath slabs. Select fill should be placed in lifts not exceeding eight inches in uncompacted thickness, moisture-conditioned to above optimum moisture content, and compacted in accordance with the recommendations presented in Table 2. Samples of proposed select fill material should be submitted to the Geotechnical Engineer at
least three business days prior to use at the site. The grading contractor should provide analytical test results or other suitable environmental documentation indicating the imported fill is free of hazardous materials at least three days before use at the site. If this data is not available, up to two weeks should be allowed to perform analytical testing on the proposed imported material.

6.1.2 Exterior Flatwork Subgrade Preparation

We recommend four inches of Class 2 aggregate base (AB) be placed beneath exterior concrete flatwork on the site, such as patios and sidewalks. The AB should be moisture-conditioned to above optimum moisture content and compacted to at least 90 percent relative compaction. Prior to placement of the AB, the soil exposed at subgrade level should be scarified to a depth of at least 12 inches and moisture-conditioned and compacted in accordance with the requirements presented in Table 2.

6.1.3 Pavement Subgrade Preparation

In vehicular pavement areas where native or imported soil is exposed at subgrade level, the upper eight inches of subgrade should be moisture-conditioned to above optimum moisture content and compacted to at least 95 percent relative compaction to achieve a firm, unyielding subgrade. The soil subgrade should be kept moist until it is covered by AB. The AB placed beneath pavements receiving vehicular traffic should be compacted to at least 95 percent relative compaction.

6.1.4 Utility Trench Backfill

All trenches should conform to the current CAL-OSHA requirements. To provide uniform support, pipes or conduits should be bedded on a minimum of four inches of sand or fine gravel. After the pipes and conduits are tested, inspected (if required) and approved, they should be covered to a depth of six inches with sand or fine gravel, which should be mechanically tamped. The pipe bedding and cover should be eliminated where an impermeable plug is required as described in the following paragraph. Backfill for utility trenches and other excavations is also considered fill, and should be placed and compacted as according to the recommendations previously presented. If imported clean sand or gravel (defined as soil with less than 10 percent
fines) is used as backfill, it should be compacted to at least 95 percent relative compaction. Jetting of trench backfill should not be permitted. Special care should be taken when backfilling utility trenches in pavement areas. Poor compaction may cause excessive settlements, resulting in damage to the pavement section.

An impermeable plug consisting of lean concrete, at least three feet in length, should be installed where the trenches enter the building footprint. Furthermore, where sand- or gravel-backfilled trenches cross planter areas and pass below pavements, a similar plug should be placed at the edge of the pavement. The purpose of these recommendations is to reduce the potential for water to become trapped in trenches beneath the building or pavements.

6.1.5 Surface Drainage

Positive surface drainage should be provided around the building to direct surface water away from the foundation. To reduce the potential for water ponding adjacent to the building, we recommend the ground surface within a horizontal distance of five feet from the building slope down away from the building with a surface gradient of at least two percent in unpaved areas and one percent in paved areas. In addition, roof downspouts should be discharged into controlled drainage facilities to keep the water away from the foundation.

6.2 Foundation Support

The primary issues to be addressed in selecting a suitable foundation type for the proposed building are the presence of up to 7-1/2 feet of undocumented fill in the previous basement area and the presence of drilled pier foundations for the existing building. Although deep foundations, such as drilled, cast-in-place concrete piers, will provide suitable support for the proposed building, these foundation types are typically more costly than a shallow foundation system. We conclude spread footings are not feasible because of the potential for differential settlement between footings underlain by existing drilled piers and nearby footings underlain by only native soil. Consequently, we conclude the most appropriate foundation system for the proposed building consists of a well-reinforced concrete mat foundation underlain by at least 12
inches of compacted on-site soil. As discussed above, the existing drilled piers should be cut off at least 18 inches below the bottom of the mat.

The mat foundation should be at least 12 inches thick and the edge of the mat should extend at least 12 inches below the lowest adjacent exterior grade. For design of the mat, we recommend using a modulus of vertical subgrade reaction of 50 pounds per cubic inch (pci) where there are no existing drilled pier foundations and 100 pci where the mat will be underlain by an existing drilled pier. These values are for a one-foot-square plate and should be scaled to account for the size of the mat foundation. The mat may be designed using allowable bearing pressures of 3,000 and 4,000 pounds per square foot (psf) for dead-plus-live loads and total loads, respectively. Localized higher bearing pressures may be acceptable; however, this should be reviewed on a case-by-case basis. We estimate total settlement of the mat foundation will be less than ¾ inch, which includes approximately ½ inch of post-construction settlement due to the building contents. We estimate post-construction differential settlement will be less than ¼ inch over a horizontal distance of 25 feet.

Lateral loads can be resisted by a combination of passive pressure on the outside edges of the mat foundation and friction along the bottom of the mat. Passive resistance may be calculated using a uniform pressure of 1,000 psf. The upper one foot of soil should be ignored unless it is confined by slabs or pavement. Frictional resistance should be computed using a base friction coefficient of 0.30 where the mat is in contact with soil and 0.20 where the mat is in underlain by a vapor retarder. These values include a factor of safety of at least 1.5.

A vapor retarder meeting the requirements for Class A vapor retarders stated in ASTM E1745-97 should be placed directly on the subgrade soil below the mat foundation. The vapor retarder should be placed in accordance with the requirements of ASTM E1643-98. These requirements include overlapping seams by six inches, taping seams, and sealing penetrations in the vapor retarder. If required by the structural engineer, the vapor retarder can be covered with two inches of sand to aid in curing the concrete.
The mat subgrade should be free of loose material, debris, and shrinkage cracks prior to placing the vapor retarder. The subgrade should be moistened as needed to prevent formation of shrinkage cracks during installation of underslab utilities. We should examine the subgrade prior to placement of the vapor retarder to confirm the condition of the subgrade is acceptable.

### 6.3 Retaining Walls

Retaining walls that are restrained from movement at the top or sides should be designed for at-rest conditions using an equivalent fluid weight (triangular distribution) of 60 pounds per cubic foot (pcf). Walls that are not restrained may be designed for active conditions using an equivalent fluid weight of 40 pcf. Because site retaining walls, if any, will likely consist of landscape walls less than five feet high, it is not necessary to include a seismic pressure increment in the design.

The foregoing design pressures assume the walls will be properly backdrained. One acceptable method for backdraining retaining walls is to place a prefabricated drainage panel (Miradrain 6000 or equivalent) against the backside of the walls. The drainage panel should extend down to a perforated PVC collector pipe at the base of the wall. The pipe should be surrounded on all sides by at least four inches of 3/4-inch crushed rock wrapped in filter fabric (Mirafi 140NC or equivalent). The pipe should be sloped to drain into a closed collection system, such as the storm drain system. We should review the manufacturer's specifications for proposed prefabricated drainage panel material and drain pipe to verify they are appropriate for the intended use.

Where wall backfill is required, it should be compacted to the relative compaction recommended in Section 6.1 using light (hand-operated) compaction equipment. If heavy equipment is used, the wall should be appropriately designed to withstand loads exerted by the equipment and/or temporarily braced.
6.4 Porous Concrete Pavement or Pavers

If porous concrete pavement or porous pavers are used, the pavement or pavers should be underlain by ¾-inch, open-graded crushed rock (i.e., drain rock). Bedding sand beneath pavers should be separated from the drain rock with a layer of filter fabric (Mirafi 140NC or equivalent). For pavement or pavers that will receive truck traffic, the drain rock should be at least 12 inches thick. If the vehicular traffic will only consist of light passenger vehicles, the drain rock should be at least 9 inches thick. The upper six inches of the subgrade should be moisture-conditioned and compacted in accordance with requirements presented in Table 2 in Section 6.1. Prior to placement of the drain rock, a layer of geotextile (Mirafi HP370 or equivalent) should be placed on the compacted subgrade. The drain rock should be compacted with at least six passes of a smooth-drum roller.

Because the permeability of the near-surface clay will be very low, it will be necessary to install a subdrain to collect surface water that infiltrates through the pavement and direct it to an appropriate discharge point. The soil subgrade beneath the drain rock should slope at a gradient of at least two percent toward perforated drain pipes spaced at no more than 20 feet apart. The drain pipes should consist of four-inch-diameter, perforated Schedule 40 PVC pipes installed in a 12-inch-wide by 12-inch-deep trench. The drain pipes should also slope at a gradient of at least one percent to the discharge point.

6.5 Rigid (Portland Cement Concrete) Pavement

Concrete pavement design is based on a maximum single-axle load of 20,000 pounds and a maximum tandem axle load of 32,000 pounds and light truck traffic (i.e., a few trucks per week). The recommended rigid pavement section for these axle loads is six inches of Portland cement concrete over six inches of Class 2 aggregate base. For driveways that will experience only passenger vehicle traffic, the recommended pavement section is five inches of Portland cement over six inches of Class 2 aggregate base.
The modulus of rupture of the concrete should be at least 500 psi at 28 days. Contraction joints should be constructed at 15-foot spacing. Where the outer edge of a concrete pavement meets asphalt concrete pavement, the concrete slab should be thickened by 50 percent at a taper not to exceed a slope of 1 in 10. For areas that will receive weekly garbage truck traffic, we recommend the slab be reinforced with a minimum of No. 4 bars at 16-inch spacing in both directions. Recommendations for subgrade preparation and aggregate base compaction for concrete pavement are the same as those we have described above for asphalt concrete pavement.

6.6 Seismic Design

For design in accordance with the 2007 CBC, we recommend Site Class D be used. The latitude and longitude of the site are 37.8563 and -122.2708, respectively. The spectral acceleration at a period of 0 seconds (corresponds to the PGA) is 0.49 times gravity (g) for the design-level earthquake. Hence, in accordance with the 2007 CBC, we recommend the following:

- SMs = 1.828g, SM1 = 1.03g
- SDs = 1.219g, SD1 = 0.687g.

6.7 Soil Corrosivity

On the basis of the results of the corrosivity analyses performed on a sample of the near-surface soil obtained during our field investigation, we conclude the near-surface soil is considered “severely corrosive”. Accordingly, buried iron, steel, cast iron, galvanized steel, and dielectric-coated steel or iron should be properly protected against corrosion. The results indicate that sulfate and chloride ion concentrations are insufficient to damage reinforced concrete structures below ground, and the pH of the soil does not present a problem with buried iron, steel, mortar-coated steel, and reinforced concrete.
7.0 ADDITIONAL GEOTECHNICAL SERVICES

Prior to construction, Rockridge Geotechnical should review the project plans and specifications to verify that they conform to the intent of our recommendations. During construction, our field engineer should provide on-site observation and testing during site preparation, placement and compaction of fill, and installation of building foundations. These observations will allow us to compare actual with anticipated subsurface conditions and to verify that the contractor's work conforms to the geotechnical aspects of the plans and specifications.

8.0 LIMITATIONS

This geotechnical study has been conducted in accordance with the standard of care commonly used as state-of-practice in the profession. No other warranties are either expressed or implied. The recommendations made in this report are based on the assumption that the subsurface soil, rock, and groundwater conditions do not deviate appreciably from those disclosed in the exploratory borings. If any variations or undesirable conditions are encountered during construction, we should be notified so that additional recommendations can be made. The foundation recommendations presented in this report are developed exclusively for the proposed development described in this report and are not valid for other locations and construction in the project vicinity.
9.0 REFERENCES


California Division of Mines and Geology, 1997, Fault Rupture Hazard Zones in California, Special Publication 42.


California Geological Survey (2008), Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication 117.

Jennings, C.W., 1994, Fault activity map of California and adjacent areas with locations and ages of recent volcanic eruptions: California Division of Mines and Geology Geologic Data Map No. 6, scale 1: 750,000.

FIGURES
EXPLANATION

B-1
Approximate location of boring by Rockridge Geotechnical; April 2010

WCS-1
Approximate location of previous boring by Woodward-Clyde-Sherard & Associates; May 1960

Probable extent of old basement as shown in May 23, 1960 report by WCS

EXPLANATION

Liquefaction: Areas where historic occurrence of liquefaction, or local topographic, geological, geotechnical, and subsurface water conditions indicate a potential for permanent ground displacements.

Earthquake-Induced Landslides: Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical, and subsurface water conditions indicate a potential for permanent ground displacements.

Reference:
State of California "Seismic Hazard Zones"
Oakland West Quadrangle.
Released on February 14, 2003
APPENDIX A

Logs of Test Borings
**MATERIAL DESCRIPTION**

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>SAMPLE</th>
<th>MATERIAL DESCRIPTION</th>
<th>S&amp;P N-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CL</td>
<td>1-1/2-inch Asphalt Concrete (AC)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>CL</td>
<td>6-inch Aggregate Base (AB)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>CL</td>
<td>CLAY (CL) black with red nodules, stiff, wet</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>CL</td>
<td>LL = 38, PI = 23</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>CL</td>
<td>CLAY (CL) gray, stiff to very stiff, wet, with occasional sand/gravel</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>CL</td>
<td>4/1/10 (immediately after drilling)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>CL</td>
<td>CLAY with SAND and GRAVEL (CL) mottled brown/gray, very stiff, moist</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>CL</td>
<td>4/1/10 (during drilling) increased sand content, wet</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>CL</td>
<td>CLAY (CL) brown, very stiff, with occasional gravel</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>CL</td>
<td>CLAYEY GRAVEL with SAND (GC) brown, dense, wet</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>CL</td>
<td>SANDY CLAY with GRAVEL (CL) brown, hard, wet</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>CL</td>
<td>CLAY (CL) brown, very stiff, with occasional gravel</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>CL</td>
<td>CLAYEY SAND (SC) brown, medium stiff to stiff, wet</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>CL</td>
<td>SANDY CLAY (CL) brown, medium dense, wet</td>
<td></td>
</tr>
</tbody>
</table>

**LABORATORY TEST DATA**

<table>
<thead>
<tr>
<th>Sample</th>
<th>Type</th>
<th>Blows/6&quot;</th>
<th>SPT N-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CL</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>CL</td>
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<td>CL</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>CL</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>CL</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>CL</td>
<td>14</td>
<td></td>
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<td>7</td>
<td>CL</td>
<td>10</td>
<td></td>
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<tr>
<td>8</td>
<td>CL</td>
<td>14</td>
<td></td>
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<tr>
<td>9</td>
<td>CL</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>CL</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>CL</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

1. S&H blow counts converted to SPT N-Values using a factor of 0.6.
Log of Boring B-2

BERKELEY PUBLIC LIBRARY - SOUTH BRANCH
Berkeley, California

PROJECT:

Boring location: See Site Plan, Figure 2
Date started: 4/1/10
Date finished: 4/1/10
Drilling method: 8-inch O.D. Hollow-Stem Auger
Hammer weight/drop: 140 lbs./30 inches
Hammer type: Downhole
Sampler: Sprague & Henwood (S&H)

MATERIAL DESCRIPTION

<table>
<thead>
<tr>
<th>DEPTH (feet)</th>
<th>SAMPLES</th>
<th>MATERIAL DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>S&amp;H</td>
<td>CL</td>
</tr>
<tr>
<td>9</td>
<td>8 CL</td>
<td>CLAY (CL) black, stiff, dry to moist</td>
</tr>
<tr>
<td>7</td>
<td>CL</td>
<td>LL = 28, PL = 14</td>
</tr>
<tr>
<td>6</td>
<td>CL</td>
<td>gray/olive, stiff, moist</td>
</tr>
<tr>
<td></td>
<td>CL</td>
<td>LL = 41, PL = 28</td>
</tr>
<tr>
<td>4</td>
<td>S&amp;H</td>
<td>CLAY with GRAVEL (CL)</td>
</tr>
<tr>
<td>12</td>
<td>12 CL</td>
<td>mottled orange/gray, stiff to very stiff, moist</td>
</tr>
<tr>
<td>11</td>
<td>15</td>
<td>increased sand content</td>
</tr>
<tr>
<td>9</td>
<td>S&amp;H</td>
<td>4/1/10 (during drilling)</td>
</tr>
<tr>
<td>18</td>
<td>26 CL</td>
<td>SANDY CLAY with GRAVEL (CL)</td>
</tr>
<tr>
<td>14</td>
<td>24 CL</td>
<td>brown, very stiff, wet</td>
</tr>
<tr>
<td>12</td>
<td>15 SC</td>
<td>CLAYEY SAND with GRAVEL (SC)</td>
</tr>
<tr>
<td>11</td>
<td>S&amp;H SC</td>
<td>brown, medium dense, wet</td>
</tr>
<tr>
<td>8</td>
<td>8 SC</td>
<td>CLAY with GRAVEL (CL)</td>
</tr>
<tr>
<td>18</td>
<td>22 CL</td>
<td>olive/ brown/ black, very stiff, wet</td>
</tr>
<tr>
<td>7</td>
<td>22 CL</td>
<td>CLAY (CL) mottled olive/ brown, stiff, wet</td>
</tr>
<tr>
<td>6</td>
<td>PP</td>
<td>4/1/10 (20 minutes after drilling)</td>
</tr>
<tr>
<td>3</td>
<td>PP</td>
<td>increased sand content</td>
</tr>
<tr>
<td>2</td>
<td>CL</td>
<td>4/1/10 (during drilling)</td>
</tr>
<tr>
<td>9</td>
<td>S&amp;H</td>
<td>CLAY with GRAVEL (CL)</td>
</tr>
<tr>
<td>18</td>
<td>18 CL</td>
<td>brown, very stiff, wet</td>
</tr>
<tr>
<td>12</td>
<td>12 CL</td>
<td>CLAY with GRAVEL (CL)</td>
</tr>
<tr>
<td>18</td>
<td>18 CL</td>
<td>olive/ brown/ black, very stiff, wet</td>
</tr>
<tr>
<td>12</td>
<td>CL</td>
<td>CLAY (CL)</td>
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LABORATORY TEST DATA

<table>
<thead>
<tr>
<th>Sample</th>
<th>Type of Strength Test</th>
<th>Hammer weight/drop</th>
<th>Blows/6&quot;</th>
<th>SPT N-Value</th>
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<tbody>
<tr>
<td>1</td>
<td>PP</td>
<td>140 lbs./30 inches</td>
<td>3,250</td>
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</tr>
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<td>2</td>
<td>PP</td>
<td>2,000</td>
<td>2,000</td>
<td>19.7</td>
</tr>
<tr>
<td>3</td>
<td>UC</td>
<td>1,490</td>
<td>1,490</td>
<td>19.7</td>
</tr>
<tr>
<td>4</td>
<td>UC</td>
<td>2,250</td>
<td>2,250</td>
<td>19.7</td>
</tr>
<tr>
<td>5</td>
<td>PP</td>
<td>3,000</td>
<td>3,000</td>
<td>19.7</td>
</tr>
<tr>
<td>6</td>
<td>PP</td>
<td>4,250</td>
<td>4,250</td>
<td>19.7</td>
</tr>
<tr>
<td>7</td>
<td>PP</td>
<td>1,750</td>
<td>1,750</td>
<td>19.7</td>
</tr>
<tr>
<td>8</td>
<td>PP</td>
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<td>3,250</td>
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<td>9</td>
<td>PP</td>
<td>3,000</td>
<td>3,000</td>
<td>19.7</td>
</tr>
<tr>
<td>10</td>
<td>PP</td>
<td>2,250</td>
<td>2,250</td>
<td>19.7</td>
</tr>
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<td>11</td>
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<td>PP</td>
<td>4,250</td>
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<td>19.7</td>
</tr>
<tr>
<td>13</td>
<td>PP</td>
<td>1,750</td>
<td>1,750</td>
<td>19.7</td>
</tr>
<tr>
<td>14</td>
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<td>25</td>
<td>PP</td>
<td>2,250</td>
<td>2,250</td>
<td>19.7</td>
</tr>
<tr>
<td>26</td>
<td>PP</td>
<td>1,750</td>
<td>1,750</td>
<td>19.7</td>
</tr>
</tbody>
</table>

S&H blow counts converted to SPT N-Values using a factor of 0.6.

Boring terminated at a depth of 25 feet below ground surface.
Boring backfilled with cement grout.
Groundwater encountered at a depth of 6 feet during drilling.
### Unified Soil Classification System

<table>
<thead>
<tr>
<th>Major Divisions</th>
<th>Symbols</th>
<th>Typical Names</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gravels</strong> (More than half of coarse fraction &gt; no. 4 sieve size)</td>
<td>GW</td>
<td>Well-graded gravels or gravel-sand mixtures, little or no fines</td>
</tr>
<tr>
<td></td>
<td>GP</td>
<td>Poorly-graded gravels or gravel-sand mixtures, little or no fines</td>
</tr>
<tr>
<td></td>
<td>GM</td>
<td>Silty gravels, gravel-sand-silt mixtures</td>
</tr>
<tr>
<td></td>
<td>GC</td>
<td>Clayey gravels, gravel-sand-clay mixtures</td>
</tr>
<tr>
<td><strong>Sands</strong> (More than half of coarse fraction &lt; no. 4 sieve size)</td>
<td>SW</td>
<td>Well-graded sands or gravelly sands, little or no fines</td>
</tr>
<tr>
<td></td>
<td>SP</td>
<td>Poorly-graded sands or gravelly sands, little or no fines</td>
</tr>
<tr>
<td></td>
<td>SM</td>
<td>Silty sands, sand-silt mixtures</td>
</tr>
<tr>
<td></td>
<td>SC</td>
<td>Clayey sands, sand-clay mixtures</td>
</tr>
<tr>
<td><strong>Silt and Clays</strong> (LL = &lt; 50)</td>
<td>ML</td>
<td>Inorganic silts and clayey silts of low plasticity, sandy silts, gravelly silts</td>
</tr>
<tr>
<td></td>
<td>CL</td>
<td>Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays</td>
</tr>
<tr>
<td></td>
<td>OL</td>
<td>Organic silts and organic silt-clays of low plasticity</td>
</tr>
<tr>
<td></td>
<td>MH</td>
<td>Inorganic silts of high plasticity</td>
</tr>
<tr>
<td><strong>Silt and Clays</strong> (LL = &gt; 50)</td>
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<td>Inorganic clays of high plasticity, fat clays</td>
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<tr>
<td></td>
<td>OH</td>
<td>Organic silts and clays of high plasticity</td>
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<tr>
<td><strong>Highly Organic Soils</strong></td>
<td>PT</td>
<td>Peat and other highly organic soils</td>
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### Grain Size Chart

<table>
<thead>
<tr>
<th>Classification</th>
<th>Range of Grain Sizes</th>
<th>U.S. Standard Sieve Size</th>
<th>Grain Size in Millimeters</th>
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</thead>
<tbody>
<tr>
<td>Boulders</td>
<td>Above 12&quot;</td>
<td>Above 305</td>
<td></td>
</tr>
<tr>
<td>Cobble</td>
<td>12&quot; to 3&quot;</td>
<td>305 to 76.2</td>
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</tr>
<tr>
<td>Gravel coarse</td>
<td>3&quot; to No. 4</td>
<td>76.2 to 4.76</td>
<td>76.2 to 19.1</td>
</tr>
<tr>
<td>Gravel fine</td>
<td>3&quot; to 3/4&quot;</td>
<td>19.1 to 4.76</td>
<td></td>
</tr>
<tr>
<td>Sand coarse</td>
<td>No. 4 to No. 200</td>
<td>4.76 to 0.075</td>
<td></td>
</tr>
<tr>
<td>Sand medium</td>
<td>No. 4 to No. 10</td>
<td>4.76 to 2.00</td>
<td></td>
</tr>
<tr>
<td>Sand fine</td>
<td>No. 10 to No. 40</td>
<td>2.00 to 0.420</td>
<td></td>
</tr>
<tr>
<td>Silt and Clay</td>
<td>No. 40 to No. 200</td>
<td>0.420 to 0.075</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Below No. 200</td>
<td>Below 0.075</td>
<td></td>
</tr>
</tbody>
</table>

### Sample Designations/Symbols

- Sample taken with Sprague & Henwood split-barrel sampler with a 3.0-inch outside diameter and a 2.43-inch inside diameter. Darkened area indicates soil recovered.
- Classification sample taken with Standard Penetration Test sampler.
- Undisturbed sample taken with thin-walled tube.
- Disturbed sample.
- Sampling attempted with no recovery.
- Core sample.
- Analytical laboratory sample.
- Sample taken with Direct Push sampler.
- Sonic.

### Sampler Type

- Core barrel
- California split-barrel sampler with 2.5-inch outside diameter and a 1.93-inch inside diameter
- Dames & Moore piston sampler using 2.5-inch outside diameter, thin-walled tube
- Osterberg piston sampler using 3.0-inch outside diameter, thin-walled Shelby tube
- Pitcher tube sampler using 3.0-inch outside diameter, thin-walled Shelby tube
- Sprague & Henwood split-barrel sampler with a 3.0-inch outside diameter and a 2.43-inch inside diameter
- Standard Penetration Test (SPT) split-barrel sampler with a 2.0-inch outside diameter and a 1.5-inch inside diameter
- Shelby Tube (3.0-inch outside diameter, thin-walled tube) advanced with hydraulic pressure

### Classification Chart

Date 04/03/10  | Project No. 10-218  | Figure A-3
APPENDIX B

Laboratory Test Results
LIQUID AND PLASTIC LIMITS TEST REPORT

Location + Description | LL | PL | PI | -200 | ASTM D 2487-90
--- | --- | --- | --- | --- | ---
● B-1 @ 2': Brownish black sandy CLAY (CL) w/organics Wn=22% | 38 | 15 | 23 | | |
▲ B-2 @ 1': Brownish black organic CLAY (OL/CL) Wn=13% | 28 | 14 | 14 | | |
■ B-2 @ 4': Dark gray lean CLAY (CL) Wn=20% | 41 | 13 | 28 | | |

Project No.: 10-217
Project: BPL-South
Client: Rock Ridge Geotechnical
Location:
Date: 4-8-10
Remarks:
ASTM D 4318
Method B

Soil Mechanics Lab
### UNCONFINED COMPRESSION TEST

<table>
<thead>
<tr>
<th>Specimen No.</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unconfined strength, psf</td>
<td>4594</td>
</tr>
<tr>
<td>Undrained shear strength, psf</td>
<td>2297</td>
</tr>
<tr>
<td>Failure strain, %</td>
<td>4.2</td>
</tr>
<tr>
<td>Strain rate, in/min</td>
<td>0.0750</td>
</tr>
<tr>
<td>Water content, % (cuttings before test)</td>
<td>17.6</td>
</tr>
<tr>
<td>Wet density, pcf</td>
<td>132.4</td>
</tr>
<tr>
<td>Dry density, pcf</td>
<td>112.7</td>
</tr>
<tr>
<td>Saturation, %</td>
<td>95.6</td>
</tr>
<tr>
<td>Void ratio</td>
<td>0.4962</td>
</tr>
<tr>
<td>Specimen diameter, in</td>
<td>2.42</td>
</tr>
<tr>
<td>Specimen height, in</td>
<td>4.73</td>
</tr>
<tr>
<td>Height/diameter ratio</td>
<td>1.96</td>
</tr>
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1) Description: Very stiff, dk. gray FAT CLAY(CH) Trace sand.
2) Description: 
3) Description: 
4) Description: 

<table>
<thead>
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<th>Project No.</th>
<th>10-217</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>4-8-10</td>
</tr>
<tr>
<td>Remarks</td>
<td></td>
</tr>
</tbody>
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**Client:** Rockridge Geotechnical

**Project:** BPL-South

**Location:** B-1 Sa.4 4.5'

---

**UNCONFINED COMPRESSION TEST**

**Soil Mechanics Lab**
UNCONFINED COMPRESSION TEST

<table>
<thead>
<tr>
<th>Specimen No.</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unconfined strength, psf</td>
<td>2978</td>
<td>4898</td>
</tr>
<tr>
<td>Undrained shear strength, psf</td>
<td>1489</td>
<td>2449</td>
</tr>
<tr>
<td>Failure strain, %</td>
<td>9.4</td>
<td>6.4</td>
</tr>
<tr>
<td>Strain rate, in/min</td>
<td>0.0750</td>
<td>0.0750</td>
</tr>
<tr>
<td>Water content, % (cuttings before test)</td>
<td>19.7</td>
<td>19.1</td>
</tr>
<tr>
<td>Wet density,pcf</td>
<td>125.9</td>
<td>131.9</td>
</tr>
<tr>
<td>Dry density,pcf</td>
<td>105.2</td>
<td>110.7</td>
</tr>
<tr>
<td>Saturation,%</td>
<td>88.2</td>
<td>98.9</td>
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<tr>
<td>Void ratio</td>
<td>0.6016</td>
<td>0.5221</td>
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<tr>
<td>Specimen diameter, in</td>
<td>2.42</td>
<td>2.42</td>
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<tr>
<td>Specimen height, in</td>
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<td>Height/diameter ratio</td>
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<td>1.95</td>
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</tbody>
</table>

1) Description: #1/Sa.3 @ 4':Very stiff,dk.gray lean CLAY(CL)
2) Description: #2/Sa.2 @ 5.5':V.stiff,dk. gray sandy CLAY(CL)
3) Description: 
4) Description:

GS= 2.7 Type: MC

Client: Rockridge Geotechnical
Project: BPL-South
Location: B-2

Soil Mechanics Lab
## Corrosivity Test Summary

**CTL #** 662-013  
**Date:** 4/8/2010  
**Tested By:** PJ  
**Checked:** PJ  
**Client:** Rockridge Geotechnical  
**Project:** Berkeley Public Library - South  
**Remarks:**

<table>
<thead>
<tr>
<th>Sample Location or ID</th>
<th>Resistivity @ 15.5 °C (Ohm-cm)</th>
<th>Chloride</th>
<th>Sulfate-(water soluble)</th>
<th>pH</th>
<th>ORP (Redox)</th>
<th>Sulfide Qualitative</th>
<th>Moisture % At Test</th>
<th>Soil Visual Description</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Boring</td>
<td>As Rec.</td>
<td>Minimum</td>
<td>Saturated</td>
<td>mg/kg</td>
<td>mg/kg</td>
<td>%</td>
<td>mv</td>
</tr>
<tr>
<td>B1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>875</td>
<td>31</td>
<td>113</td>
<td>0.0113</td>
<td>7.5</td>
</tr>
</tbody>
</table>

**Remarks:** Chloride pH ORP Sulfide Moisture

- Bi
- Sl
- N
- Dt
- ft
- AR
- Mi
- i
- Sl
- V i
- D it
- i
- /k
- /k
- %
APPENDIX C
Logs of Previous Test Borings by Others
FIG. 1 - SITE PLAN
SCALE: 1" = 20'
BERKELEY PUBLIC LIBRARY
SOUTH BRANCH
FIG. 2 - LOG OF BORINGS
FIG. 3 - Logs of Borings
April 27, 2010
Project No. 1571.002

Berkeley Public Library
2031 Bancroft Way
Berkeley, California 94704

Attention: Mr. Dennis Dang

Subject: Geotechnical Study Update, West Branch Library, 1125 University Avenue, Berkeley, California

Dear Mr. Dang:

In accordance with your request, Fugro West, Inc. (Fugro) is pleased to present this geotechnical study update for the proposed West Branch Library Project, located at 1125 University Avenue in Berkeley, California. We previously performed a geotechnical investigation for the proposed library improvements project, the results of which were presented in our report titled, “Geologic Exploration, Berkeley Public Library – West Branch Improvements, Berkeley, California” dated June 16, 2003. The 2003 report is attached with this letter.

The purpose of our work was to review the details of the currently proposed project, the current site conditions, and the previous geotechnical investigation report to determine the applicability of the previous study to the currently proposed project, and to update recommendations presented in the report as appropriate to the presently proposed project. Our scope of work included the following tasks:

- Review documents pertaining to the project and site vicinity in our files, including the previous geotechnical investigation report;
- Perform a reconnaissance of the project site to view current site conditions;
- Evaluate the applicability of the previous report and the geotechnical recommendations presented in those reports to the currently proposed project, and develop revised or supplemental geotechnical recommendations for the currently proposed project, as appropriate;
- Prepare this update letter report.
CURRENT PROJECT DETAILS

Based on our review of the preliminary project plans furnished to us, we understand that the project will consist of constructing a new single-story library building at the referenced site in Berkeley. The proposed library building is expected to cover a majority of the property. No new parking area is planned for the project. The relatively flat site is currently occupied by the existing library, consisting of the original 1923 building and a newer addition, which will both be demolished prior to construction of the new building.

CURRENT SITE CONDITIONS

Surface Conditions

We performed a reconnaissance of the library site on March 24, 2010 to observe the current conditions. Based on our observations, the library site is in a similar condition as observed during our previous study performed in 2003. The existing single-story library building is situated east of San Pablo Avenue and just north of University Avenue. The project site is approximately 100 feet by 120 feet in size. The existing structure covers a majority of the site, except that a concrete driveway and a small parking area are located along the west side of the building; an access ramp is located at the southeast corner of the site; and small landscape areas are located at the northeast and northwest corners of the site. The relatively flat site is approximately 2 to 4 feet above the street level of University Avenue. A concrete retaining wall is located along the western edge of the project parcel. The surrounding topography slopes gently downward toward the west.

Subsurface Conditions

Based on our previous studies, the subsurface conditions where explored generally consisted of very stiff to hard clay of moderate plasticity overlying medium dense to dense sands. Groundwater was encountered in the previous borings at depth of about 18 feet.

CONCLUSIONS

Based on our review of the currently proposed project, it is our opinion that the geotechnical conclusions and recommendations presented in the June 16, 2003 geotechnical report are applicable to the project, as currently proposed, with supplemental or revised geotechnical recommendations presented herein pertaining to new seismic design criteria, alternative structural mat foundation, floor slab moisture protection considerations, and more project-specific recommendations for site grading.
Liquefaction and Dynamic Densification

Settlement can occur as a result of seismic ground shaking due to liquefaction or densification of the subsurface soils. In both liquefaction and densification, ground shaking causes predominantly granular soils to become more compact, therefore occupying less volume and resulting in settlement. Soils most susceptible to liquefaction and densification are loose to medium dense, clean, poorly graded, fine-grained sands. Liquefaction can occur where soils are saturated (submerged) is accompanied by a temporary loss of strength (i.e., the soil “liquefies”). Densification can occur where the soils are unsaturated.

According to the State of California Seismic Hazard Zones Map for Oakland West 7.5-Minute Quadrangle (CGS, 2003), the project site is not located in a designated liquefaction hazard evaluation zone. Based on our previous subsurface exploration in 2003, we generally encountered stiff to hard clay overlying medium dense to dense clayey sand at the project site. To evaluate the potential for earthquake-induced liquefaction of the onsite subsurface soils, we performed a liquefaction analysis of the subsurface data from our previous Boring B-2 based on Tokimatsu and Seed (1987) and Youd and Idriss (2001). Based on our analysis, the medium dense clayey sand layer in Boring B-2 is NOT likely to be susceptible to liquefaction, due to sufficiently high blow count resistance and fines content. Since no sand layer was encountered in the shallower Boring B-1, in our opinion, the likelihood of significant damage to the proposed building due to liquefaction or dynamic densification occurring at the site is very low to negligible.

SUPPLEMENTAL RECOMMENDATIONS

Seismic Design

The proposed improvements should be designed to resist the lateral forces generated by earthquake shaking in accordance with local design practice. This section presents seismic design criteria for use with the 2007 California Building Code (CBC).

The site seismic design criteria were determined based on the site latitude and longitude using the public domain computer software (NSHMP_HazardApp.jar). Based on the subsurface conditions encountered at the site and the “Site Class Definitions” per the 2007 CBC, we judge that Site Class “D” (stiff soil profile) should be assumed for design. If the project is to be designed in accordance with the 2007 CBC, the following design parameters should be used.

Based on the seismic design parameters and per 2007 CBC §1613.5.6A, structures of Occupancy Categories I, II, III and IV should be designed according to Seismic Design Category “D”.
Table 1. Seismic Design Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>ASCE 7-05 TABLE/FIGURE</th>
<th>FACTOR/COEFFICIENT</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-Period MCE at 0.2s</td>
<td>Figure 22-3</td>
<td>$S_s$</td>
<td>1.75g</td>
</tr>
<tr>
<td>1.0s Period MCE</td>
<td>Figure 22-4</td>
<td>$S_1$</td>
<td>0.65g</td>
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<tr>
<td>Soil Profile Type</td>
<td>Table 20.3-1</td>
<td>Site Class</td>
<td>D</td>
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<tr>
<td>Site Coefficient</td>
<td>Table 11.4-1</td>
<td>$F_a$</td>
<td>1.00</td>
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<tr>
<td>Site Coefficient</td>
<td>Table 11.4-2</td>
<td>$F_v$</td>
<td>1.50</td>
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<tr>
<td>Adjusted MC Spectral Response Parameters</td>
<td>Equation 11.4-1</td>
<td>$S_{MS}$</td>
<td>1.75</td>
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<tr>
<td></td>
<td>Equation 11.4-2</td>
<td>$S_{M1}$</td>
<td>0.97</td>
</tr>
<tr>
<td>Design Spectral Acceleration Parameters</td>
<td>Equation 11.4-3</td>
<td>$S_{DS}$</td>
<td>1.17</td>
</tr>
<tr>
<td></td>
<td>Equation 11.4-4</td>
<td>$S_{D1}$</td>
<td>0.65</td>
</tr>
</tbody>
</table>

Mat Foundation

As an alternative to spread footing and drilled pier foundations, the proposed library may be supported on a mat foundation bearing on properly compacted subgrade consisting of competent native soils or engineered fill. Fugro recommends using the maximum allowable bearing pressures presented below:

Table 2. Allowable Bearing Pressures for Mat Foundation

<table>
<thead>
<tr>
<th>Load Condition</th>
<th>Allowable Bearing Pressure (psf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dead Load</td>
<td>500</td>
</tr>
<tr>
<td>Dead plus Live Loads</td>
<td>750</td>
</tr>
<tr>
<td>Total Loads (including wind or seismic)</td>
<td>1,000</td>
</tr>
</tbody>
</table>

We recommend that a modulus of subgrade reaction of 100 pounds per cubic inch (pci) be assumed for the design of the mat foundation that will be supported on properly compacted native subgrade soil. This value is based on a 1-foot-square bearing area and needs to be scaled to account for mat foundation size effects. In addition, an effective plasticity index of 22 may be used for design. Lateral resistance for the mat foundation may be calculated based on friction and passive pressure values presented in Section 6.5 of our 2003 report. Lateral resistance may be derived from passive pressure acting on the edges of the mat, provided the foundation is poured neat against undisturbed material.

We understand that the finished floor elevation of the proposed library building will be up to about 4 feet above the existing grade of the adjacent property along the west side of the project site, and a deepened edge of up to about 6 feet below the finished floor elevation, serving as a retaining wall, will be constructed along the west edge of the new mat foundation. In our opinion, in order to reduce the potential of differential settlement and seasonal movement...
of the onsite expansive soil across the proposed building, we recommend that a thickened edge extending to a minimum depth of 36 inches below the finished floor or lowest adjacent grade, whichever is deeper, be constructed around the entire mat foundation.

Based on these aforementioned allowable bearing pressures, we anticipate that differential movement of the proposed structure supported on a mat foundation will be on the order of 1/2 inch or less.

Where migration of moisture through the floor slab is undesirable, and additional measures to reduce the potential for damage to moisture-sensitive floor coverings are desired, a moisture retarder system may be considered for use between the slab and subgrade, as described in the following section - *Interior Slabs-on-Grade or Structurally Supported Slabs*.

**Interior Slabs-on-Grade or Structurally Supported Slabs**

We recommend that interior slabs-on-grade be supported on a minimum 18-inch thickness of non-expansive, engineered fill. However, structurally supported slabs (i.e., a mat foundation) may be supported on properly compacted native subgrade soil. Slab reinforcing should be provided in accordance with the anticipated use and loading of the slab. Slab-on-grade subgrade surfaces should be proof-rolled to provide a smooth, unyielding surface for slab support.

Near-surface groundwater was not encountered during our field investigation. However, if migration of moisture through the floor slab is undesirable, and additional measures to reduce the potential for damage to moisture-sensitive floor coverings are still desired, a moisture retarder system may be considered for use between the slab and subgrade. Such a system could consist of 4 inches of free-draining gravel, such as 3/4-inch, clean, crushed, uniformly graded gravel with less than 3 percent passing No. 200 sieve, or equivalent, overlain by a relatively impermeable vapor retarder placed between the subgrade soil and the slab. The vapor retarder should be at least 10-mil thick and should conform to the requirements for ASTM E 1745 Class A, B, or C Underslab Vapor Retarders. If additional protection is desired by the owner, a higher quality vapor barrier conforming to the requirements of ASTM E 1745 Class A, with a water vapor transmission rate less than or equal to 0.006 gr/ft²/hr (i.e., .012 perms) per ASTM E 96 (e.g., 15-mil thick “Stego Wrap Class A”) may be used in place of the retarder. The gravel layer can be considered to be part of the recommended non-expansive fill layer.

During construction, all penetrations (e.g., pipes and conduits,) overlap seams, and punctures should be completely sealed using a waterproof tape or mastic applied in accordance with the vapor retarder manufacturer’s specifications. The vapor retarder or barrier should extend to the perimeter cutoff beam or footing. The vapor retarder or barrier should be placed directly under the slab, or at the structural engineer’s option, the retarder may be covered with 2 inches of sand. Sand, if used, should be lightly moistened just prior to placing the concrete.
SITE PREPARATION AND GRADING

Earthwork construction, including site and subgrade preparation, engineering fill placement and compaction, and surface drainage should be performed in accordance with our June 16, 2003 report. Subgrade preparation for the proposed mat foundation and trench backfill should be constructed as recommended in the section below.

Subgrade Preparation for Mat Foundation

Following excavation to the required grades and removal of the existing structures, native clayey soil subgrades should be scarified to a depth of at least 6 inches, moisture conditioned to at least 3 percent above optimum, and compacted to 88 to 92 percent relative compaction. The compacted surface should be firm and unyielding and should be protected from damage caused by traffic or weather. Soil subgrades should be kept moist during construction. If the subgrade is allowed to become dry, it should be moisture conditioned to eliminate shrinkage cracks. If import material is required to construct portions of the mat subgrade, such material should be compacted to a minimum 90 percent relative compaction.

In order to achieve satisfactory compaction of the subgrade and fill materials, it may be necessary to adjust the water content at the time of construction. This may require that water be added to soils that are too dry, or that scarification and aeration be performed in any soils that are too wet.

If earthwork is performed during or shortly after wet weather conditions, and within or near the existing landscape areas, after site stripping, some exposed subgrade materials may be above their optimum moisture content, and could be unstable. If unstable subgrade soils are encountered during construction and the construction schedule will not allow proper moisture conditioning and compaction of the subgrade soil, the building pad should be uniformly overexcavated to competent soils (i.e., excavate to a similar depth across the entire building pad to reduce the potential of differential settlement/movement) or to a minimum of 18 inches below finished subgrade elevation where competent soils are not encountered. The bottom of the excavation should then be completely covered with a ground stabilization geotextile fabric such as Mirafi 500X, or equivalent, and typically backfilled with Class 2 aggregate base.

The subgrade stabilization procedure presented above is preliminary, and for cost estimating only. The geotechnical engineer should develop final detailed stabilization recommendations when the actual subgrade materials are exposed during construction. Alternative stabilization methods such as lime treatment could also be considered at the time of construction.

Trench Backfill

Pipeline trenches should be backfilled with materials satisfying the criteria described above for fill, placed in lifts of approximately 8 inches in pre-compacted thickness. However, thicker lifts may be used provided the method of compaction is approved by the project geotechnical engineer and the required minimum degree of compaction is achieved. Onsite
clayey soil used for trench backfill should be compacted to 88 to 92 percent relative compaction, and imported non-expansive fill materials should be compacted to at least 90 percent relative compaction by mechanical means only (jetting should not be permitted). The upper 3 feet of on-site trench backfill in slab and pavement areas should be compacted to at least 95 percent relative compaction. Sand can be used for trench backfill if it is compacted to at least 95 percent relative compaction and sufficient water is added during backfilling operations to prevent the soil from “bulking” during compaction.

Where utility trenches backfilled with sand enter the building pad, the trenches should be backfilled by an impermeable plug at the exterior wall foundation. The plugs can be composed of compacted clayey soil, compacted bentonite, or a bentonite-cement or sand-cement slurry mixture. The plugs should be at least 2 feet thick and should ideally extend at least 2 feet beyond the edges and bottom of the trench to ‘key in’ the plug. The plug should also extend to within 1 foot of the lowest adjacent grade.

All utility trenches that extend below curbs and gutters should also be plugged as described above. The plug should be located below the curb and gutter.

**CLOSING**

The above recommendations presented in this letter are meant to supplement and revise as applicable the recommendations presented in Fugro’s June 16, 2003 report, and were made in accordance with generally accepted local and current (i.e., at the date of this letter) geotechnical engineering principles and practices. Due to the limited access onsite for exploration equipment, none of the previous borings were performed in the eastern portion of the project site. Therefore, we recommend that during construction, the Geotechnical Engineer of Record (GEOR) confirm that the subsurface conditions encountered in the foundation excavations are consistent with soils capable of providing the supporting capacities assumed in this letter for project design.

Should you have any questions or require additional information, please contact us.

Sincerely,

FUGRO WEST, INC.

Coleman K. Ng, P.E.  
Project Engineer

Corey T. Dare, P.E., G.E.  
Principal Engineer

CN/CTD

Copies Submitted:  (4 + PDF) Addressee
June 16, 2003  
Project No. 1571.001  

Berkeley Public Library  
2090 Kittredge Street  
Berkeley, California 94704  

Attention:  Ms. Elena Engel  

Subject:  Geotechnical Exploration  
Berkeley Public Library – West Branch Improvements  
Berkeley, California  

Dear Ms. Engel:  

Fugro is pleased to present this report summarizing the results of our geotechnical exploration services for the proposed Berkeley Public Library – West Branch, located in Berkeley, California. The accompanying report presents the results of our field exploration and engineering analyses. The soil and foundation conditions are discussed and recommendations for the soil and foundation engineering aspects of the project are presented.  

We appreciate this opportunity to be of continued service to the Berkeley Public Library. Please call if you have any questions regarding the information presented in this report.  

Sincerely,  

FUGRO WEST, INC.  

Rune Storesund, P.E.  
Staff Engineer  

Robin Bartlett, P.E., G.E.  
Associate Engineer  

RS/RNB:kel  
Copies Submitted:  (5) Addressee  

A member of the Fugro group of companies with offices throughout the world.
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## APPENDICES

**APPENDIX A**  
FIELD EXPLORATION

- Plate A-1, Unified Soil Classification System/Key to Test Data and Symbols
- Boring Logs B-1 and B-2

**APPENDIX B**  
LABORATORY TESTING PROGRAM
1.0 INTRODUCTION

This report presents the results of a geotechnical exploration conducted by Fugro West, Inc. (Fugro) for the proposed Berkeley Public Library – West Branch Improvements to be located at 1125 University Avenue in Berkeley, California as shown on the Vicinity Map, Plate 1. The purpose of our work was to explore the subsurface conditions and provide recommendations for the geotechnical aspects of the project. Information for the project was obtained from Ms. Elena Engel of the Berkeley Public Library and Ms. Nellie Ingraham of Ingraham DeJesse, the project structural engineers.

1.1 PROJECT DESCRIPTION

We are informed that the Berkeley Public Library – West Branch will be partially demolished and reconstructed. The existing library is a single story structure that has maximum plan dimensions of approximately 180 feet by 210 feet. A concrete driveway is located along the western side of the existing structure. Landscaped areas are located around the perimeter of the building. A patio area and a small stand of trees are situated in the northwest corner of the parcel. The finished floor of the existing library is about 4 feet above the adjacent sidewalk grade along University Avenue.

The new library will be a single story adjacent to University Avenue and a two-story structure to the rear of the property. The footprint of the new structure is anticipated to be approximately 10,500 square feet. A portion of the existing structure will be moved and placed on new foundations and will be incorporated into the renovated structure. The finished floor will be near the existing sidewalk grade. The structure will be relatively heavy for its size and will likely incorporate a steel braced frame. Drilled pier foundation elements may be required to resist uplift forces from the frame. The building will likely also incorporate retaining walls which will be integral with the structure walls.

1.2 SCOPE OF SERVICES

The scope of our geotechnical services, as outlined in our proposal dated April 28, 2003, consisted of conducting a geotechnical exploration at the site by drilling two soil test borings, geotechnical laboratory tests, engineering analyses to develop recommendations regarding the geotechnical aspects of the project; and preparing a report summarizing our findings and conclusions.

2.0 FIELD EXPLORATION AND LABORATORY TESTING

The field exploration was conducted on May 20, 2003, and consisted of drilling two soil test borings using a CME 75 truck mounted drill rig. The soil test borings, designated as B-1 and B-2, extended to depths of approximately 21½ and 31½ feet, respectively. The approximate locations of the test borings are indicated on the Site Plan, Plate 2. Logs of the test borings and details regarding the field exploration program are included in Appendix A.
results of the laboratory tests are discussed in Appendix B. The subsurface conditions encountered during the exploration are summarized in Section 4.

3.0 GEOLOGIC SETTING

3.1 REGIONAL GEOLOGY

The site is located in the Coast Ranges geomorphic province, which is characterized by northwest-southeast trending valleys and ridges. These are controlled by folds and faults that resulted from the collision of the Pacific and North American plates and subsequent strike-slip faulting along the San Andreas fault zone. Bedrock underlying the region is primarily of the Franciscan Complex, which is characterized by a diverse assemblage of sandstone, shale, chert, greenstone, and melange.

Geologic formations in the San Francisco Bay Region range in age from Jurassic to Recent Holocene. The Franciscan Complex is the oldest, and underlies younger surficial deposits throughout San Francisco. The Franciscan Complex consists mainly of marine-deposited sedimentary and volcanic rocks in close association with bodies of serpentine. Following deposition, the Franciscan rocks were regionally uplifted and, in the process, extensively faulted and folded.

The Bay Area also experienced uplift and faulting in several episodes during late Tertiary time (about 25 to 2 million years ago). This produced a series of northwest-trending valleys and mountain ranges, including the Berkeley Hills, the San Francisco Peninsula, and the intervening San Francisco Bay. Uplifted areas were eroded and as a result, Pleistocene and recent marine sediments were deposited in the San Francisco Bay, and stream and marshland sediments were deposited in low-lying areas adjacent to the Bay.

3.2 REGIONAL SEISMICITY

The project site is located in the San Francisco Bay Area, which is considered one of the most seismically active regions in the United States. Significant earthquakes have occurred in the San Francisco Bay Area and are believed to be associated with crustal movements along a system of subparallel fault zones that generally trend in a northwesterly direction.

In 1999, the Working Group on California Earthquake Probabilities (WG99), in conjunction with the United States Geological Survey (USGS), published an updated report evaluating the probabilities of significant earthquakes occurring in the Bay Area over the next three decades. WG99 finds that there is a 70 percent probability that at least one magnitude 6.7 or greater earthquake will occur in the San Francisco Bay region before 2030. This probability is an aggregate value that considers seven principal Bay Area fault systems and unknown faults (background values). The San Francisco Bay region continues to be seismically active. The principal active faults in the Bay Area include the San Andreas, Hayward, Calaveras, and the San Gregorio faults. Earthquakes occurring along these faults are capable of generating strong ground shaking at the project site.
The approximate distance of the site from known mapped faults\(^1\) is summarized in Table 1. The project site is not located within an Alquist-Priolo Earthquake Fault Zone.

<table>
<thead>
<tr>
<th>Fault</th>
<th>Approximate Distance from Site</th>
<th>Direction from Site</th>
<th>Maximum Moment Magnitude</th>
<th>Fault Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hayward</td>
<td>2.8 km (1.7 mi)</td>
<td>Northeast</td>
<td>7.1</td>
<td>A</td>
</tr>
<tr>
<td>Calaveras (north segment)</td>
<td>13.9 km (13.9 mi)</td>
<td>Southeast</td>
<td>6.8</td>
<td>B</td>
</tr>
<tr>
<td>Rodgers Creek</td>
<td>24.8 km (15.4 mi)</td>
<td>North-northwest</td>
<td>7</td>
<td>A</td>
</tr>
<tr>
<td>Concord – Green Valley</td>
<td>25.1 km (15.6 mi)</td>
<td>Northeast</td>
<td>6.9</td>
<td>B</td>
</tr>
<tr>
<td>San Andreas (peninsula segment)</td>
<td>26.8 km (16.7 mi)</td>
<td>Southwest</td>
<td>7.9</td>
<td>A</td>
</tr>
</tbody>
</table>

4.0 SITE CONDITIONS

4.1 SURFACE CONDITIONS

The existing one-story Berkeley Public Library – West Branch building is situated east of San Pablo Avenue and just north of University Avenue. The project parcel is approximately 210 feet by 240 feet. The existing structure is situated toward the northeast corner of the project parcel and measures approximately 215 feet by 160 feet. The site grade is approximately 4 feet above the University Avenue sidewalk to the west and 2 feet to the east. A concrete retaining wall is located along the western edge of the project parcel. The surrounding topography slopes gently downwards towards the west. A small stand of trees and a patio area are located in the northwest corner of the site. The remainder of the site contains miscellaneous small concrete planter boxes, open paved space for parking, and minor landscaping.

4.2 SITE GEOLOGY

The site is located in near downtown Berkeley, California, within the Northern California Coast Ranges Geomorphic Province. The regional geology is characterized by northwest trending valleys and mountain ranges, and northwest striking faults. Graymer\(^2\) has mapped the vicinity as being underlain by Alluvial Fan and Fluvial Deposits (Qhaf).

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\(^{1}\) According to the Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada, prepared by California Department of Conservation, Division of Mines and Geology (1998).

\(^{2}\) Maximum Moment Magnitude and Fault Type are based on 1997 UBC designations.

4.3 SUBSURFACE CONDITIONS

4.3.1 Soil Conditions

The subsurface conditions encountered during our exploration are depicted on the boring logs presented in Appendix A and are summarized briefly below. Our subsurface exploration consisted of drilling a total of two test borings, designated as B-1 and B-2. Both borings were drilled in concrete parking and driveway areas. The pavement section consisted generally of 4 inches concrete over 4 inches aggregate base (AB).

The soils encountered beneath the concrete pavement consisted of about one to two feet of fill overlying very stiff to hard clay that extends to a depth of about 17 to 18 feet in both the borings. The results of Atterberg limits determinations conducted on soils within the upper 5 feet indicate a Plasticity Index (PI) between 21 and 22, suggesting that these soils are moderately expansive\(^4\). Interlayered medium dense to dense clayey sand and stiff clay was observed in both borings from about a depth of about 17 to 18 feet to the maximum depth explored (31\(\frac{1}{2}\) feet).

Detailed descriptions of the soils encountered in the test borings are presented on the boring logs in Appendix A. The boring logs and related information depict location-specific subsurface conditions encountered during our field exploration program. The approximate locations of the test borings were determined by pacing and should be considered accurate only to the degree implied by the method used. The passage of time can result in changes in the subsurface conditions reported.

4.3.2 Groundwater

Groundwater was initially observed in both test borings during drilling at approximately 20 feet below ground surface. The holes remained open for approximately 1.5 to 2.5 hours when the depth to groundwater was re-measured at which time it was observed at a depth of about 18 feet below ground surface.

All borings were backfilled with cement grout on the same day of drilling completion; therefore borings may not have been left open for a sufficient period of time to establish equilibrium groundwater conditions. Fluctuations in the groundwater level should be anticipated due to seasonal variations and other factors.

5.0 DISCUSSION AND CONCLUSIONS

We conclude that the proposed development is feasible from a geotechnical standpoint, provided that the conclusions and recommendations presented in this report are incorporated into the project design and specifications. The principal geotechnical considerations regarding the project are discussed in the following sections:

---

\(^4\) Expansive soils have the potential to shrink and swell with changes in moisture content.
5.1 SEISMICITY

The site is located in a seismically active region of California. Significant earthquakes in the Bay Area have been associated with movements along well-defined fault zones. Earthquakes occurring along the Hayward Fault or any of a number of other Bay Area faults have the potential to produce strong ground shaking at the site. For this reason, the structures should be designed to resist lateral and uplift forces generated by earthquake shaking, in accordance with local design practice.

Settlement can occur as a result of seismic ground shaking due to liquefaction or densification of the subsurface soils. In both liquefaction and densification, ground shaking causes predominantly granular soils to become more compact, therefore occupying less volume and resulting in settlement. Soils most susceptible to liquefaction and densification are loose, clean, poorly graded, fine-grained sands. Liquefaction can occur where these soils are saturated (submerged), and is accompanied by a temporary loss of strength (i.e., the soil “liquefies”). Densification can occur where the soils are unsaturated.

The soils encountered during our exploration consist predominantly of lean clay or medium dense to dense clayey sand and have sufficient cohesion and/or density to not be prone to liquefaction. Other geologic hazards such as slope instability, slumping, or fault rupture are considered to be unlikely at this site due to the relatively flat terrain and the distance from a known active fault.

5.2 EXPANSIVE SOILS AND FOUNDATION SUPPORT

The results of Atterberg limits determinations indicate the near-surface soils to be moderately expansive. Expansive soils have the potential to shrink and swell in response to changes in moisture content and can damage structures, slabs-on-grade and other surface improvements unless properly mitigated. Methods commonly used to mitigate the effect of expansive soils typically involve altering the soil to reduce its expansion potential (lime treatment\(^5\)), supporting structures below the depth of seasonal moisture change (deepened foundations) and removing and replacing near-surface soils with compacted fill having a lower expansion potential (remove and replace). A number of edge treatment details are also commonly used to limit moisture changes and mitigate expansive soil effects at the perimeter of building, pavement and slab-on-grade areas. The geotechnical recommendations presented in Section 5 of this report include deepened footings, removal and replacement of near surface soils beneath exterior slabs-on-grade and edge treatment details judged appropriate for the mitigation of moderately expansive near surface soils.

Based on the results of our investigation, we judge that the proposed building can be supported on a deepened spread footing foundation system. We estimate that the long-term total and differential static settlement of spread footing foundations constructed as recommended in this report should be less than about $\frac{3}{4}$-inch and $\frac{1}{2}$-inch, respectively.

\(^5\) Lime treatment is generally considered a construction expedient and not appropriate for the long-term mitigation of expansive soil effects, particularly beneath structures.
5.3 DRILLED PIERS

We understand that the proposed structure will likely include a steel braced frame and may have relatively high uplift loads. These loads may be resisted by drilled pier foundations. Drilled piers may extend below the water table and may penetrate layers of relatively cohesionless soil. The contractor should anticipate caving problems and be prepared to address them during construction. Where water accumulates in the bottom of the pier excavations the water should be pumped from the hole prior to placement of concrete and the concrete should be placed by the tremie method. Concrete should be placed as soon as practical after pier drilling to reduce potential caving problems. The bottoms of the pier shafts should be clean and free of sluff and debris. The contractor should review the boring logs prior to establishing a method of drilling the piers. The drilling method should be reviewed by the geotechnical engineer prior to the beginning of construction. Design recommendations for the driller piers are presented in Section 6 of this report.

5.4 EARTHWORK CONSIDERATIONS

Site grades will be lowered and excavations will be required to construct deepened spread footings, install utilities and to remove surficial expansive and/or locally weak or unsuitable soils. Where excavation cuts are planned adjacent to existing buildings, sidewalks, pavements and utilities, shoring and/or underpinning may be required. All excavations that will be deeper than 5 feet and will be entered by workers should be shored or sloped for safety in accordance with Occupational Safety and Health Administration (OSHA) standards.

In general, the need for temporary shoring or underpinning should be evaluated if excavation cuts extend below an imaginary plane projecting downward at 45 degrees (1:1, horizontal to vertical) from adjacent building foundations. It will likely be necessary to further assess shoring/underpinning requirements for the existing building at the east property line once more details regarding the design and location are known.

Dewatering may be required in deep excavations at the site depending upon groundwater conditions encountered during construction, precipitation and runoff. Although groundwater was encountered below the planned depth of excavation in test borings, the contractor should anticipate that localized site dewatering may be required. We anticipate that, should dewatering be required, it will likely involve pumping from sumps or other low points within the excavation.

The design, installation and maintenance of temporary shoring, underpinning and dewatering systems is generally considered to be the responsibility of the contractor. Fugro should review submittals from the contractor regarding site shoring, underpinning and dewatering prior to their installation.

If earthwork is performed during the dry season, care should be taken during construction to prevent the moderately expansive soils from becoming dry. If the surface soils are dry they will require moisture conditioning. If earthwork is performed during or shortly after wet weather conditions, the moisture content of the onsite soils could be appreciably above
optimum. Consequently, subgrade preparation and fill placement may be difficult. Additional recommendations for wet weather construction can be provided at the time of construction, if required.

6.0 RECOMMENDATIONS

6.1 SEISMIC DESIGN

The structures should be designed to resist the lateral forces generated by earthquake shaking in accordance with local design practice. This section presents seismic design criteria for use with the 1997 UBC.

As defined in the 1997 UBC, we judge the following criteria to be appropriate for the site:

- Seismic Zone Factor \( Z = 0.4 \)
- Near Source Factor \( N_s = 1.4 \)
- Seismic Coefficient \( C_a = 0.44 \) \( N_a = 0.62 \)
- Near Source Factor \( N_s = 1.9 \)
- Seismic Coefficient \( C_s = 0.64 \) \( N_s = 1.21 \)

The near source factors \( N_s \) and \( N_s \) are greater than unity as a result of the site's proximity to a Type A fault (the Hayward Fault). The near source factors \( N_s \) and \( N_s \) are equal to unity at distances greater than or equal to 10 kilometers and 15 kilometers, respectively, from a Type A fault.

6.2 GENERAL EARTHWORK

6.2.1 Clearing and Site Preparation

Prior to grading, the areas of proposed construction should be cleared. Existing surface improvements such as pavements, concrete slabs, and landscaping should be demolished and removed from the site. Near surface soils containing organic materials should be stripped. Materials that have been cleared and stripped from the site are not suitable for re-use as fill and should be removed.

Existing underground utilities should be identified and properly abandoned or relocated. Existing trees within the areas of proposed construction should be removed and grubbed to the depth necessary to remove stumps and roots. Holes resulting from the removal of underground utilities, tree roots, old foundations or other below-grade improvements should be excavated to competent soil and backfilled with properly compacted fill under the observation of the geotechnical engineer.

6.2.2 Subgrade Preparation

We recommend that all slabs-on-grade be underlain by at least 18 inches of "non-expansive" imported fill to mitigate potential expansive soil effects. We recommend that import
fill have a Plasticity Index (PI) of less than 15, which is indicative of a generally low expansion potential. At least the upper 8 inches of soil below the non-expansive fill layer should be moisture conditioned as needed to 3 to 5 percent over optimum moisture and compacted to 88 to 92 percent relative compaction per ASTM D1557. The above-mentioned moisture conditioning and compaction should extend below the bottom of any desiccation cracks that may be present at the time of construction. The non-expansive fill layer should be moisture conditioned, as appropriate, and compacted to at least 90 percent relative compaction (per ASTM D1557). The “non-expansive” fill and subgrade moisture conditioning should extend at least three feet, laterally, beyond the slab edge, unless the area is covered by an existing building or slab.

Slab subgrades should be smooth-rolled to create a firm and non-yielding surface. Our field engineer should be present during subgrade proof-rolling to ensure that the finished subgrade surface is firm and unyielding. All slab subgrades should be protected and kept moist until slabs-on-grade are cast.

6.2.3 Fill and Backfill Materials

On-site soils having an organic content of less than 3 percent by volume may be used as fill. Imported fill should have a liquid limit not exceeding 40 percent and a plasticity index not exceeding 15. Import fill should contain no environmental contaminants or construction debris. Fill should not contain rocks or lumps larger than 4 inches in greatest dimension and contain no more than 15 percent larger than 2.5 inches. In addition, imported fill should be predominantly granular, with a plasticity index of 12 or less.

6.2.4 Fill Placement

Fill materials satisfying the criteria described in Section 6.2.3 should be placed near the optimum moisture content, spread in lifts not exceeding 8 inches in uncompacted thickness, and compacted to at least 90 percent relative compaction, per ASTM D1557. Structural fill should be compacted to at least 90 percent relative compaction as determined by ASTM D1557. The upper 6 inches of subgrade soils beneath pavements should be compacted to at least 95 percent relative compaction (per ASTM D1557).

6.2.5 Pipeline Bedding/Trench Backfill

Pipe bedding materials should be placed in maximum 8-inch lifts and should be shoveled sliced and vibrated until they are unyielding in the haunch area to provide full support for the pipe barrel.

Pipeline trenches should be backfilled with fill placed in lifts of approximately 8 inches in uncompacted thickness. However, thicker lifts can be used provided the method of compaction is approved by the Geotechnical Engineer and the required minimum degree of compaction is achieved. Backfill should be placed by mechanical means only. Jetting is not permitted.
If on-site soil is used as trench backfill, it should be compacted to at least 90 percent relative compaction by mechanical means only. Imported sand can be used for trench backfill if it is compacted to at least 95 percent relative compaction, and sufficient water is added during backfilling operations to prevent the soil from "bulking" during compaction.

Pipeline trenches may extend below ground water requiring temporary dewatering during construction. Utilities that extend below the ground water level should be appropriately designed for the high water level.

6.2.6 Surface Drainage

The finished surface adjacent to the building should be graded to direct surface water away from foundations, slabs and pavement edges and towards suitable discharge facilities. Ponding of surface water should not be allowed adjacent to the structure or on pavements. Roof downspouts should direct water away from the foundation and toward suitable discharge or collection points through either closed pipes or across pavements.

6.3 SPREAD FOOTINGS

Planned new structures and seismic improvements can be supported on spread footings that bear upon undisturbed soil. The maximum allowable bearing pressures that should be used to design new spread footings are presented below:

<table>
<thead>
<tr>
<th>Load Condition</th>
<th>Allowable Bearing Pressure (psf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dead load</td>
<td>3,000</td>
</tr>
<tr>
<td>Dead plus sustained live loads</td>
<td>4,500</td>
</tr>
<tr>
<td>Total loads, including wind or seismic</td>
<td>6,000</td>
</tr>
</tbody>
</table>

To mitigate potential expansive soil effects: (1) spread footings for new structures should be embedded at least 24 inches below the lowest adjacent grade, and (2) the exterior walls of new buildings should be supported on a continuous foundation providing total enclosure of the building perimeter. Continuous and isolated footings should be at least 12 inches and 18 inches wide, respectively.

Footing excavations should be checked by our field engineer for proper depth, bearing, and cleanout prior to the placement of reinforcing steel. Weak or disturbed soil present at the bottom of footing excavations should be excavated to competent natural soil. All foundation excavations should be kept moist and free of loose material and standing water prior to concrete placement.

6.4 DRILLED PIERS

Uplift resistance for the brace frame may be provided by drilled piers. The piers should be designed to derive their capacity from friction in the native soils underlying the site. The
piers should have a minimum diameter of 14 inches and a minimum center-to-center spacing of three times the shaft diameter.

Drilled piers may be designed using an allowable friction capacity in axial compression of 750 pounds per square foot for dead plus live loads. This value may be increased by one-third when evaluating for total loads, including wind and seismic forces. Eighty percent of these values may be used in determining uplift resistance. The upper 3 feet should be neglected in determining axial capacities.

6.5 LATERAL RESISTANCE

Resistance to lateral loads can be provided by friction along the base of foundations and by passive pressures developing on the footings and pier shafts. Passive resistance in soil can be estimated using an equivalent fluid weight of 350 psf. For short-term, transient lateral loads (such as seismic loading), a uniform lateral resistance of 3,000 pounds per square foot (psf) can be used. These passive resistances can be applied to twice the pier diameter. Where pavements cover the adjacent ground surface or floor slabs, passive resistance can be assumed to begin at the ground surface. In areas not confined by slabs or pavements, passive resistance should be neglected within 1 foot of the ground surface.

The passive resistance value presented above has a factor of safety of over 2.0, however, relatively large deformations would be required to mobilize the ultimate passive resistance. We estimate that this passive resistance value corresponds approximately to lateral deflection of about \( \frac{1}{2} \)-inch.

A friction coefficient of 0.30 times the dead load can be used to evaluate frictional resistance along the bottoms of the foundations. This friction coefficient can be considered an ultimate value and can be mobilized with deformations of less than \( \frac{1}{4} \)-inch.

6.6 RETAINING WALLS

Building walls that extend below grade must be designed to resist both lateral earth pressures and any additional lateral loads caused by surcharging. Restrained retaining walls should be designed to resist an at-rest soil pressure equal to an equivalent fluid pressure of 60 pounds per cubic foot (pcf). Walls subjected to surcharge loads should be designed for an additional uniform lateral pressure equal to one-half the anticipated surcharge load. For seismic design, the retaining wall should be designed to resist an active earth pressure equal to an equivalent fluid pressure of 35 pcf plus an additional uniform load equal to 18H (in feet) pound per square foot, where H equals the height of soil retained by the wall. The basement walls should be supported on the spread footing or drilled pier foundations designed in accordance with the recommendations presented above.

The above pressures are based on basement walls that are fully backdrained to prevent the buildup of hydrostatic pressure. Wall-drainage should consist of a drain rock layer at least 12 inches thick that extends to within 1 foot of the ground surface. Four-inch-diameter perforated PVC pipe should be installed (with perforations down) at least 1 foot below the
finished basement floor grade. The pipe should sit on a four-inch-thick bed of drain rock. The pipe should be sloped to drain by gravity to a suitable drainage facility or sump. Drain rock should conform to Caltrans specifications for Class 2 permeable material. Clean, 1/2- to 3/4-inch maximum size, crushed rock or gravel may be used as an alternative, provided it is encapsulated in a non-woven geotextile filter fabric, such as Mirafi 140N or an approved alternative. A 1-foot-thick cap of clayey soil should be placed over the drain rock to inhibit surface water infiltration. As an alternative to drain rock, prefabricated drainage panels (Miradrain or an approved alternative) may be used. Prefabricated drainage panels should be installed in accordance with the manufacturer’s recommendations.

Basement wall backfill should be placed in accordance with the recommendations presented in Section 6.2.3 and Section 6.2.4. Light compaction equipment should be used if possible. If heavy compaction equipment is used, the walls should be appropriately designed to withstand loads exerted by the heavy equipment, and/or temporarily braced.

The basement walls should be appropriately waterproofed. The waterproofing should be designed by an engineer who specializes in waterproofing.

6.7 SLAB-ON-GRADE FLOORS

We recommend that slabs-on-grade be underlain by at least 18-inches of import fill to mitigate potential expansive soil effects. The slab subgrade should be properly prepared according to the recommendations of Section 6.2.2 and should be relatively smooth, firm and non-yielding under equipment loads. A layer of clean, angular crushed rock, at least 4 inches thick, should be placed beneath interior slabs to provide a capillary moisture break. The crushed rock should conform to the following gradation criteria:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 inch</td>
<td>100</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>90 - 100</td>
</tr>
<tr>
<td>No. 200</td>
<td>0 - 3</td>
</tr>
</tbody>
</table>

Moisture vapor is likely to condense on the underside of interior slab-on-grade floors. If the movement of moisture vapor through the interior slabs is objectionable, a vapor barrier should be used. The vapor barrier should consist of an impermeable membrane at least 10 mil thick placed above the crushed rock. The membrane should be covered with 2 inches of sand for protection during construction. The moisture barrier may be considered as 6 inches of “non-expansive” fill.

6.8 PLAN REVIEW AND CONSTRUCTION OBSERVATION

We recommend that Fugro review the final project plans and specifications to evaluate their conformance with the intent of our recommendations. This will also provide supplemental recommendations for project construction items that may not currently be covered by this report, if required.
During construction, we should observe site preparation and grading to verify earthwork is performed in accordance with our recommendations. We should also observe footing excavations to check that they are properly prepared and that the footings will bear on suitable materials. Our services during construction will also permit us to make appropriate recommendations for changes in design and construction to account for unanticipated conditions, if appropriate.

7.0 LIMITATIONS

Our services consist of professional opinions, conclusions, and recommendations that are made in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

Variations may exist and conditions not observed or described in this report could be encountered during construction. Our conclusions and recommendations are based on the observed conditions. If conditions other than those described in this report are encountered, we should be notified so that additional recommendations, if warranted, can be provided.

This report has been prepared for the exclusive use of Berkeley Public Library and their consultants for specific application to the proposed Berkeley Public Library - West Branch project as described herein. In the event that there are any changes in the ownership, nature, design or location of the project, or if any future additions are planned, the conclusions and recommendations contained in this report should not be considered valid unless (1) the project changes are reviewed by Fugro, and (2) conclusions and recommendations presented in this report are modified or verified in writing. Reliance on this report by others must be at their risk, unless we are consulted on its use or limitations. We cannot be responsible for the impacts of any changes in geotechnical standards, practices, or regulations subsequent to performance of our services without our further consultation. We can neither vouch for the accuracy of information supplied by others, nor accept consequences for unconsulted use of segregated portions of this report.
PLATES
SOURCE: Drawing information adapted from Ratcliff Slama

LEGEND

B-2 APPROXIMATE LOCATION OF BORINGS

SITE PLAN
Berkeley Public Library - West Branch
Berkeley, California

PLATE 2
APPENDIX A
FIELD EXPLORATION
APPENDIX A
FIELD EXPLORATION

The field investigation was conducted on May 22, 2003 and consisted of drilling two exploratory boring using a CME 75 truck-mounted drill rig. Our field engineer observed drilling and sampling operations and prepared logs of each test boring. Logs of the test borings are presented in Appendix A. Soils are classified in accordance with the Unified Soil Classification System (ASTM D2487) described on Plate A-1. Representative soil samples were obtained from the exploratory borings at selected depths. The samples were obtained using a Modified California sampler (3-inch outside diameter, 2.5-inch inside diameter) and a Standard Penetration split-spoon sampler (2-inch outside diameter, 1.5-inch inside diameter).

Resistance blow counts were obtained by driving the Modified California or Standard Penetration split-spoon samplers into the soil with a 140-pound hammer falling 30 inches using an automatic drop hammer system. The sampler was driven 18 inches, and the number of blows were recorded for each 6 inches of penetration. The blows per foot presented on the boring logs represent the accumulated number of blows that were required to drive the last 12 inches. Due to the larger diameter of the Modified California sampler, the blow counts recorded for that sampler are not Standard Penetration Test resistance values.

The attached boring logs and related information show our interpretation of the subsurface condition at the dates and locations indicated, and it is not warranted that they are representative of subsurface conditions at other locations and times.
<table>
<thead>
<tr>
<th>MAJOR DIVISIONS</th>
<th>GROUP NAMES</th>
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<tbody>
<tr>
<td>GRAVELS</td>
<td>GW: Well-Graded Gravel</td>
</tr>
<tr>
<td></td>
<td>GP: Poorly Graded Gravel</td>
</tr>
<tr>
<td></td>
<td>GM: Silty Gravel</td>
</tr>
<tr>
<td></td>
<td>GC: Clayey Gravel</td>
</tr>
<tr>
<td>SANDS</td>
<td>SW: Well-Graded Sand</td>
</tr>
<tr>
<td></td>
<td>SP: Poorly Graded Sand</td>
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<tr>
<td></td>
<td>SM: Silty Sand</td>
</tr>
<tr>
<td></td>
<td>SC: Clayey Sand</td>
</tr>
<tr>
<td>SILTS AND CLAYS</td>
<td>ML: Silt</td>
</tr>
<tr>
<td></td>
<td>CL: Lean Clay</td>
</tr>
<tr>
<td></td>
<td>OC: Organic Clay</td>
</tr>
<tr>
<td></td>
<td>MH: Elastic Silt</td>
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<tr>
<td></td>
<td>CH: Fat Clay</td>
</tr>
<tr>
<td></td>
<td>CH: Organic Clay</td>
</tr>
<tr>
<td>HIGHLY ORGANIC SOILS</td>
<td>PT: Pest or Highly Organic Soils</td>
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<tr>
<td>FILL</td>
<td>FILL: Debris or Mixed Fill</td>
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<table>
<thead>
<tr>
<th>SAMPLER TYPE</th>
<th>Sampler and sampler dimensions (unless otherwise noted in report text) are as follows:</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>SPT Sampler, driven 3 1/4&quot; OD, 2&quot; CD</td>
</tr>
<tr>
<td>2</td>
<td>MOD CA Liner Sampler 3 3/4&quot; ID, 3&quot; CD</td>
</tr>
<tr>
<td>3</td>
<td>CA Liner Sampler 1 7/8&quot; ID, 2.5&quot; CD</td>
</tr>
<tr>
<td>4</td>
<td>Thin-walled Tubes, pushed 3 1/2&quot; ID, 3&quot; CD</td>
</tr>
<tr>
<td>6</td>
<td>Bulk Bag Sample (from cuttings)</td>
</tr>
<tr>
<td>6</td>
<td>Hand Auger Sample</td>
</tr>
<tr>
<td>7</td>
<td>Lexan Sample</td>
</tr>
<tr>
<td>8</td>
<td>Pitcher Sample</td>
</tr>
<tr>
<td>9</td>
<td>Vibracore Sample</td>
</tr>
<tr>
<td>10</td>
<td>No Sample Recovered</td>
</tr>
<tr>
<td>11</td>
<td>Rock Core</td>
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</table>

<table>
<thead>
<tr>
<th>CONSISTENCY</th>
<th>Blows/Foot SPT</th>
<th>Undrained Shear Strength (k)</th>
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<tbody>
<tr>
<td>Very Soft</td>
<td>0 - 2</td>
<td>0 - 0.25</td>
</tr>
<tr>
<td>Soft</td>
<td>3 - 4</td>
<td>0.25 - 0.5</td>
</tr>
<tr>
<td>Firm</td>
<td>5 - 8</td>
<td>0.5 - 1</td>
</tr>
<tr>
<td>Stiff</td>
<td>9 - 16</td>
<td>1 - 2</td>
</tr>
<tr>
<td>Very Stiff</td>
<td>17 - 32</td>
<td>2 - 4</td>
</tr>
<tr>
<td>Hard</td>
<td>Over 32</td>
<td>Over 4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RELATIVE DENSITY</th>
<th>Sands and Gravels</th>
<th>Blows/Foot SPT</th>
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</thead>
<tbody>
<tr>
<td>Very Loose</td>
<td>0 - 4</td>
<td></td>
</tr>
<tr>
<td>Loose</td>
<td>4 - 10</td>
<td></td>
</tr>
<tr>
<td>Medium Dense</td>
<td>11 - 30</td>
<td></td>
</tr>
<tr>
<td>Dense</td>
<td>31 - 50</td>
<td></td>
</tr>
<tr>
<td>Very Dense</td>
<td>Over 50</td>
<td></td>
</tr>
</tbody>
</table>

| INCREASING VISUAL MOISTURE CONTENT | Dry | Moist | Wet |

Information on each boring log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as from laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines on the logs may be transitional and approximate in nature. Water level measurements refer only to those observed at the time and places indicated, and can vary with time, geologic condition, or construction activity.

TERMS AND SYMBOLS USED ON BORING LOGS
LOCATION: Approx. 80 feet south-southeast from the northwest corner of the project site
SURFACE EL: ft +/- (rel. MSL datum)

<table>
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<tr>
<th>DEPTH, ft</th>
<th>MATERIAL SYMBOL</th>
<th>MATERIAL DESCRIPTION</th>
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</thead>
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<tr>
<td>5</td>
<td></td>
<td>4 inches CONCRETE:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 inches AGGREGATE BASE:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lean CLAY (CL): very stiff, yellowish brown and brown, moist, trace rootlets in upper 3 feet, trace angular coarse-grained sand (FILL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lean CLAY (CL) with sand: very stiff to hard, dark yellowish-brown, moist, trace fine gravels, fine to medium-grained sand</td>
</tr>
<tr>
<td></td>
<td></td>
<td>occasional coarse gravel or cobbles</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>Lean CLAY (CL): very stiff, reddish brown, moist</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>Sandy Lean CLAY (CL) to clayey SAND (SC): stiff/medium dense, reddish brown, moist, fine to medium-grained</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>Lean CLAY (CL): stiff, reddish brown, wet</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

BORING DEPTH: 21.5 ft
DEPTH TO WATER: 18.0 ft
BACKFILL: Concrete grout
COMPLETION DATE: May 22, 2003
NOTES: 1. Terms and symbols defined on Plate A-1.

DRILLING METHOD: 8-in. dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
RIG TYPE: CME 75
DRILLED BY: HEW, Perfecto
LOGGED BY: R Storesund

LOG OF BORING NO. B-1
Berkeley Public Library
Berkeley, California
**LOG OF BORING NO. B-2**

Berkeley Public Library  
Berkeley, California

---

**BORING DEPTH:** 31.5 ft  
**DEPTH TO WATER:** 18.0 ft  
**BACKFILL:** Concrete grout  
**COMPLETION DATE:** May 22, 2003  
**NOTES:** 1. Terms and symbols defined on Plate A-1.
APPENDIX B
LABORATORY TESTING PROGRAM
APPENDIX B
LABORATORY TESTING PROGRAM

The laboratory-testing program was directed towards an evaluation of the physical and mechanical properties of the soils underlying the site.

The natural water content was determined on 9 samples of the materials recovered from the borings in accordance with ASTM Test Designation D2216. These water contents are recorded on the boring logs at the sample depths.

Dry density determinations were performed on 9 samples to evaluate their physical properties. The results of these tests are shown on the boring logs at the sample depths.

Particle size (Passing the No. 200 Sieve) analyses were performed on 2 samples to evaluate the fines content of the soil and aid in classification. The test was performed in accordance with ASTM Test Designation D1140. The results of these tests are presented on the appropriate boring logs and sample depths.

Atterberg Limits determination was performed on 2 samples of the subsurface soils to determine the range of water contents over which this material exhibits plasticity. The Atterberg Limits were determined in accordance with ASTM Test Designation D4318. This value is used to classify the soil in accordance with the United Soil Classification System and to indicate the soil's compressibility and expansion potentials. The results of this test are presented on Plate B-1 and on the boring logs at the appropriate sample depths.
### Plasticity Chart and Data

**Key Symbol** | **Boring No.** | **Depth (Feet)** | **Liquid Limit** | **Plasticity Index** | **Liquidity Index** | **Water Content (%)** | **% Passing #200 Sieve** | **USCS**
--- | --- | --- | --- | --- | --- | --- | --- | ---
• | B-2 | 1.5 | 39 | 22 | 0.307 | 24 | | CL
• | B-2 | 3.5 | 37 | 21 | 0.105 | 18 | | CL

**PLASTICITY CHART AND DATA**

**BERKELEY PUBLIC LIBRARY**

Berkley, California

**FIGURE**

B-1
Appendix K

Mitigation Monitoring Plan
Mitigation Monitoring Program

The following table describes the mitigation measures recommended in the Draft EIR for Berkeley Branch Libraries Program, the agency responsible for carrying them out, and verification that they have been carried out as intended.
# Mitigation Monitoring Program

<table>
<thead>
<tr>
<th>Mitigation Measures</th>
<th>Responsible Department/Agency</th>
<th>Method of Verification</th>
<th>Timing of Verification</th>
<th>Compliance Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CULTURAL RESOURCES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CULTURAL-South-1a: The project sponsors should undertake a salvage program to save and reuse the wood slat ceiling. Prior to demolition, the project sponsors shall conduct a full survey of all historic architectural elements and hire qualified salvage contractors and companies with experience in historic buildings to complete this salvage program.</td>
<td>Berkeley Public Library</td>
<td>Site Inspection by City of Berkeley Planning Department</td>
<td>During Demolition</td>
<td></td>
</tr>
<tr>
<td>CULTURAL-South-1b: The project sponsors shall fund a permanent exhibition and interpretative program on the development of the South Berkeley Branch Library. The Berkeley South Branch Library is one of four branch libraries in the city, and the history of public library development in Berkeley shall be shared with the public through a permanent exhibition and interpretative program. Components of this mitigation program could include a kiosk containing historic photographs and plans, as well as a signage program and gallery located preferably at one of the Branch Libraries, or if not, at the Main Library.</td>
<td>Berkeley Public Library</td>
<td>City of Berkeley Planning Department</td>
<td>On Project Completion</td>
<td></td>
</tr>
<tr>
<td>CULTURAL-West-1a: The project sponsors shall undertake a salvage program to save and promote reuse of the building’s historically significant materials and features to the extent reasonably feasible, namely the Classical decorative elements called out in the Structure of Merit designation: the cornice, original wood framed windows, original arched entry with semi-circular window, engaged columns, ornamental medallion, and remaining incised lettering. Salvage allows for the removal of individual architectural elements for potential reuse. Salvaged elements could be reused at the project site or another project, or be given to an architectural salvage company. Salvage has the added benefit of landfill and waste diversion.</td>
<td>Berkeley Public Library</td>
<td>Site Inspection by City of Berkeley Planning Department</td>
<td>During Demolition</td>
<td></td>
</tr>
<tr>
<td>Mitigation Measures</td>
<td>Responsible Department/Agency</td>
<td>Method of Verification</td>
<td>Timing of Verification</td>
<td>Compliance Verification</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------------------------</td>
<td>------------------------</td>
<td>-----------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>CULTURAL-West-1b</td>
<td>Berkeley Public Library</td>
<td>City of Berkeley Planning Department</td>
<td>On Project Completion</td>
<td></td>
</tr>
</tbody>
</table>

The project sponsors shall fund a permanent exhibition and interpretative program on the development of the West Berkeley Branch Library. The Berkeley West Branch Library is one of four branch libraries in the city, and the history of public library development in Berkeley should be shared with the public through a permanent exhibition and interpretative program. Components of this mitigation program could include a kiosk containing historic photographs and plans, as well as a signage program and gallery located preferably at one of the Branch Libraries, or if not, at the Main Library.
Assumptions: Based on utility PG&E utility bills provided by the City of Berkeley from October 06 through October 09. In some cases consumption data was estimated using data from previous years (June through September 2007 for South, Central, Claremont and North libraries). In a small number of other cases monthly data was based on an average of the month before and after the missing date. The South library includes a tool lending library so may include additional sources of energy consumption. Square footages used were West – 6230sf, South-5040sf, Central-100,000sf, Claremont 7300 and North-5390sf. The EUI for the South Branch exclude energy consumption associated with the tool lending library.

The average EUI for the West Branch since September 2007 has been 50. The results for the West and Claremont Branches is consistent with the findings from the Commercial End Use Consumption survey which shows that existing schools and offices have EUIs of 40 and 55 respectively. The results for the South Branch rise from approximately 55 to nearly 80, indicating a potential change in operation or deteriorating equipment. The spike in the EUI is due unusually high gas consumption in October 2008. The EUI for the Central Library is an average of 66 which is surprisingly high considering that it includes a renovation and 70,000sf addition completed in 2002. The North Branch, with an EUI of 97 is clearly the least efficient building for reasons which at this time are unclear.
Electricity consumption indicates the use of mechanical cooling during the summer cooling season. The average month usage for July and August is 6500 kWh compared with the average monthly usage for the shoulder months May and October of 5600 kWh. This implies an EUI for lighting and plug loads of 37. The West Branch gas consumption is consistent with the winter heating season with minimal (approximately 1 therm per month) of gas usage during the cooling season, presumably for service hot water.

The shoebox simulation indicated that a standard building, minimally compliant with Title 24, would have an EUI of 24. The represents a 50% reduction over the existing West Branch which is consistent with the current AIA 2030 target of a 50% reduction over existing buildings. The high efficiency shoebox scheme yielded an EUI of 12 which represents a reduction of 75% over the existing West Branch. This scheme reduced the cooling energy to zero and essentially eliminated the heating and hot water loads. Comparing this scheme to the estimated EUI for lighting and plug loads in the existing building of 37 would mean a reduction of 70% in lighting and plug load energy. This level of reduction appears high and indicates that the current assumptions may underestimate plug loads.
ZNE Preliminary Analysis Report
Prepared for Berkeley Public Library and Pacific Gas & Electric Co.
ZNE Preliminary Analysis Report
Prepared for Berkeley Public Library and Pacific Gas & Electric Co.

15 January 2010
HARLEY ELLIS DEVEREAUX
## PROJECT DESIGN TEAM

<table>
<thead>
<tr>
<th>NAME</th>
<th>ADDRESS</th>
<th>PHONE</th>
</tr>
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<tr>
<td>Harley Ellis Devereaux</td>
<td>2430 5th Street, Studio M</td>
<td>510.644.2814</td>
</tr>
<tr>
<td>Architet</td>
<td>Berkeley, CA 94710</td>
<td></td>
</tr>
<tr>
<td>GreenWorks Studio</td>
<td>2430 5th Street, Studio M</td>
<td>510.644.2814</td>
</tr>
<tr>
<td>Zero Net Energy Design</td>
<td>Berkeley, CA 94710</td>
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<tr>
<td>Timmons Design Engineers</td>
<td>901 Market Street, Suite 480</td>
<td>415-957-8788</td>
</tr>
<tr>
<td>Mechanical, Electrical &amp; Plumbing</td>
<td>San Francisco, CA 94103</td>
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<tr>
<td>Engineering</td>
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<tr>
<td>Tipping-Mar</td>
<td>1906 Shattuck Ave</td>
<td>510-549-1906</td>
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<tr>
<td>Structural Engineering</td>
<td>Berkeley, CA 94704</td>
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<tr>
<td>John Northmore Roberts &amp; Associates</td>
<td>2927 Newbury Street, Suite B</td>
<td>510-843-3666</td>
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<tr>
<td>Landscape Architect</td>
<td>Berkeley CA 94703</td>
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<tr>
<td>Moran Engineering</td>
<td>1930 Shattuck Avenue, #A</td>
<td>510-848-1930</td>
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<td>Civil Engineering</td>
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<tr>
<td>Cumming Corporation</td>
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<td>Cost Estimating</td>
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<tr>
<td>Rosen Goldberg Der &amp; Lewitz</td>
<td>1100 Larkspur Landing Circle #354</td>
<td>415-464-0150</td>
</tr>
<tr>
<td>Acoustics, Noise Control</td>
<td>Larkspur CA 94939</td>
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</table>
INTRODUCTION

One of the primary design objectives for the new West Branch of the Berkeley Public Library is to achieve Zero Net Energy (ZNE) performance. This report summarizes the site and climate analysis completed in preparation for the architectural studies of the Conceptual Design phase of the project. This analysis points the way toward ZNE design approaches appropriate for this type and size of building, as well as the site and climate characteristics.

The results of this work were presented at the ZNE project kickoff meeting held in Berkeley on 19 November 2009. In attendance were the design team architects and engineers as well as David Vasnaik and Thomas Bowers of the Zero Net Energy program of Pacific Gas & Electric Company, which is supporting the ZNE design study.
Fig. 1. West Branch Library site with existing library building.
1. BASE PROJECT DESCRIPTION AND ANTICIPATED ZNE ISSUES

The Project consists of a new building located at 1125 University Avenue, Berkeley, CA, replacing the existing branch library facility. The original branch library on this site was built in 1923 and consisted of 2,200 gross sq. ft. In 1974, an extensive renovation and addition to this structure resulting in the current 6,230 gross sq. ft. building. A major portion of the exterior skin of the 1923 building was destroyed in the process, with the surviving portion designated a “Structure of Merit” in 2003 by the Berkeley Landmarks Preservation Commission.

The existing library and site are shown in Fig. 1. The site is bounded on the east by a three-story hotel and on the west by a parking lot. The south side of the site fronts on to University Avenue, a busy and noisy street connecting downtown Berkeley and the University of California with the principal East Bay freeway, I-80. The north side of the site faces a residential area.

The height of the shadow-casting eave of the hotel to the east is 34 feet. Development of the site to the west with a building up to 40 feet in height is possible in the future. Solar access for photovoltaic systems is an issue that will be studied as part of this project.

The current project calls for the demolition of the 4,130 sq. ft. 1974 addition and a possible rebuilding of the remaining portion of the original 1923 library building, bringing the total new facility to approximately 9,000 gross sq. ft.

As part of this first phase of the project, Conceptual Design, the design team is charged with developing three principal alternative designs for the new building: (A) a scheme that rebuilds the 1923 building and adds approximately 6,800 sq. ft. of new space; (B) a one-story building that demolishes the entire existing structure and reuses identified building components from the 1923 building; (C) a two-story building that is basically similar to the one-story building, but which uses a second level for some programmatic functions in order to provide additional ground-level exterior space.

Each of these alternative designs will have opportunities and constraints related to the optimal design approach to achieve zero net energy use. These issues will be discussed in the ZNE Preliminary Design Report, to be issued at the end of the Conceptual Design Phase.

2. ZNE DESIGN KICKOFF MEETING

On 19 November 2009, a ZNE kickoff meeting was held to share project information and begin preliminary discussions about opportunities for increased building energy performance. The presentation provided detailed information on energy efficiency goals, climatic patterns and potential areas for energy reduction. The presentation is attached as an appendix to this report.

The measures included the following:

Daylighting
- North or south facing roof monitors
- Side windows with light redirecting devices
- Horizontal skylights

Natural Ventilation
- Operable windows
- Earth tubes
- Pre-cooling air through crawl space
- Operable skylights
- Solar chimneys

Heating
- Tight building envelope
- Radiant floor heating
- Air source / ground source heat pump
- Trombe wall
- Ventilated facade
- Energy Recovery Ventilator

Service Hot Water
- Air source / ground source heat pump
- Solar thermal with gas/electric backup
Assumptions: Based on utility PG&E utility bills provided by the City of Berkeley from October 06 through October 09. In some cases consumption data was estimated using data from previous years (June through September 2007 for South, Central, Claremont and North libraries). In a small number of other cases monthly data was based on an average of the month before and after the missing date. The South library includes a tool lending library so may include additional sources of energy consumption. Square footages used were West – 6,230sf, South-5,040sf, Central-100,000sf, Claremont 7,300 and North-5,390sf. The EUI for the South Branch exclude energy consumption associated with the tool lending library.
3. EXISTING BUILDING ENERGY CONSUMPTION

To assist with the development of energy consumption goals, the utility records for each of the City of Berkeley’s existing libraries were collected and organized. The resulting Energy Usage Intensity (EUI)\(^1\) for each building ranged from 48 up to 103, based on records from September 2007 through to November 2009. See Fig. 2.

The average EUI for the West Branch since September 2007 has been 50. The results for the West and Claremont Branches is consistent with the findings from the Commercial End Use Consumption\(^2\) survey which shows that existing schools and offices have EUIs of 40 and 55 respectively.

The results for the South Branch rise from approximately 55 to nearly 80, indicating a potential change in operation or deteriorating equipment. The spike in the EUI is due unusually high gas consumption in October 2008. The EUI for the Central Library is an average of 66 which is surprisingly high considering that it includes a recent renovation and 70,000 sf addition, completed in 2002. The North Branch, with an EUI of 97 is clearly the least efficient building for reasons which at this time are unclear.

The data for the energy use for gas and electricity consumption at the West Branch indicates interesting existing trends that can be compared in the future with the results of the energy use modeling for the new design. See Fig. 3 on the next page.

Electricity consumption at the West Branch Library indicates the use of mechanical cooling during the summer cooling season. The average monthly usage for July and August is 6,500 kWh compared with the average monthly usage for the shoulder months May and October of 5,600 kWh. This implies an EUI for lighting and plug loads of 37. The West Branch gas consumption is consistent with the winter heating season with minimal (approximately 1 therm per month) gas usage during the cooling season, presumably for service hot water.

A “shoebox” simulation\(^3\) indicated that a standard building, minimally compliant with Title 24, would have an EUI of 24. This represents a 50% reduction over the existing West Branch which is consistent with the current AIA 2030 target of a 50% reduction over existing buildings.

The high efficiency shoebox scheme yielded an EUI of 12 which represents a reduction of 75% over the existing West Branch. This scheme reduced the cooling energy to zero and essentially eliminated the heating and hot water loads. Comparing this scheme to the estimated EUI for lighting and plug loads in the existing building of 37 would mean a reduction of 70% in lighting and plug load energy. This level of reduction appears high and indicates that the current assumptions may underestimate plug loads.

\(^1\) EUI = 1 KBTU/sq. ft.-year


\(^3\) In the absence of a building design, a simple block shape, a “shoebox”, of the same area as the new building and with assumed average physical properties, is used for preliminary analysis.
Fig. 3. Energy Consumption Profile, Gas and Electricity, for the Existing West Branch Library
4. ROOF SPACE REQUIREMENTS FOR PHOTOVOLTAIC PANELS

To gauge the area of photovoltaic panels required to meet zero net energy consumption for different calculated building EUI’s, the photovoltaic system was modeled for different configurations. The simulation was performed using eQuest and high efficiency crystalline panels available from Sunpower. To estimate the total area of roof required, the spacing required between each row of panels to provide access or prevent self shading was also calculated. See Fig. 4 below.

Fig. 4. Preliminary study of alternative configurations of photovoltaic panels and required spacing for different tilt angles.
The area of photovoltaic panels required for different EUI’s to achieve zero net energy ranged significantly, from approximately 900 to 4,300 square feet. By tilting the panels, the efficiency of the photovoltaic system increases, so fewer panels are required. However, the row spacing required to prevent shading between panels increases the required roof area. These results are being used by the design team to ensure that adequate roof area, with good solar access is preserved in each of the designs to allow the ZNE goal to be met. See Table 1 below, which indicates the roof area requirements for the photovoltaic panels.

Although solar thermal hot water and space heating may be considered, the roof area required for these systems is small in comparison to that required for electricity generation. The roof area requirement for these systems has therefore been ignored at this stage of the analysis.

Maintenance access requirements are also not included at this point since the layout and tilt of the panels strongly affect the area required. Local code requirements for fire department access and other roof location limitations will require additional area, but this will be evaluated when the preferred alternative schemes have been established with regard to roof configuration.

### Table 1. Area of photovoltaic panels required to reach ZNE performance for the West Berkeley Branch*

<table>
<thead>
<tr>
<th>EUI (kBtu/sf)</th>
<th>Flat Roof - Horizontal</th>
<th>Flat Roof- Tilted (30deg)</th>
<th>Sloped Roof - Tilted (30deg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># panels</td>
<td>kW</td>
<td>Area (sf)</td>
</tr>
<tr>
<td>24</td>
<td>171</td>
<td>54</td>
<td>4282</td>
</tr>
<tr>
<td>18</td>
<td>128</td>
<td>40</td>
<td>3205</td>
</tr>
<tr>
<td>12</td>
<td>85</td>
<td>27</td>
<td>2128</td>
</tr>
<tr>
<td>6</td>
<td>43</td>
<td>14</td>
<td>1077</td>
</tr>
</tbody>
</table>

*Excludes area required for thermal hot water system, possible space heating system and system maintenance, as well as local code requirements for fire department access.

### Next Steps

Detailed energy and daylight modeling will be performed on the three established alternative designs. The next stage of analysis will consist of whole building energy and daylight modeling for each scheme to help inform scheme selection and various design decisions. The results from this work will be summarized and presented in the ZNE Preliminary Design Report, to be issued at the end of the Conceptual Design phase.
West Berkeley Branch Library

Weather Analysis and Preliminary Shoebox Modeling

11-19-09
Closest TMY3 Weather Station
Comparison of Oakland TMY3 Ave. Monthly DB with UCB Weather Station

- Significantly cooler temperatures
Peak Temperature Events > 80F

2008 Berkeley weather data shows similar high temperature peaks to Oakland data.
High Temperature Events

Location: null, null, null
Latitude/Longitude: 37.72° North, 122.22° West, Time Zone from Greenwich -8
Data Source: LOCATION Berkeley Bancroft St 2005 WMO Station Number, Elevation 6 ft
Binned DB Temperatures for 2008 Weather

99.6% 39F
0.4% 82F

37.2 is Oakland DD for heating

Same as Oakland DD for cooling
Binned Wind Speeds for 2008 Weather

Most wind events are low speed and appropriate for wind driven ventilation.
Wind Rose for September – 2008 Berkeley Weather
Average Monthly Wind Speeds

LOCATION: null, null, null
Latitude/Longitude: 37.72° North, 122.22° West, Time Zone from Greenwich -8
Data Source: LOCATION Berkeley Bancroft St 2008 WMO Station Number, Elevation 8 ft

LEGEND
- RECORD HIGH
- AVERAGE HIGH
- MEAN
- AVERAGE LOW
- RECORD LOW

<table>
<thead>
<tr>
<th>WIND VELOCITY RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 20 mph</td>
</tr>
<tr>
<td>20 to 40 mph</td>
</tr>
<tr>
<td>40 to 60 mph</td>
</tr>
<tr>
<td>60 mph</td>
</tr>
</tbody>
</table>

PLOT:
- mph
- Fitted data

WIND VELOCITY:
- 0 to 60 mph
- Fit to Data

Graph showing average monthly wind speeds from January to December, with annual data also shown.
Potential Passive Strategies

PSYCHROMETRIC CHART

LOCATION: null, null, null
Latitude/Longitude: 37.72° North, 122.22° West, Time Zone from Greenwich -8
Data Source: LOCATION Berkeley Bancroft St 2008 WMO Station Number, Elevation 6 ft

LEGEND

DRI-Y-BULB TEMP (degrees F)
- 0% < 32
- 94% 32 - 70
- 3% 70 - 75
- 2% 75 - 100
- 0% > 100

PLOT: DRY-BULB TEMP
- All Months
- Selected Months
- Single Month

TEMPERATURE RANGE:
- 10 to 110 degrees F
- Fit to Data

DESIGN STRATEGIES: JANUARY through DECEMBER

1. Comfort (157 hrs)
2. Sun Shading (359 hrs)
3. High Thermal Mass (20 hrs)
4. High Thermal Mass/Night Flushing (0 hrs)
5. Direct Evaporative Cooling (0 hrs)
6. Natural Ventilation Cooling (217 hrs)
7. Fan-Forced Ventilation Cooling (0 hrs)
8. Internal Heat Gain (1536 hrs)
10. Passive Solar Direct Gain High Mass (1118 hrs)
11. Humidification (181 hrs)
12. Solar Protection (264 hrs)
13. Conventional Air Conditioning (102 hrs)
14. Conventional Heating (4828 hrs)

100.0% Composite of Selected Strategies
Impact of a Warming Climate

IPCC Scenarios for 2020 and 2050 were applied to the CZ3 TMY2 weather file. The weather impacts shown above represent the average for the climate change model – not the actual morphed CZ3 file results.

Actual scenario is HadCM3 A2 - [http://www.grida.no/publications/other/ipcc_srl/?src=/climate/ipcc/emission/](http://www.grida.no/publications/other/ipcc_srl/?src=/climate/ipcc/emission/)
Possible increase in average monthly temperatures between TMY2 (1961-1990) CZ3 data and the IPCC A2 Scenario for 2020 and 2050

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2050</th>
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<tbody>
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<td>(F)</td>
<td>1.583</td>
<td>2.613</td>
</tr>
<tr>
<td></td>
<td>1.503</td>
<td>2.465</td>
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<tr>
<td></td>
<td>1.32</td>
<td>2.617</td>
</tr>
<tr>
<td></td>
<td>1.254</td>
<td>3.216</td>
</tr>
<tr>
<td></td>
<td>1.414</td>
<td>3.169</td>
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<tr>
<td></td>
<td>2.245</td>
<td>5.156</td>
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<td>6.666</td>
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<td></td>
<td>2.952</td>
<td>5.924</td>
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<td></td>
<td>2.698</td>
<td>5.575</td>
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<tr>
<td></td>
<td>1.697</td>
<td>4.473</td>
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<tr>
<td></td>
<td>1.447</td>
<td>3.406</td>
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<tr>
<td></td>
<td>1.277</td>
<td>3.064</td>
</tr>
</tbody>
</table>

To test impact of climate change on building energy it is recommended that simulations include running the CZ3 2020 weather file. The use of this weather scenario rather than 2050 may be more appropriate given the relatively cooler temperatures in Berkeley.
Natural Ventilation (% of hours)

- Berkeley Bancroft 2008
- CZ3
- CZ3 2020
- CZ3 2050

Hours: 8am to 10pm, Mon-Sat
Max Temp: 78F
Min Temp: 57F
Humidity Limit: 0.012lb/lb
Potential resource for earth tubes, GSHP. What are soil conditions, level and movement of water table?
Daylighting Potential – 6% Skylight to Floor Ratio

## SkyCalc: Skylight Design Assistant - Graphic Results

**Company Name:** Company ABC, Inc.

**Project Description:** Skylighting Project

<table>
<thead>
<tr>
<th>Dome Skylight</th>
<th>Effective Aperture = 1.74%, Skylight to Floor Ratio (SFR) = 6.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average daylight footcandles (fc)</td>
</tr>
<tr>
<td></td>
<td>1   2   3   4   5   6   7   8   9   10  11  12  13  14  15  16  17  18  19  20  21  22  23  24</td>
</tr>
<tr>
<td>Jan</td>
<td>0   0   0   0   0   0   0   0   0   0  10  23  34  42  44  41  33  21  6   0   0   0   0   0   0   0   0   0   0</td>
</tr>
<tr>
<td>Feb</td>
<td>0   0   0   0   0   0   0   0   0   0  4   20  36  51  60  63  56  47  32  15  2   0   0   0   0   0   0   0   0   0   0</td>
</tr>
<tr>
<td>Mar</td>
<td>0   0   0   0   0   0   0   0   0   0  2   15  34  52  66  76  73  74  63  46  27  7   0   0   0   0   0   0   0   0   0   0</td>
</tr>
<tr>
<td>Apr</td>
<td>0   0   0   0   0   0   0   0   0   0  3   17  39  62  83  99  108 111 105 93  75  51  26  6   0   0   0   0   0   0   0   0</td>
</tr>
<tr>
<td>May</td>
<td>0   0   0   0   0   0   0   0   0   0  5   19  41  64  85 101 112 112 112 101 83  59  33  11  1   0   0   0   0   0   0   0</td>
</tr>
<tr>
<td>Jun</td>
<td>0   0   0   0   0   0   0   0   0   0  2   15  36  62  86 102 111 114 111 100 84  59  33  10  1   0   0   0   0   0   0   0</td>
</tr>
<tr>
<td>Jul</td>
<td>0   0   0   0   0   0   0   0   0   0  14  32  51  65  72  73  66  51  32  13  0   0   0   0   0   0   0   0   0   0   0</td>
</tr>
<tr>
<td>Aug</td>
<td>0   0   0   0   0   0   0   0   0   0  5   19  34  46  52  51  43  32  17  5   0   0   0   0   0   0   0   0   0   0   0</td>
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<tr>
<td>Sep</td>
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</tr>
<tr>
<td>Oct</td>
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</tr>
<tr>
<td>Nov</td>
<td>0   0   0   0   0   0   0   0   0   0  12  25  37  43  44  30  27  15  5   0   0   0   0   0   0   0   0   0   0   0</td>
</tr>
<tr>
<td>Dec</td>
<td>0   0   0   0   0   0   0   0   0   0  12  25  37  43  44  30  27  15  5   0   0   0   0   0   0   0   0   0   0   0</td>
</tr>
</tbody>
</table>

**Design Illuminance = 30 fc**

- `|< 1 fc;` - `|< 15 fc;` - `|< 30 fc;` - `|> 30 fc;`

**Location = Oakland AP**
Skylight Tradeoff Between Daylight and Thermal Conditioning

Total Annual Energy Savings from Skylights
Lighting, Cooling and Heating (all fuels converted to kWh)

Annual Energy Savings (kWh/yr.)

Skylight to Floor Ratio (SFR)

Design
Solar Insolation – Sep 21

Solar gain through 100sf of window @ SHGC of 0.30 = 12,000 Btu (1 ton)
Cumulative Solar Insolation

Jan - Dec

Object Attributes

Total Radiation
Value Range: 0.0000 - 7,300,000.0 0.0 Wh/m2

Roof: 6,300,000 Wh/m2 (2,000 kBtu/sf)
South façade: 3,500,000 Wh/m2 (1,100 kBtu/sf)
West façade: 2,100,000 Wh/m2 (700 kBtu/sf)

ROOF: 586 kWh/sf @ 12% PV conversion efficiency = 70 kWh/sf
Winter Solstice – Roof Shading

9am

10am

11am

12am

1pm

2pm

3pm

4pm
### EUI Benchmarks

#### 2030 CHALLENGE Targets: U.S. National Averages

<table>
<thead>
<tr>
<th>Primary Space / Building Type</th>
<th>Available in Target Finder</th>
<th>Average Source EUI&lt;sup&gt;a&lt;/sup&gt; (kBtu/Sq.Ft.Yr)</th>
<th>Average Percent Electric</th>
<th>Average Site EUI&lt;sup&gt;b&lt;/sup&gt; (kBtu/Sq.Ft.Yr)</th>
<th>2030 Challenge Site EUI Targets (kBtu/Sq.Ft.Yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library</td>
<td>246</td>
<td>59%</td>
<td>104</td>
<td>52.0</td>
<td>41.6, 31.2, 20.8, 10.4</td>
</tr>
</tbody>
</table>

#### Table 9-8: Small Office Electric EUIs, Fuel Shares, and Els

<table>
<thead>
<tr>
<th>End Use</th>
<th>Electric EUI (kWh/End Use ft&lt;sup&gt;2&lt;/sup&gt;)</th>
<th>Electric Fuel Share</th>
<th>Electric El (kWh/ft&lt;sup&gt;2&lt;/sup&gt;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating</td>
<td>0.75</td>
<td>32.10</td>
<td>0.24</td>
</tr>
<tr>
<td>Cooling</td>
<td>2.87</td>
<td>86.10</td>
<td>2.47</td>
</tr>
<tr>
<td>Ventilation</td>
<td>1.81</td>
<td>68.72</td>
<td>1.42</td>
</tr>
<tr>
<td>Water Heating</td>
<td>0.31</td>
<td>65.30</td>
<td>0.20</td>
</tr>
<tr>
<td>Cooking</td>
<td>0.06</td>
<td>65.86</td>
<td>0.06</td>
</tr>
<tr>
<td>Refrigeration</td>
<td>0.03</td>
<td>64.00</td>
<td>0.03</td>
</tr>
<tr>
<td>Interior Lighting</td>
<td>3.90</td>
<td>100.00</td>
<td>3.90</td>
</tr>
<tr>
<td>Office Equipment</td>
<td>2.91</td>
<td>58.40</td>
<td>2.86</td>
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<tr>
<td>Exterior Lighting</td>
<td>0.88</td>
<td>82.80</td>
<td>0.72</td>
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<td>Miscellaneous</td>
<td>1.21</td>
<td>61.80</td>
<td>0.99</td>
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<td>Process</td>
<td>0.73</td>
<td>6.80</td>
<td>0.01</td>
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<tr>
<td>Motors</td>
<td>0.51</td>
<td>23.90</td>
<td>0.12</td>
</tr>
<tr>
<td>Air Compressors</td>
<td>0.41</td>
<td>22.30</td>
<td>0.09</td>
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<tr>
<td>All End Uses</td>
<td>n/a</td>
<td>n/a</td>
<td>11.48</td>
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</tbody>
</table>

#### Table 9-9: Small Office Natural Gas EUIs, Fuel Shares, and Els

<table>
<thead>
<tr>
<th>End Use</th>
<th>Natural Gas EUI (kBtu/End Use ft&lt;sup&gt;2&lt;/sup&gt;)</th>
<th>Natural Gas Fuel Share</th>
<th>Natural Gas El (kBtu/ft&lt;sup&gt;2&lt;/sup&gt;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating</td>
<td>24.65</td>
<td>68.60</td>
<td>16.06</td>
</tr>
<tr>
<td>Cooling</td>
<td>0.60</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>Water Heating</td>
<td>3.61</td>
<td>34.50</td>
<td>1.25</td>
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<tr>
<td>Cooling</td>
<td>2.19</td>
<td>0.30</td>
<td>0.01</td>
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<tr>
<td>Miscellaneous</td>
<td>12.65</td>
<td>0.20</td>
<td>0.02</td>
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<tr>
<td>Process</td>
<td>23.27</td>
<td>0.30</td>
<td>0.08</td>
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<tr>
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<td>n/a</td>
<td>n/a</td>
<td>18.02</td>
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#### Table 9-22: School Electric EUIs, Fuel Shares, and Els

<table>
<thead>
<tr>
<th>End Use</th>
<th>Electric EUI (kWh/End Use ft&lt;sup&gt;2&lt;/sup&gt;)</th>
<th>Electric Fuel Share</th>
<th>Electric El (kWh/ft&lt;sup&gt;2&lt;/sup&gt;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating</td>
<td>0.17</td>
<td>86.10</td>
<td>0.11</td>
</tr>
<tr>
<td>Cooling</td>
<td>1.15</td>
<td>72.80</td>
<td>0.83</td>
</tr>
<tr>
<td>Ventilation</td>
<td>0.94</td>
<td>91.90</td>
<td>0.92</td>
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<tr>
<td>Water Heating</td>
<td>0.16</td>
<td>35.50</td>
<td>0.06</td>
</tr>
<tr>
<td>Cooking</td>
<td>0.22</td>
<td>99.90</td>
<td>0.22</td>
</tr>
<tr>
<td>Refrigeration</td>
<td>0.49</td>
<td>99.90</td>
<td>0.49</td>
</tr>
<tr>
<td>Interior Lighting</td>
<td>2.73</td>
<td>100.00</td>
<td>2.73</td>
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<tr>
<td>Office Equipment</td>
<td>0.36</td>
<td>100.00</td>
<td>0.36</td>
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<tr>
<td>Exterior Lighting</td>
<td>0.77</td>
<td>95.80</td>
<td>0.73</td>
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<tr>
<td>Miscellaneous</td>
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<td>92.60</td>
<td>0.25</td>
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<tr>
<td>Process</td>
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<td>Motors</td>
<td>0.21</td>
<td>44.00</td>
<td>0.10</td>
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<tr>
<td>Air Compressors</td>
<td>0.06</td>
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<td>0.01</td>
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<tr>
<td>All End Uses</td>
<td>n/a</td>
<td>n/a</td>
<td>6.91</td>
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</table>

#### Table 9-23: School Natural Gas EUIs, Fuel Shares, and Els

<table>
<thead>
<tr>
<th>End Use</th>
<th>Natural Gas EUI (kBtu/End Use ft&lt;sup&gt;2&lt;/sup&gt;)</th>
<th>Natural Gas Fuel Share</th>
<th>Natural Gas El (kBtu/ft&lt;sup&gt;2&lt;/sup&gt;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating</td>
<td>15.89</td>
<td>83.80</td>
<td>14.87</td>
</tr>
<tr>
<td>Cooling</td>
<td>7.74</td>
<td>3.70</td>
<td>0.26</td>
</tr>
<tr>
<td>Water Heating</td>
<td>5.93</td>
<td>63.70</td>
<td>5.26</td>
</tr>
<tr>
<td>Cooking</td>
<td>2.18</td>
<td>60.70</td>
<td>1.32</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>0.28</td>
<td>4.50</td>
<td>0.01</td>
</tr>
<tr>
<td>Process</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>All End Uses</td>
<td>n/a</td>
<td>n/a</td>
<td>21.75</td>
</tr>
</tbody>
</table>

CEUS PG&E: EUI = approx 55 kBtu/sf/yr

EUI = approx 40 kBtu/sf/yr
Internal Gains – Typical Week
Baseline – Annual Whole Building Energy Consumption

Fuel Breakdown - Untitled, Building 1
1 Jan - 31 Dec, Annual

EnergyPlus Output

Room Electricity  Lighting  System Fans  Heat Generation (Gas)  Chiller (Electricity)  DHW (Gas)

24 kBtu/sf/yr
Baseline – Monthly Whole Building Energy Consumption
Baseline – Design Heating and Cooling Loads

<table>
<thead>
<tr>
<th>Zone</th>
<th>Comfort Temperature (°F)</th>
<th>Steady-State Heat Loss (kBTU/h)</th>
<th>Design Capacity (kBTU/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NW Total design heat loss = 149.720 (kBTU/h)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Zone 1</td>
<td>68.07</td>
<td>27.27</td>
<td>27.27</td>
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<tr>
<td>Plenum Total design heat loss = 0.000 (kBTU/h)</td>
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<td></td>
<td></td>
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<tr>
<td>Zone 1</td>
<td>64.60</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>Mezzanine Total design heat loss = 23.070 (kBTU/h)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Zone 1</td>
<td>67.88</td>
<td>23.07</td>
<td>23.07</td>
</tr>
<tr>
<td>Double Height Total design heat loss = 71.360 (kBTU/h)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Zone 1</td>
<td>67.75</td>
<td>71.86</td>
<td>71.86</td>
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<tr>
<td>NE Total design heat loss = 27.520 (kBTU/h)</td>
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<tr>
<td>Zone 1</td>
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Heating Load: 13 tons
Cooling Load: 10 tons

**Untitled, Building 1**

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<th>Design Flow Rate (CFM)</th>
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<th>Latent (kBTU/h)</th>
<th>Air Temperature (°F)</th>
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<td>0.0</td>
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</table>
Measures:
- Raise cooling setpoint from 75F to 80F
- Reduce plug loads by 20% from 0.6 W/sf to 0.48W/sf
- Reduce infiltration from 0.5 to 0.4 ACH
- Daylighting controls
- Fixed shading devices
- Exterior movable vertical shades
- Wall insulation increased from R16 to R22
- Roof insulation increased from R27 to R34
- Mixed mode natural ventilation system
- No mechanical cooling system
- Heating switched from furnace to heat pump with COP of 3.0
- Sensible heat recovery
- Water heater switch from furnace to heat pump with COP of 3.0
Energy Savings Potential

- 24kW of PV
- If ST used to offset water and space heating then drops to 22kW
Internal Hourly Temperature Distribution – Double Height Space

- 80.6°F: 57 hours at or above
- 82.4°F: 9 hours at or above
Could also consider thermal chimney, earth tubes and ceiling fans as additional passive / low energy strategies.
APPENDIX M

CLIMATE ACTION PLAN AND LEED SCORE CARDS
Climate Action Plan

Access this report online at:
www.CityofBerkeley.info/sustainable
Acknowledgements

The City of Berkeley would like to thank the following individuals and groups for their input, guidance, and support on the Berkeley Climate Action Plan:

- The hundreds of community members who took the time to contribute ideas and ask questions for the benefit of this plan
- The Berkeley Mayor and City Council
- The City cross-departmental “G-Team”
- The City Commissions that hosted “Climate Action Workshops”
- The Mayor’s Advisory Group on Climate Protection
- ICLEI – Local Governments for Sustainability
- UC faculty, staff members and student leaders who contributed to the plan through their research, volunteerism, and guidance
- The San Francisco Foundation
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Executive Summary

The science is clear. Global warming is a real and significant threat to humankind. However, our response to this threat presents opportunities to create a more livable, equitable, and economically vibrant community. By using energy more efficiently, harnessing renewable energy to power our buildings, enhancing access to sustainable transportation modes, recycling our waste, and building local food systems, we can keep dollars in our local economy, create new green jobs, and improve community quality of life. In fact, most of the actions in the plan will provide more savings – nearly $500 million in total by 2020 – than initial costs.

Even beyond the benefits of local climate action, the impacts associated with climate change make action at all levels an urgent and absolute necessity. Globally, the rise in temperatures has profound implications for the availability of the natural resources on which economic prosperity and human development depend. The changing climate also has potentially severe economic, health, social, and environmental consequences for us close to home, including:

- Threats to coastal infrastructure due to a rising San Francisco bay: The bay rose seven inches over the past 150 years. Estimates are that by 2100, the bay could rise up to a meter.¹
- Increased incidence of large wildfires: The risk of large wildfires in California could increase by as much as 55% by century’s end.
- Serious public health threats: Increasing temperatures exacerbate local air pollution, lead to intensified heat waves, and expand the range for infectious diseases.
- Water shortages: Due to rising temperatures, the Sierra Nevada mountain snowpack that supplies much of the state’s water supply could decrease by 80% by century’s end. Loss of snowpack threatens drinking and agricultural water supplies as well as hydropower generation and the health of the state’s creeks and rivers.²

The cost of inaction, or inadequate action, is unacceptable. Berkeley citizens recognize this truth and are eager to get to work. In November 2006, Berkeley voters issued a call to action on the climate challenge by overwhelmingly endorsing ballot Measure G. The mandate was simple but bold: Reduce our entire community’s greenhouse gas (GHG) emissions by 80% by the year 2050. The measure directs the Mayor to develop a Climate Action Plan to reach that target.

Mayor Tom Bates embraced Berkeley citizens’ call to action and provided leadership in engaging the community in a local climate protection campaign. This plan is the result of the campaign that Measure G set in motion. It is rooted in the vision for a sustainable Berkeley that emerged from the climate action planning process. The plan’s purpose is to serve as a guide for setting the community on a path to achieve that vision.

**Vision for the year 2050:**

- New and existing Berkeley buildings achieve zero net energy consumption through increased energy efficiency and a shift to renewable energy sources such as solar and wind.
- Public transit, walking, cycling, and other sustainable mobility modes are the primary means of transportation for Berkeley residents and visitors.
- Personal vehicles run on electricity produced from renewable sources or other low-carbon fuels.
- Zero waste is sent to landfills.
- The majority of food consumed in Berkeley is produced locally, i.e., within a few hundred miles.
- Our community is resilient and prepared for the impacts of global warming.
- The social and economic benefits of the climate protection effort are shared across the community.

**Berkeley’s Emissions Inventory**

To ensure that the community stays on course to meet its aggressive GHG reduction target, it is necessary to track our progress by conducting regular, community-wide GHG emissions inventories.

It helps to think of the inventory as a “snapshot” of our community’s GHG emissions for a given year. It identifies the major sources and quantity of GHG emissions produced by residents, businesses, and public institutions. In 2005 Berkeley emitted approximately 576,000 metric tons of GHG emissions. The chart (top of page ES3) illustrates these emissions by source.
The inventory reflects the emissions that result from motor vehicles driven and electricity and natural gas consumed within Berkeley city limits. While there are important limitations in the inventory methodology, it does serve as a useful tool for tracking community emissions over time and for targeting climate protection strategies to address the main emissions sources.

Targets & Trends

Per Measure G, Berkeley’s emissions reduction target is an 80% reduction below 2000 levels by 2050. This target is expressed in absolute tons and is not relative to projected growth. In order to monitor progress along the way, it is effective to set interim, short-term targets. The 2020 target is to achieve a 33% absolute reduction below 2000 community-wide emissions levels, which equates to about a two percent reduction per year in total community-wide emissions.4

This plan focuses on actions our community can and should implement between now and 2020, but in the context of promoting the types of innovative approaches that will be necessary to achieve the ultimate 2050 target.

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3 Estimated from the Berkeley 2005 GHG emissions inventory conducted by ICLEI – Local Governments for Sustainability.

4 The 2020 target was determined from a linear extrapolation from year 2000 emissions levels to 80% below 2000 levels by the year 2050.
Based on forecasted emissions levels, a 33% reduction from 2000 levels equates to an annual GHG emissions reduction of nearly 188,000 metric tons by 2020.

Recent trends in Berkeley’s community-wide GHG emissions show an almost nine percent decrease between 2000 and 2005, one of the largest reductions in GHG emissions documented by a U.S. city. However, the community cannot count on or fully identify the array of social and economic factors that contributed to this short-term trend. This plan outlines a series of actions aimed at continuing this trend and achieving Berkeley’s emissions reduction targets.

Recommended Emissions Reduction Actions

The Berkeley Climate Action Plan was designed under the premise that local governments and the communities they represent are uniquely capable of addressing the main sources of the emissions that cause global warming: the energy consumed in buildings and for transportation, and the solid waste sent to landfills.

Below is a summary of the core recommended strategies for each category of action included in the plan. See the corresponding chapters for detailed recommendations:

1. Sustainable Transportation & Land Use (Chapter 3)

The plan is designed to reduce vehicle miles traveled in the community by making cycling, walking, public transit, and other sustainable mobility modes the mainstream and to increase vehicle fuel efficiency and the utilization of low-carbon fuels:

- **Increase the safety, reliability, and frequency of public transit.**
- **Expand other mobility options, such as car share pods and shuttle buses, into areas where existing public transit is less frequent and accessible.**
- **Accelerate implementation of the City’s Bicycle and Pedestrian Plans and continue efforts to make walking and cycling safe, healthy, and enjoyable alternatives to driving.**
- **Ensure that new development is “green” development, meaning that it is oriented toward transit and is coupled with enhancements to green and open space, urban forestry efforts, and water conservation efforts, among others.**
- **Manage parking effectively to minimize driving demand and encourage and support alternatives to driving.**
- **Create incentives for low-carbon vehicles such as electric vehicles and plug-in hybrids.**
2. Building Energy Use (Chapter 4)
The community’s task is to reduce conventional energy use in every existing Berkeley home, business, and institution through high-quality energy efficiency retrofits and a greater reliance on renewable energy such as solar:
- Strive to achieve zero net energy performance in new construction by 2020.
- Enhance and lower the cost of energy efficiency services and standards for existing residential and non-residential buildings.
- Develop a local, clean, decentralized renewable energy supply to meet a larger portion of the community’s energy needs.
- Continue to increase energy efficiency and renewable energy use in public buildings.
- Prepare local residents for job opportunities in the emerging green economy.

3. Waste Reduction & Recycling (Chapter 5)
These measures aim to eliminate solid waste at its source, i.e., the point of production, and to maximize reuse and recycling throughout the community:
- Enhance recycling, composting, and source reduction services for residential and non-residential buildings.
- Expand the types of materials that can be recycled locally, such as certain plastics.
- Expand efforts to eliminate waste at its source by limiting the use of plastic bags and by increasing producers’ responsibility for product waste and packaging.

4. Community Outreach & Empowerment (Chapter 7)
The success of local climate action efforts rests on behavior change. Actions designed to educate and empower community members are fundamental to this plan:
- Launch a coordinated outreach and education campaign to mobilize residents, businesses, and industry.
- Continue to expand the opportunities students have to learn about and take action on climate change.
- Increase awareness and action in the City government by providing training on how to increase sustainability at home and in the workplace.

5. Preparing for Climate Change Impacts (Chapter 6)
We live in a region that knows well the value of preparedness. Even as the community ramps up efforts to mitigate greenhouse gas emissions, it is critical that we start now to apply the region’s preparedness doctrine to the risks associated with climate change. The City should partner with local, regional, and state agencies to develop a plan of action for climate adaptation.
From Planning to Action: Everyone has a Role to Play

While measuring GHG emissions, establishing reduction targets, and developing a Climate Action Plan are essential steps, the most important component of the community climate protection effort lies ahead: Implementation.

Turning this plan into action rests on more than just ideas and good intentions. It requires Berkeley residents, businesses, the City government, and other institutions to urgently rise to the challenge of making big changes – changes in our infrastructure, technological advances, ramped up green workforce development, and change in the decisions we make every day as members of the Berkeley community. Everyone must play a role.

The Climate Action Plan recommends strategies that support individuals’ and businesses’ efforts to consume less energy and produce less waste. Implementing the plan will, for example, increase access to public transit and make it safer to commute by foot or bicycle, provide incentives to make one’s home or business more energy efficient, and increase the convenience of recycling and composting waste. The City is committed to playing a leadership role in eliminating barriers to local climate action.

In the meantime, individuals can start now to reduce their carbon footprint and save money at the same time. Here are just a few easy action steps to consider:

- Change your commute. Pick at least one day per week to ride your bicycle, walk, take public transit, or carpool to work. If you already do so, encourage a friend or family member to join you.
- Go unplugged. Many appliances are “vampires.” They suck electricity even when turned off. Plug your TV, stereo and other appliances into a power strip and turn it off when the appliances are not in use.
- Generate less waste. The average American generates over four pounds of trash each day. Generate less trash by taking simple steps such as using reusable coffee mugs and grocery bags.
- Save water. Install a low-flow shower head and faucet aerator. These easy-to-install devices can significantly reduce water consumption and the energy it takes to heat water.
- Grow your own food. Join a community garden or plant a garden in your yard. Local food production reduces the distance food must travel to get to our tables, among several other benefits.
Thanks to photographer Kiran Singh for the use of his photos from Berkeley: The Life and Spirit of a Remarkable Town (Berkeley: Frog Books, 2004): Cover; p1 two middle; p2 top; p4 top; p6 bottom.

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kiran@kiranphoto.com

Printed on 100% recycled paper.
APPENDIX M2

BERKELEY CLIMATE ACTION PLAN SUMMARY
Chapter 1: Introduction

The science is clear. Global warming is a real and significant threat to humanity. However, our response to this threat presents opportunities to create a more livable, equitable and economically vibrant community. By using energy more efficiently, harnessing renewable energy to power our buildings, enhancing access to sustainable transportation modes, recycling our waste, and building local food systems, we can keep dollars in our local economy, create new green jobs and improve community quality of life. In fact, most of the actions in the plan will provide more savings – nearly $500 million in total by 2020 – than initial costs.

Even beyond the benefits of local climate action, the impacts associated with climate change make action at all levels an urgent and absolute necessity. Globally, the rise in temperatures has profound implications for the availability of the natural resources on which economic prosperity and human development depend. The changing climate also has potentially severe economic, health, social and environmental consequences for us close to home, including:

- **Threats to coastal infrastructure due to a rising San Francisco Bay**: The Bay rose seven inches over the past 150 years. Estimates are that by 2100, the bay could rise up to a meter.¹

- **Increased incidence of large wildfires**: The risk of large wildfires in California could increase by as much as 55% by century’s end.

- **Serious public health threats**: Increasing temperatures exacerbate local air pollution, lead to intensified heat waves, and expand the range for infectious diseases.

- **Water shortages**: Due to rising temperatures, the Sierra Nevada mountain snow-pack that supplies much of the state’s water supply could decrease by 80% by century’s end. Loss of snow-pack threatens drinking and agricultural water supplies as well as hydropower generation and the health of the state’s creeks and rivers.²

Berkeley citizens recognize the growing threat that the climate crisis poses and are eager to do something about it. In November 2006, Berkeley voters issued a call to action on the climate challenge by overwhelmingly endorsing ballot Measure G. The mandate was simple but bold: Reduce our entire community’s greenhouse gas (GHG) emissions by 80% by the year 2050. The measure directs the Mayor to develop a Climate Action Plan to reach that target.

² Our Changing Climate: A Summary Report from the California Climate Change Center (2006)
Mayor Tom Bates embraced Berkeley citizens’ call to action and provided leadership in engaging the community in a local climate protection campaign. The goal of the campaign was two-fold. One, provide as many opportunities as possible for Berkeley residents to engage in developing local climate protection strategies that will affect our community for years to come. Two, educate community members about the role each of us can and must play if the Measure G targets are to be achieved.

This plan is the result of the campaign that Measure G set in motion. It is rooted in the vision for a sustainable Berkeley that emerged from the climate action planning process. The plan’s purpose is to serve as a guide for setting the community on a path to achieve that vision.

**Vision for year 2050:**

- New and existing Berkeley buildings achieve zero net energy consumption through increased energy efficiency and a shift to renewable energy sources such as solar and wind
- Public transit, walking, cycling, and other sustainable mobility modes are the primary means of transportation for Berkeley residents and visitors
- Personal vehicles run on electricity produced from renewable sources or other low-carbon fuels
- Zero waste is sent to landfills
- The majority of food consumed in Berkeley is produced locally, i.e., within a few hundred miles
- Our community is resilient and prepared for the impacts of global warming
- The social and economic benefits of the climate protection effort are shared across the community

Turning the vision and this plan into action rests on more than just ideas and good intentions. It requires Berkeley residents, businesses, and institutions to urgently rise to the challenge of making big changes - changes in our infrastructure, technological advances, ramped up green workforce development, and change in the decisions we make every day as members of the Berkeley community. No one entity or sector – not the City government, nor schools, nor industry...
or small businesses, nor individual residents – can create these changes alone. Everyone must play a role.

At the same time, our community must ensure that the solutions we propose and implement are sensitive to a broader set of societal concerns such as social justice, local economic vitality, public health, and dependence on oil, a finite resource. Addressing the climate challenge is not only an opportunity to reduce greenhouse gas emissions, but also an opportunity to build a positive, community-based movement in Berkeley that results in increased civic pride and improved quality of life.

The time for complacency and old habits is over. The time for bold action has begun.

Climate Action Plan Purpose

The Berkeley Climate Action Plan was designed under the premise that local governments and the communities they represent are uniquely capable of addressing the main sources of the emissions that cause global warming: the energy consumed in buildings and for transportation, and the solid waste sent to landfills.

The purpose of the plan is to guide the development, enhancement, and ultimately the implementation of actions that aggressively cut Berkeley’s greenhouse gas emissions. The plan does the following:

■ Describes Berkeley’s GHG emissions sources
■ Provides an estimate of how those emissions could be expected to grow
■ Recommends goals, policies and actions that we as a community can implement to achieve GHG reductions and other community benefits such as increased green job opportunities and improved public health. Several of the recommendations in the plan require Council approval separate from adoption of the Climate Action Plan and also require additional funding in order to be implemented.
■ Provides a timeline for the plan’s implementation, including identifying existing and potential costs and funding sources
■ Defines a strategy for turning this plan into action and transparently tracking and reporting progress toward our goals

Clearly, our community does not start from scratch. Berkeley is known throughout the world as a pioneering green city that is willing to lead social change through innovative and creative action. Ways in which Berkeley exhibits climate action leadership include:

■ Berkeley was the first city in the nation to offer curbside recycling
■ The City government pioneered the use of bio-diesel and car-sharing in its fleet
The City was the first to require that energy and water saving measures be implemented at the time a residential or commercial building is sold or being substantially renovated.

Small businesses in Berkeley receive subsidized energy and lighting retrofits.

Residents have access to free energy and water saving devices.

Berkeley was the first City to establish its climate protection targets through a vote of the people.

Furthermore, this plan builds on already adopted City policies and plans, including: the Berkeley General Plan, the Bicycle Plan, the Pedestrian Plan, the Green Building Initiative, the Environmentally Preferable Purchasing Policy, the Zero Waste Goal, and Berkeley’s official endorsement of the Kyoto Protocol, among others.

Partly as a result of these and many other existing actions and planning efforts, the community reduced the GHG emissions that result from electricity, natural gas and transportation fuel consumption by nearly nine percent between 2000 and 2005 — a truly remarkable accomplishment.

How Was This Plan Developed?

Just as the climate action planning effort was set in motion by Berkeley voters, the plan itself is a product of community members’ ideas and vision for a “climate friendly” city.

The City Council allocated two years of funding to enable City staff to perform extensive research on potential climate protection strategies and to conduct a robust community input process. Development of the plan was a cross-departmental effort coordinated by the City’s Office of Energy & Sustainable Development (OESD). OESD relied on the expertise of staff from the Department of Public Works, which includes the Transportation Division and the Solid Waste Management Division; the Department of Planning & Development; the City Manager’s Office, which includes the Office of Economic Development and neighborhood services staff; and the Department of Health and Human Services; among others.

The public process was designed to maximize the opportunities community members have to contribute ideas, learn more about the various components of the climate issue, and get involved in existing sustainability efforts.

There was extensive opportunity to engage in the development of the plan prior to the release of the first draft in 2008, including:

Climate Action Kick-Off: This event was held in May 2007 and attended by over 170 community members.

**Commission-Hosted “Climate Action Workshops”**: Seven City Commissions hosted public workshops for the purpose of providing a forum for participation in plan development.

**Community Events & Meetings**: City staff persons and volunteers participated in many community events. Over 1,500 people stopped by a “Berkeley Climate Action” booth or attended a community event with a climate action component.

**Emails, Phone Calls & On-Line Forums**: The City also solicited ideas and feedback on a website specifically designed for that purpose (www.BerkeleyClimateAction.org) and through various email networks.

At the invitation of the mayor, a number of local experts in the fields of climate science, energy, transportation, and public engagement also served as informal advisors leading up to the release of the first and second drafts of the Climate Action Plan.

In addition, UC faculty, staff members and student leaders contributed to the plan through their research, volunteerism, and guidance. Chancellor Robert Birgeneau also set a positive example by setting aggressive carbon reduction targets for the University and empowering staff and faculty to develop a concrete and detailed plan on how to reach those targets. Appendix D includes an overview of UC Berkeley’s climate protection initiative.

In January 2008, City staff presented to City Council and released for public comment the first draft of the Berkeley Climate Action Plan. Hundreds of community comments were submitted on that draft through a variety of means, including:

- At another round of public workshops hosted by City Commissions and the City’s Office of Energy & Sustainable Development
- At additional community-led meetings hosted by organizations such as the Sierra Club, League of Women Voters, Livable Berkeley, and the Bicycle Friendly Berkeley Coalition
- On-line at www.BerkeleyClimateAction.org

An underlying theme of public comments on the first draft is that the plan offered a strong vision, but more specific implementation steps are needed, including an implementation timeline, estimates of costs associated with implementation, and identification of potential sources of funding. Community members also urged the City to be bold when designing strategies to achieve our GHG emissions reduction goal.
A second draft of the Climate Action Plan was presented to City Council in September 2008. It carried forward the main program elements from the first draft, and filled in those program elements with specific measures needed to achieve the necessary scale of GHG emissions reductions. Because the second draft included significant new information staff undertook another round of public review and comment. The public comment period on the second draft was open from September 23, 2008 to January 16, 2009.

This final draft of the plan, adopted by Council on June 2, 2009, once again benefited from community feedback and discussion gathered at approximately a dozen community meetings, including commission meetings, “town hall” meetings hosted by Council Members, and presentations at neighborhood associations. Several community members also provided detailed comments on the second draft at www.BerkeleyClimateAction.org.

The result of the extensive community and expert input is a detailed and far-reaching plan that reflects a wide range of ideas and influences and that benefited from the creativity, diversity and passion that is Berkeley. The City will continue to reach out to local residents, businesses and community organizations to monitor the plan’s efficacy, maximize its benefits, and keep it up to date so it can serve as a dynamic blueprint for achieving the necessary scale of GHG reductions.

How does Local Climate Action Interface with Action at the Regional & State Levels?

The Berkeley Climate Action Plan was prepared at a time of unprecedented potential for local, regional, and state government agencies to collaborate on addressing the climate crisis. In December 2008, the California Air Resources Board (CARB) approved the Climate Change Scoping Plan, which contains the main strategies California will use to reduce GHG emissions. The Scoping Plan is a central requirement of Assembly (AB) Bill 32 (Nunez), the Global Warming Solutions Act of 2006 that requires California to reduce its greenhouse gas emissions to 1990 levels by 2020. Essentially serving as the state’s climate action plan, it recognizes the fundamental role of local governments in reducing the emissions that result from energy consumption and waste generation. Many of the measures in the state’s plan rely on local government actions. Through the plan, the state also encourages local governments to adopt GHG reduction targets for City government and community-wide emissions, and to develop local action plans for achieving those targets. Berkeley’s Climate Action Plan is

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3 See more on state-level climate legislation at www.arb.ca.gov/cc/cc.htm (2009).
already serving as a model for cities across the state that are embarking on their own action planning processes.

An essential component of the state Scoping Plan is reducing GHG emissions from transportation. In September 2008, Governor Schwarzenegger signed **Senate Bill (SB) 375** (Steinberg). SB 375 mandates an integrated, regional land use and transportation planning approach to reducing GHG emissions from cars and light trucks. Cars and light trucks generate about 31% of statewide GHG emissions, and a little over one quarter of GHG emissions within the Bay Area and within Berkeley. The law directs CARB to establish regional GHG reduction targets for cars and light trucks and assigns Metropolitan Planning Organizations (MPOs) throughout the state (the Association of Bay Area Governments and the Metropolitan Transportation Commission in the Bay Area) to develop plans for achieving those targets. Essentially, SB 375 is a mechanism for implementing the measure in the state’s Scoping Plan related to reducing regional transportation-related GHG emissions. Through the SB 375 process local governments in the Bay Area (and in other regions) will have to work together to integrate development patterns and transportation networks in a way that achieves regional GHG reduction targets while also meeting housing needs, protecting greenspace, and addressing other regional planning objectives. SB 375 also provides relief from certain California Environmental Quality Act (CEQA) requirements for development projects that are consistent with regional plans that achieve the established GHG reduction targets. The City of Berkeley looks forward to the opportunity to work collaboratively with other cities in the region and views the Berkeley Climate Action Plan as an important resource for developing the regional plan required by CARB.

Another central piece of state legislation that affects climate action at the local government level is **SB 97 (Dutton)**. Signed into law by Governor Schwarzenegger in August 2007, SB 97 provides that greenhouse gas emissions and their effects are subject to CEQA. CEQA requires that agencies identify a given project’s potentially significant effects on the environment and mitigate those significant effects whenever feasible. Public agencies such as local governments are therefore now obligated to determine whether a given project’s climate change-related impacts are significant and to mitigate any significant effects. CARB is tasked with recommending where the threshold of “significance” lies.

There are several other important state laws and executive orders that interface directly with efforts in Berkeley and other cities throughout California to reduce greenhouse gas emissions and to prepare for the impacts of global warming. These include, but are certainly not limited to:

- **AB 1493 (Pavley, 2002):** Known as the “Pavley Bill,” AB 1493 directed CARB to adopt vehicle standards that lower GHG emissions to the maximum extent technologically feasible, beginning with the 2009 model year. The standards would reduce GHG emissions
from California passenger vehicles by about 22% by 2012 and about 30% by 2016, thereby having a significant impact on local GHG reduction efforts.

■ **SB 107 (Simitian, 2006):** SB 107 obligates the investor-owned utilities (IOUs) to increase the share of renewable energy sources (e.g., wind, solar, geothermal) in their electricity mix to 20% by 2010. Known as the Renewables Portfolio Standards (RPS), the law is intended to decrease California’s reliance on fossil fuels and reduce GHG emissions from the electricity sector. Governor Schwarzenegger has since called for 33% of California’s electricity to be provided by renewable resources by 2020. As of 2008, about 12% of California’s electricity demand is met with renewable resources. A cleaner, greener electricity grid is a key component of achieving state and local GHG reduction targets. The City of Berkeley supports the Governor’s call to increase the RPS to 33% and urges PG&E to achieve that standard.

■ **Executive Order (EO) S-13-08:** Given the serious threat of sea level rise to California’s water supply and coastal resources and the impact it would have on our state’s economy, population and natural resources, in 2008 Governor Arnold Schwarzenegger issued EO S-13-08 directing state agencies to enhance the state’s management of climate impacts from sea level rise, increased temperatures, shifting precipitation and extreme weather events. As part of implementation of EO S-13-08, the California Resources Agency, along with the Cal/EPA, the Business Transportation and Housing Agency, the Department of Health and Human Services, and others, is developing the state’s first comprehensive Climate Adaptation Strategy (CAS). Berkeley and other local governments should participate in the planning and implementation of the CAS.

**Climate Action & Green Collar Jobs**

Addressing climate change is not only a cause for environmentalists. Climate action intersects with efforts to create employment opportunities in the emerging green economy. Implementing the Berkeley Climate Action Plan will result in increased demand for skilled labor that can do the work we need done, such as energy efficiency retrofits, solar installations, processing of recyclables, growing and processing local food, and designing, building and maintaining infrastructure related to alternative transportation.

Importantly, this demand for labor is local, because it requires improving our local environment. It cannot be outsourced. The City must work with neighboring cities and

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4 See more on AB 1493 at [www.arb.ca.gov/cc/ccms/ccms.htm](http://www.arb.ca.gov/cc/ccms/ccms.htm) (2009).
community agencies to connect local residents to emerging job opportunities. In doing so we will protect the environment and provide pathways to sustainable employment at the same time.

The City of Berkeley and several partners have already begun the task of preparing local residents for jobs in the emerging green economy. Together, through a cooperative effort called the East Bay Green Corridor Partnership, the Cities of Berkeley, Oakland, Richmond and Emeryville are joining with leaders from UC Berkeley and Lawrence Berkeley National Laboratory (LBNL) to design a regional program that supports green workforce development. The goal of the effort is to provide the training necessary to meet future workforce demand in the green economy and to continue to attract green energy investment in the region. The partnership works collaboratively to identify regional employer demand and develop new technical and soft skills training and education programs to help meet that demand. The overarching vision is to have in place Green Energy Education Pathways that provide multiple entry points into the training and education system and that lead to jobs with career ladders and benefits. See additional specific strategies for developing a green collar workforce in Chapter 4.
Chapter 2: Berkeley’s Greenhouse Gas Emissions Estimates

A. Why Conduct a GHG Emissions Inventory?

Measure G targets an 80% greenhouse gas emissions reduction below 2000 levels by the year 2050. This target is in absolute terms, meaning that it is independent of population or workforce growth. To ensure that Berkeley stays on course to meet this long-term target, it makes sense to set interim, short-term targets and to track emissions reduction progress over time by conducting regular, community-wide greenhouse gas emissions inventories.

It helps to think of an emissions inventory as a “snapshot” of community emissions for a given year. This “snapshot” is a useful policy tool because it quantifies the main sources of heat-trapping emissions for which the community is responsible. Equipped with this knowledge, we can better target policies and actions to address those sources.

The emissions inventory is useful for another important reason: it helps to remind us that we are both part of the global warming problem and part of the solution. The GHG emissions that the inventory captures are the result of our energy consumption in our homes, businesses, industries and institutions and in our motor vehicles. We are sources of global warming pollution, known as anthropogenic sources. Fortunately, we are also the source of solutions. By driving less, creating more energy efficient buildings, shifting to renewable sources of energy and by committing as a community to the actions laid out later in this plan, we can collectively start to turn this problem around. One city cannot solve the problem on its own. But if Berkeley leads, as it has done so often in the past, others will follow.

B. Inventory Methodology

The International Council for Local Environmental Initiatives (ICLEI) conducted Berkeley’s GHG emissions inventory for the year 2005. ICLEI provides the accepted community-level inventory methodology for over 700 local governments throughout the world. City staff conducted inventories of Berkeley’s 19901 and

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1 Berkeley’s 1990 GHG emissions inventory is incomplete due to lack of available transportation-related data.
2000 emissions using ICLEI’s inventory methodology and emissions analysis software tool (Clean Air & Climate Protection software).

To estimate Berkeley’s emissions, ICLEI and City of Berkeley staff persons collected data from a number of different sources. PG&E provided electricity and natural gas consumption data for community-wide energy consumption. This energy consumption data is applied to an emissions factor in order to arrive at an estimate for tons of GHG emissions.2 The Metropolitan Transportation Commission (MTC) and the Bay Area Air Quality Management District (BAAQMD) provided transportation-related data. MTC provides an estimate for total vehicle miles traveled (VMT) within City limits and BAAQMD provides an estimated breakdown of the vehicle types that are responsible for Berkeley’s VMT.

When calculating Berkeley’s emissions inventory, all electricity and natural gas consumed in the City is included. This means that, even though the electricity used in Berkeley buildings is produced elsewhere, the emissions associated with it appear in the inventory. The decision to calculate emissions in this manner reflects the philosophy that a community should take full ownership of the impacts associated with its energy consumption, regardless of whether the generation occurs within the geographical limits of the community.

However, the emissions that result from energy consumption at UC Berkeley (UCB) and Lawrence Berkeley National Laboratory (LBNL) are not included in the inventory. ICLEI’s inventory methodology assumes that local governments have little ability to influence the operational decisions of autonomous institutions in a community, such as universities and buildings owned and operated by other levels of government. Both UCB and LBNL are developing and implementing strategies to reduce their own greenhouse gas emissions.

For the transportation sector, Berkeley’s GHG inventory estimates the emissions that result from vehicles driven within City limits. While the intent of ICLEI’s inventory methodology is to measure emissions that a local government can influence through municipal policy, setting the boundaries of the inventory at the city limits leads to a less than complete picture of how a community may influence those emissions. First, the current methodology under-reports community transportation-related emissions. For example, Berkeley’s inventory does not currently capture sources of emissions such as people driving to or from Berkeley by interstate (e.g., on I 80); the emissions that result from Berkeley citizens driving outside of Berkeley; and the emissions that result from citizens of other communities driving to Berkeley (until they reach City limits) for jobs and other services. In short, Berkeley is responsible for significantly more transportation-related emissions than what is reported in the emissions inventory.

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2 The emissions factor for electricity was provided through ICLEI by PG&E and is 0.49 lbs. CO\(_2\)e per KWh. The emissions factor for natural gas was provided through ICLEI by the U.S. Department of Energy and is 12.3 lbs. CO\(_2\)e per therm.
Second, because the current inventory methodology only captures vehicle travel within city limits, it does not capture how local land use decisions can affect regional motor vehicle travel. For example, focusing mixed-use development near transit stations in Downtown Berkeley may increase passenger vehicle miles traveled (and the associated emissions) in Berkeley in the short-term by increasing Berkeley’s population. But such a land use strategy would ultimately reduce the region’s greenhouse gas emissions by enabling more individuals to drive less because they can now live in a more compact, pedestrian-friendly, transit-oriented neighborhood such as Downtown Berkeley.

As described further in the Sustainable Transportation & Land Use chapter, Berkeley’s land use and transportation decisions occur in a regional context. Therefore, the community must consider other indicators beyond the community-level emissions inventory when making policy decisions. ICLEI is currently updating its inventory protocols to enable communities to better capture and report transportation-related GHG emissions. In addition, City staff is working to develop more specific estimates for the scale of emissions generated as a result of vehicle miles driven to and from Berkeley.

An additional limitation of note to the current community level emissions inventory methodology is that, despite the fact that the beneficial effects of waste diversion on greenhouse gas emissions are well documented, the Berkeley greenhouse gas emissions inventory does not include the emissions that result from the waste our community sends to the landfill. This is not an oversight but, rather, is indicative of the difficulty in accurately measuring solid waste-related emissions. This limitation notwithstanding and in light of the known GHG reduction potential of solid waste diversion, this plan contains a series of solid waste diversion strategies, as well as the potential GHG reductions associated with them. Further, ICLEI is currently partnering with the Alameda County Waste Management Authority & Recycling Board (known as StopWaste.Org) to update Berkeley’s emissions inventory to include solid waste-related emissions.

Despite the limitations mentioned above, ICLEI’s emissions analysis assistance is sophisticated and useful. But calculating the emissions that result from energy consumption with precision is inherently difficult. The model depends upon numerous assumptions and is limited by the quantity and quality of available data. With this in mind, it is useful to think of any specific number generated by the model as a rough approximation rather than an exact value.
C. Berkeley’s Emissions Portfolio

The table and charts below depict Berkeley’s most recent emissions “snapshot,” year 2005.

Berkeley’s community-wide greenhouse gas emissions totaled 575,889 metric tons of CO₂-equivalent (MTCO₂e) in 2005. This is roughly the equivalent amount of emissions that result from 106,000 sedans traveling 12,000 miles per year.

Gasoline and diesel consumption by vehicles driving within the Berkeley City limits accounts for about 47% of Berkeley’s total greenhouse gas emissions, approximately 265,500 MTCO₂e per year as of 2005. The emissions that result from gasoline consumption, mostly in private vehicles, are nearly double the emissions that result from the diesel consumed in trucks and other large vehicles. Gasoline consumption is the single largest source of GHG emissions in Berkeley.

Commercial and residential buildings account for the remaining 53% of emissions. Natural gas use is by far a larger source of emissions than electricity in both the commercial and residential sectors. Natural gas is predominately used for space and water heating.

Municipal operations constitute about one percent of Berkeley’s total emissions. These emissions are included in the commercial and transportation sector data.

The 2005 inventory reflects a significant decrease in greenhouse gas emissions in Berkeley: an almost nine percent decrease between 2000 and 2005, one of the largest reductions in GHG emissions documented by any U.S. city.

A portion of these reductions can be attributed to increased energy efficiency in Berkeley homes and businesses. This period also included the 2000 California

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3 Emissions are aggregated and reported in terms of carbon dioxide equivalent units, or CO₂e. Converting all greenhouse gas emissions to carbon dioxide equivalent units allows for the consideration of different greenhouse gases in comparable terms. For example, methane is 21 times more potent than carbon dioxide in its ability to trap heat, so ICLEI’s emissions analysis software converts one ton of methane emissions to 21 tons CO₂e.
energy crisis. Surveys conducted by utilities and community groups at that time show that many consumers turned to energy efficiency in order to reduce energy costs.

According to data provided by the Metropolitan Transportation Commission (MTC), transportation-related emissions remained steady during that same period. The table below shows a slight reduction, but given the approximate nature of the community emissions analysis, the reduction is considered to be within the margin of error.

Overall the reductions add up to approximately 56,000 fewer metric tons of greenhouse gas emissions in the atmosphere compared to 2000, or the emissions equivalent of taking over 12,000 sedans off the road.

While the reduction in GHG emissions in Berkeley between 2000 and 2005 is a remarkable accomplishment, a sustained, community-wide emissions reduction effort is necessary to continue this trend and achieve Berkeley’s emissions reduction targets.

<table>
<thead>
<tr>
<th>Sector</th>
<th>2000</th>
<th>2005</th>
<th>Percentage Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Sector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electricity</td>
<td>45,806</td>
<td>40,822</td>
<td>-10.9%</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>129,971</td>
<td>111,777</td>
<td>-14%</td>
</tr>
<tr>
<td>subtotal</td>
<td>175,777</td>
<td>152,599</td>
<td>-13.2%</td>
</tr>
<tr>
<td>Commercial/Industrial Sector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electricity</td>
<td>70,636</td>
<td>61,302</td>
<td>-13.2%</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>112,417</td>
<td>96,442</td>
<td>-14.2%</td>
</tr>
<tr>
<td>subtotal</td>
<td>183,053</td>
<td>157,746</td>
<td>-13.8%</td>
</tr>
<tr>
<td>Transportation Sector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gasoline</td>
<td>175,888</td>
<td>169,031</td>
<td>-3.9%</td>
</tr>
<tr>
<td>Diesel</td>
<td>97,145</td>
<td>96,512</td>
<td>-0.7%</td>
</tr>
<tr>
<td>subtotal</td>
<td>273,033</td>
<td>265,544</td>
<td>-2.7%</td>
</tr>
<tr>
<td>TOTAL EMISSIONS</td>
<td>631,863</td>
<td>575,889</td>
<td>-8.9%</td>
</tr>
</tbody>
</table>

**How does energy consumption translate into GHG emissions?**

1 kWh of electricity = approximately 0.5 lbs. (0.22 kg) CO₂e
1 therm of natural gas = approximately 12 lbs. (5.6 kg) CO₂e
1 gallon of gasoline = approximately 20 lbs. (9.4 kg) CO₂e
D. Emissions Inventory vs. Carbon Footprint

Not all of the greenhouse gas emissions generated by the community are included in Berkeley’s emissions inventory. This does not mean that we limit our strategies to those that reduce the emissions we can currently quantify. It means, rather, that with the current state of emissions modeling, a community is limited in its ability to comprehensively measure and quantify its climate impact.

This point illustrates the difference between an emissions inventory and a “carbon footprint.” Berkeley’s inventory includes the emissions that we know how to measure and that result from actions taken within the City. Alternatively, a “carbon footprint” examines a broader range of emissions for which individuals and institutions are responsible. For example, a “carbon footprint” may examine lifestyle and consumption choices such as air travel; the energy required to grow and ship the food we eat; and the “embodied energy” in products, i.e., the energy associated with acquiring raw materials and manufacturing, packaging, transporting, distributing, using and disposing of a given product. At this time, it is difficult to accurately calculate and assign responsibility for the emissions that result from this energy consumption at a community scale. Nonetheless, it is important that Berkeley residents and businesses do what is in their power to reduce their “carbon footprint” by buying local, reducing packaging and taking other climate-friendly behavioral steps outlined in this report.

E. Emissions Forecast and Targets

Setting interim targets is essential in order to gauge community progress on the road to 80% by 2050. In fact, 10-15 years is about the longest timeframe over which defensible assumptions can be made about the impact on future emissions of things like technological change; future growth in population and housing; and future local, state, and federal legislation.

This plan focuses on actions our community can and should implement between now and 2020, but in the context of promoting the types of innovative approaches that will be necessary to achieve the ultimate 2050 target.

The 2020 target is to achieve a 33% absolute reduction below 2000 community-wide emissions levels, which equates to about a two percent reduction per year in total community-wide emissions. The City will seek to “frontload” reductions in the short-term by achieving at least a three percent annual reduction in community-wide GHG emissions for the first two years following adoption of the CAP (2010 – 2011).

The interim 2020 target is based on the 2050 target established by Measure G. It was determined from a linear extrapolation from year 2000 emissions
levels to the targeted 80% below 2000 levels by 2050. Though the Measure G targets are aggressive and were established based on scientific understanding of the scale of reductions needed to achieve climate stabilization, scientific knowledge of safe thresholds of GHG emissions in the atmosphere has advanced considerably since that time and will continue to advance into the future. As of 2009, leading scientists agree that achieving climate stabilization may actually require reducing global GHG emissions by 25-40% below 1990 levels by 2020, or more. As it works to implement the policies in this Climate Action Plan, the City will also revise and continually update the community-wide GHG reduction target based on the latest scientific understanding. City staff will provide annual reports to City Council on progress made toward achieving its climate protection goals as well as on the latest scientific assessments of the scale of GHG reductions necessary to achieve climate stabilization.

To accurately estimate the actual reduction in tons needed to achieve the City’s current 2020 target, it is necessary to estimate a forecast of how the community’s future emissions may change in a “business-as-usual” scenario. A “business-as-usual” scenario assumes no community emissions reduction activities. It projects emissions based on applying basic housing unit and workforce growth factors to the energy consumption data used to conduct Berkeley’s emissions inventory. The Association of Bay Area Governments (ABAG) provides projected workforce and housing unit data in its Projections 2007, an estimate of how much Berkeley is forecasted to grow through 2035. Based on these data, City staff estimates that a 30% reduction from forecasted emissions levels is required to meet the absolute target. This equates to an annual GHG emissions reduction of over 188,000 metric tons CO₂e by the year 2020.

Note that when establishing an emissions reduction target for the Berkeley community, it is important to not lose sight of the fact that climate change is a global issue and that GHG emissions know no boundaries. Meaning that even though Berkeley has its own local GHG reduction target (as do hundreds of local governments), it would be antithetical to the purpose of setting a climate protection target if that target were achieved in part by shunning its share of growth and shifting it to other communities. This is especially the case given the fact that Berkeley is a transit-rich, walkable community as compared to most communities in the region. Berkeley residents have generally excellent transit choices as well as extensive bicycle and pedestrian infrastructure.

It is important, therefore, that Berkeley assumes its share of the region’s population growth and ultimately establishes a methodology for tracking progress toward the GHG reduction goals that accounts for change in population or economic activity.

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4 ABAG Projections 2007 is available at www.abag.ca.gov/planning/research/projections_2007.html
5 The targeted reduction from the 2020 growth forecast is lower than the 33% absolute reduction because there was a significant decrease in emissions between 2000 and 2005, which is greater than the forecasted growth between 2005 and 2020.
that is inconsistent with what has been assumed, i.e., an unexpected growth or reduction in Berkeley’s population or economy. The outcome of the methodology, which City staff is currently refining, will provide a better accounting of regional transportation-related GHG emissions.

For example, if the Berkeley community were to absorb more household growth than what is forecasted by ABAG, then one could assume that that household growth is being displaced from somewhere else in the region. Because Berkeley is a relatively dense, transit-rich community, one could also assume that the average new household in Berkeley drives less and is responsible for fewer GHG emissions than the average household in the region. Given these assumptions, a new household in Berkeley is displacing some GHG emissions that would have occurred if that household was cited elsewhere, i.e., in a less dense and transit-rich community. In order to account for the regional nature of transportation and land use policy, this displacement of GHG emissions related to where household growth occurs must be captured and quantified. City staff is working to integrate a methodology for doing so into ongoing efforts to track Berkeley’s community-wide GHG emissions and emissions reductions.

In conclusion, greenhouse gas emissions from each of the various sources identified in Berkeley’s emissions inventory must decrease steadily and significantly over the coming years to achieve the Measure G targets. This requires implementing an unprecedented array of strategies mainly geared toward reducing energy consumption in buildings and motor vehicles. A series of such strategies, as well as actions for reducing waste, is outlined in the remaining chapters of this report.
Chapter 3: Sustainable Transportation & Land Use

A. The Vision: Cycling, Walking, Public Transit and Other Sustainable Modes of Transportation Become Mainstream

According to Berkeley’s most recent greenhouse gas emissions inventory, vehicle trips (including cars, trucks, buses and motorcycles) within Berkeley city limits account for 47% of Berkeley’s total greenhouse gas emissions, approximately 265,500 metric tons CO$_2$e (MTCO$_2$e) per year in 2005. Gasoline consumption in automobiles is the single largest source of emissions in Berkeley.\(^1\)

In order for the community to achieve its GHG reduction target, transportation-related GHG emissions must decline by approximately 30% by the year 2020. This equates to an annual reduction of about 90,000 MTCO$_2$e within the next 12 years. This is the equivalent of reducing gasoline consumption by over 9.2 million gallons per year by 2020.

To say that achieving this target requires significant change is an understatement. Transportation modes such as public transit, walking and bicycling must become the primary means of fulfilling our mobility needs, and remaining motor vehicle use must be far less carbon-intensive. More active modes of transportation will become the mainstream when they are as convenient and cost effective as driving.

Shifting the balance toward sustainable transportation modes requires a combination of policies, consumer education initiatives, sustained sources of revenue, and effective incentives. In essence, it requires assembling policies and programs that together will aggressively reduce vehicle miles traveled (VMT) and the associated GHG emissions, while also improving community mobility and quality of life. The main pieces of Berkeley’s “mobility management puzzle” are:

- **Smart Growth:** “Walkability,” “bikeability” and ridership of public transit are fundamentally tied to density and a mix of land uses near transit

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\(^1\) The current community-level GHG inventory methodology (provided by ICLEI) measures only the emissions that occur within city limits. It therefore does not include the emissions that result from freeway traffic, airplanes and boats, and vehicle travel on UC Berkeley and Lawrence Berkeley National Laboratory campuses. It also does not include the emissions that result from Berkeley citizens driving outside City limits or from people driving to Berkeley (until they reach the City limit). Please see Chapter 2 for a full description of the emissions inventory methodology.
hubs and jobs (such as in Downtown Berkeley) and along transit corridors (such as San Pablo and University Avenues). To maximize quality of life benefits as well as GHG reductions, Smart Growth in Berkeley must be “green growth.” It must support enhanced green space; urban forestry efforts and local food production; green building measures; and effective water conservation and storm water management practices. Smart growth in Berkeley must also help meet the demand for affordable and workforce housing.

- **Increased Safety, Reliability and Frequency of Existing Public Transit**: BART and AC Transit provide essential services to the people of Berkeley and beyond. In order for public transit to become mainstream, these services must expand, improve customer service, and be integrated into a broader mobility management system that includes shuttles, the bicycle and pedestrian network, car sharing, and more.

- **Expansion of other Underused Modes**: AC Transit buses and BART trains serve as the north/south backbone of the East Bay’s public transit system. In general, east/west transit service is less frequent, and development of other transit modes is necessary to truly enable community members to travel from their neighborhoods to destinations throughout the City without a car. Travel modes expected to be increasingly important parts of Berkeley’s mobility management system include:
  - A network of short-route local transit buses, i.e., employer-based and commercial shuttles and on-demand vehicles
  - A larger network of car share pods conveniently located adjacent to transit networks and in neighborhoods underserved by transportation alternatives
  - An increased role for rideshare/casual carpool programs
  - An expanded bicycle and pedestrian infrastructure including bicycle share programs
  - An increased role for taxis
  - A ferry system that is fully integrated into existing transit services
  - Neighborhood electric vehicles

These modes of transportation must be integrated with AC Transit buses and BART to form a comprehensive, convenient alternative transportation network that connects people to key destinations.

- **Pricing Strategies**: As well as encouraging residents to choose an alternative to the car, it is important that those who choose or need to drive a car pay the full costs, including environmental costs, of doing so. This is especially true for individuals who drive alone. Examples of how these costs may be addressed in Berkeley include:
• Expanding parking pricing (e.g., meters and/or permit zones) to certain areas where parking is currently free
• Implementing a parking fee that would make it more expensive for individuals to own multiple cars
• Increasing parking costs associated with existing on and off-street parking facilities

In addition to local efforts, the City and its residents can also support regional pricing strategies such as:

• Instituting a carbon tax on gasoline
• Implementing “Pay-As-You-Drive” programs in which motorists have the opportunity to lower their insurance costs by driving less

As well as serving as a disincentive to driving, such fees also serve to build revenue that can be used to provide enhanced, more sustainable mobility options in Berkeley and in the region. Action must be taken to ensure that any additional fees do not negatively affect low-income households. On the contrary, fees should be structured and employed to improve access to a range of transportation modes.

Enhanced Marketing, Community Education, and Incentives: Behavior change underlies the success of each of the components outlined above. The City of Berkeley and its partners must combine efforts in the policy arena with targeted education for residents and businesses and savvy marketing of sustainable mobility options.

Each of the components outlined above is described in more detail, along with implementation steps and timelines, later in this chapter.

B. A Growing Problem: Dependence on Driving

Achieving the scale of reductions necessary to reach the community’s target is a truly daunting task.

Why is the task so daunting?

To answer that question it is helpful to visualize the challenge of reducing GHG emissions from the transportation sector as a three-legged stool. One leg represents vehicle fuel efficiency; the second leg represents the fuel’s carbon content; and the third leg represents the amount vehicles are driven, known as vehicle miles traveled (VMT). Until recently, legislation at the state and federal levels has largely focused on the first two legs of the stool. Such legislation is essential and effective, but a stool needs three legs to stand.
Technological improvements that result in increased fuel efficiency and lower carbon fuels are being overwhelmed by the steady increase in VMT. Between 1983 and 2001, personal travel in the U.S. grew at an annual rate of 3.6 percent. Since 1982, VMT has increased by 47% per person, from an average of 6,800 miles per person per year to almost 10,000 miles per person per year. Since 1980, the number of miles Americans drive has grown three times faster than the U.S. population, and almost twice as fast as vehicle registrations.

Upward swings in gasoline prices tend to moderate these trends to some degree. But given the difficulty in changing the factors that contribute to increasing VMT, such as low-density community design and people’s decisions about where they want to live, it will take many years to reverse current trends.

Close to home, the San Francisco Bay Area is expected to grow by nearly 2 million people, a million cars, over 700,000 new homes, 1.8 million new jobs, and a tripling in freight volumes between 2000 and 2035. The number of daily vehicle trips is expected to increase by 5 million per day and the daily VMT will increase by 50 million miles per day by 2030.

The City of Berkeley is not immune to such trends. For example, vehicle ownership has been growing steadily for many years. In 2000, there were approximately 59,500 privately owned cars in Berkeley, nearly 20,000 more than there were in 1960. This is true even though the population of the city has remained essentially steady since the 1970’s. In fact, between 1970 and 1990, the Berkeley population decreased by over 13,000 people, while the number of cars owned by Berkeley residents increased by approximately 10,000 during that same time period.

In short, as a community, as a region, and as a nation, we are increasingly dependent on driving. The problem of steadily increasing VMT makes it such that transportation-related GHG emissions will likely stay far above the reduction targets established at the state-level by California’s Global Warming Solutions Act (AB 32) and at the local-level by Berkeley’s Measure G.

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2 FHWA Traffic Volume Trends, August 2007.
3 Metropolitan Transportation Commission.
Achieving state and local climate protection goals makes reducing VMT an imperative. How does a rapidly growing Bay Area—which is expected to grow by two million people, one million cars, and 1.8 million jobs by 2035—succeed at reducing the growth in VMT? The answer lies in a multifaceted approach, including more citizen education and outreach, strategic transportation pricing, and an enhanced alternative transportation infrastructure. A fundamental component of the approach also lies in growing in a way that makes it easier for community members to drive less.

A large and growing body of evidence shows that living near transit is the single largest influence on vehicle miles traveled. Overall, the evidence shows that people who live near transit drive between 20% and 40% less. Accordingly, the most effective strategy for reducing VMT in the long-term is to site new housing near transit.

The benefits of building more housing in proximity to transit are not only environmental. Compact development patterns result in improved public health (by reducing local air pollutants associated with driving and by promoting a more active lifestyle) and improved access to alternative forms of transportation. In Berkeley, more housing near transit hubs and corridors means more customers for local businesses. Importantly, transit-oriented, walkable, bikeable communities are also more resilient to a volatile economy. For example, housing values in transit-rich areas such as Berkeley are more stable than in the outlying areas of the region. As gas prices inevitably increase, Berkeley residents are also better able than most in the region to hop on transit, walk or ride their bike to fulfill their mobility needs. And transit-friendly, walkable, bikeable communities are also important to maintaining quality of life for the elderly. By 2035 one quarter of the Bay Area population will be over 65 years of age. It is important for older people who would rather not or who are unable to drive to still get around town without having to get behind the wheel.

While options to improve vehicle fuel efficiency and fuel carbon content are relatively limited at the local level (and are largely addressed through state and federal policy), cities like Berkeley do have significant power to direct any new residential and commercial development toward locations that are close to transit and have retail and other services within walking or bicycling distance. As the Bay Area seeks to accommodate two million people over the next 25 years, it is especially critical that every new unit that is added be well served by transit. Every Bay Area city is expected to do its share of accommodating population growth, and Berkeley is particularly well positioned to do so given its existing high level of transit service.

In fact, a number of Berkeley neighborhoods are living examples of how travel characteristics are affected by land use policies. A comparison of travel behavior in the Bay Area shows that Berkeley households drive significantly fewer miles, and emit 58% fewer transportation-related greenhouse emissions, than the average Bay Area household.

When specific areas (called Travel Analysis Zones, or TAZs) in Berkeley are compared, households in zones located near BART stations drive less and are therefore responsible for fewer emissions. For example, residents of Downtown Berkeley emit
84% fewer transportation-related GHG emissions than the Bay Area average.\(^6\)

There are a number of important reasons for this. First, for a medium-sized city integrated into a larger metropolitan area, Berkeley includes an unusually high proportion of residents who live close to where they work or go to school. For example, many UC students, faculty and staff live in Berkeley in order to be close to campus. Many of them walk or bicycle to campus and those who drive make mostly short trips. In the 2000 U.S. Census, 15% of Berkeley residents reported walking to work, compared with just 3.2% in Alameda County.

Second, residents of the Downtown and other relatively compact neighborhoods are able to make at least some shopping and other non-work trips on foot or bicycle, thereby reducing overall automobile use.

Finally, a relatively high-proportion of Berkeley residents lives near AC Transit lines or one of Berkeley’s three BART stations, enabling increased mobility without reliance on a car. In 2000 just 42% of Berkeley residents reported driving alone to work, compared to 66% in Alameda County. Nearly one in five people commute on transit and one in ten carpools.

Such figures are noteworthy. But it is also important to note that Berkeley has not improved its commute mode share markedly since 1990. Clearly, maintaining the status quo will not do if the community is to achieve its voter-approved emissions reduction targets.

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\(^6\) MTC Travel Model and Climate Change maps

\(^7\) Findings based on data provided by the Metropolitan Transportation Commission.
D. Sustainable Transportation & Land Use Actions

The goals, policies and actions outlined in this section are consistent with and build on existing City of Berkeley plans and policies, including:

- The Berkeley General Plan
- Specific Area Plans (including the draft Downtown Area Plan)
- Bicycle Plan
- Pedestrian Plan (currently in draft form)
- Transit First Policy

Ultimately, the purpose of the policies and actions included in this chapter is to serve as guides for doing what is in the community’s power to:

- Reduce vehicle miles traveled in the community and in the region
- Increase vehicle fuel efficiency and the utilization of low-carbon fuels

See Appendix A for a consolidated list of goals, policies and implementing actions, along with an implementation timeline, related to sustainable transportation and land use.

1. Goal: Increase density along transit corridors

As has been mentioned, an essential component of reducing transportation-related greenhouse gas emissions in Berkeley and in the region is to direct new development to locations that are close to transit and have retail and other services within walking distance (such as the Downtown).

The Association of Bay Area Governments (ABAG) provides regular forecasts for how the nine-county Bay Region and the cities therein are expected to grow. According to ABAG’s Projections 2007, the total population of Berkeley is expected to grow from 104,400 in 2005 to 119,400 in 2035 – a total increase of 15,000 people, about half the growth rate projected for the region as a whole. The City is expected to increase its housing stock from 45,530 in 2005 to 50,980 during that same period – or an increase of 5,450 units. The projections expect an average increase in housing of about 182 units per year. Jobs are expected to increase from 75,430 to 87,150, or about 11,700 jobs. ABAG is projecting that the average number of workers per household will increase substantially over the projection period, with employed residents increasing from 55,510 in 2005 to 77,450 in 2035 – or about 22,000 new workers living in Berkeley. Although not calculated by ABAG, this means that the average number of workers per household will increase from 1.22 in 2005 to 1.52 in 2035 – very close to the regional averages for both those figures. It is largely because of this increase in workers per household (both here and in the region)
that the region’s (and Berkeley’s) job/housing balance does not substantially worsen over the 30-year projection period. Today, Berkeley has about 20,000 more jobs than employed residents. In 2035, Berkeley is projected to have only 10,000 more jobs than employed residents.⁸

The increase in housing units in Berkeley forecasted by ABAG reflects the significant existing imbalance between jobs and housing in the City, and projected employment growth. The City is also relatively “transit-rich” with four fixed rail stations (BART and Amtrak) and over 20 AC Transit bus routes in a relatively small city.

Berkeley’s job/housing imbalance results in high demand for limited housing and a large number of people driving into the city on a daily basis. About 50% of employed Berkeley residents, or 28,000 people, live and work in Berkeley. These 28,000 residents fill 44% of the jobs. Thirty-six thousand non-resident commuters fill the remaining 56% of Berkeley-based jobs.

The fundamental issue for Berkeley is the cumulative effect of the need to accommodate its portion of the region’s growth – especially given the growth of jobs at UC Berkeley and Lawrence Berkeley National Laboratory. With Berkeley’s growth in employment, its central location in the region, and its access to transit, our community is likely to be called on over time to accommodate more of the region’s residential growth, rather than less. The City must accommodate long-term growth while preserving the essential qualities of the community and achieving our GHG reduction goals.

The most effective strategy for accommodating growth and reducing VMT is to site new development near transit.

Consider the following additional statistics:

- Households in Transit Oriented Developments (TOD) drive 5,000-7,500 fewer miles per year,⁹ and use transit five times more than households in adjacent locations.¹⁰
- Office workers use transit 3.5 times more when job sites are in close proximity to transit.¹¹
- Rates of GHG emissions have been shown to be 2 to 3.4 metric tons per year per household lower within TOD locations.¹²

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Compact development also provides several other benefits, including preservation of forests, open space and farmland by focusing growth in the urban core; providing more opportunities for physical activity like walking and cycling; and reducing costs associated with road construction and other infrastructure.

Clearly, by accommodating more people near jobs, transit and other services, the Berkeley community can play an important role in reducing GHG emissions and maintaining a vibrant, healthy community.

At the same time, many in Berkeley are concerned about the impact of increasing density on neighborhood character and community quality of life. In Berkeley, where transit corridors such as San Pablo, University and Shattuck Avenues are sometimes adjacent to existing lower density residential neighborhoods, design and zoning tools should seek to step down density into the neighborhood, while maintaining or even increasing what is permitted immediately adjacent to the major boulevard. In this manner, impacts on existing neighborhoods can be minimized. It is also imperative that new development is built (or renovated) according to nationally recognized green standards and encompasses requirements and incentives to enhance local green space, conserve natural resources, protect sites of historical significance, and minimize shading of public places. In this way Berkeley can absorb growth in a manner that is not only consistent with stated GHG-reduction goals, but also improves community livability.

**a. Policy:** Encourage the development of housing (including affordable housing) retail services, and employment centers in areas of Berkeley best served by transit.

Policies to increase residential and commercial density near transit are already articulated in the Berkeley General Plan, Land Use (LU) chapter. Examples include:

- **Policy LU-23 Transit-Oriented Development:** Encourage and maintain zoning that allows greater commercial and residential density and reduced residential parking requirements in areas with above-average transit service such as Downtown Berkeley.

- **Policy LU-25 Affordable Housing Development:** Encourage development of affordable housing in the Downtown Plan area, the Southside Plan area, and other transit-oriented locations.

As well as reducing commute VMT by adding housing near transit, the community can do more to reduce the number and length of shopping trips that require driving. While residents are able to meet some of their needs in local commercial districts, Berkeley lacks stores in significant categories like consumer electronics, appliances, men’s clothing, and, in some areas, grocery stores. Filling gaps in retail demand can help reduce the need for Berkeley residents to drive to shopping malls in Emeryville, Walnut Creek, or other cities.

Locating compact residential development and neighborhood-serving retail development along the same transit corridors represents an integrated strategy for
reducing VMT and increasing other mobility options. More retail options provide residents, workers, and transit riders with more convenient access to services, while more residents and workers translate into more customers for local stores and services. Further, adding affordable housing and residential-serving retail in Berkeley’s most transit-accessible corridors also has the potential to provide low-income households with convenient access to transportation and other services without having to own a car.

**Implementing Actions:**

- **Conduct a “land use scenario study”** in order to help visualize, quantify, and compare the impacts on VMT (and the associated GHG and local air pollutant emissions) of various land use scenarios. The study should also consider the impacts of various land use scenarios on solar access, views, and usable open space. The study should focus its analysis on corridors within Berkeley that are best served by public transit and/or have the potential to be transit-served corridors in the future. The study should also help to identify and prioritize additional opportunities to create/expand green space within the city.

- **Implement zoning adjustments to facilitate a mix of housing and commercial development (including retail services and employment centers) in certain transit-served areas.** Proposed zoning adjustments or changes to the General Plan will not have any force or effect until approved by a separate action by the City Council. Such proposals will undergo thorough review by commissions, community members and the City Council. Review processes will include noticed public hearings. Proposed zoning adjustments include:
  
  - Encourage car-lite (e.g., households with fewer cars than driving-age residents) and, where possible, car-free (e.g., households without cars) development in certain transit-served areas by creating incentives and eventually requiring developers and business owners who work with the City, AC Transit, BART and other appropriate agencies to develop and implement a plan of action for reducing the impact of their development/business on VMT.
  
  - Encourage car-lite and/or car-free development in certain transit-served areas by making parking requirements more flexible for developers and business owners that site near transit and that provide services, infrastructure and/or mitigation payments to reduce parking demand. Options a developer/business owner could provide in lieu of providing parking spaces may include:
    - ✔ Car share parking
    - ✔ Indoor and outdoor bicycle parking
Indoor showers and changing rooms for cycling employees
Dedicated parking for electric vehicles, hybrids and plug-in hybrids
Implementation of an Eco-Pass program for employees/tenants
Mitigation payments that would be allocated to local transportation demand management projects

- Establish parking maximums in specified transit-rich areas of the City,
- Adjust zoning to allow for greater residential density and specified commercial uses along certain transit corridors and in proximity to the Downtown Berkeley, Ashby and North Berkeley BART stations
- Establish minimum building heights in certain transit-rich areas such as the Downtown in order to prevent the underutilization of transit-served areas
- Ensure that dense transit-served corridors transition well into surrounding lower density residential zones in order to preserve the character of interior neighborhoods
- Increase current bicycle parking requirements for new development in Berkeley

In order to improve livability and reduce VMT in existing neighborhoods that are not well served by transit, consider where in-fill neighborhood-serving retail, that is oriented to basic daily needs such as “corner stores” and small markets, may be feasible.

Develop tools and guidance that the Zoning Adjustments Board (ZAB), Planning Commission and City Council can utilize in order to effectively consider and reduce the impact on GHG emissions of a given land use-related proposal. Examples include:
- Provide guidance and tools to the ZAB and Planning Commission that would help to guide the process of reviewing a given proposal based on the impact the proposal would have on local and regional GHG emissions. The guidance and tools would help the ZAB to consider the impact on GHG emissions of a given proposal when administering the “non-detriment finding.” This guidance would reflect City Policy on the importance of reducing greenhouse gas emissions
- Require that any changes that result in “down-zoning” in certain areas in proximity to transit undergo a thorough review for impact on local and regional GHG emissions

Partner with UC Berkeley to assess and address unmet housing demand of UC employees and students. UC Berkeley is the largest employer in the City of Berkeley and therefore has a substantial impact on commu-
nity VMT. The high cost and high demand for housing means that many UC employees and faculty are unable to live in Berkeley. UC could do more to address those housing needs. Some institutions directly address this issue by either developing housing themselves, subsidizing others to do so, or through direct housing assistance to employees.

- Partner with UC Berkeley and the Berkeley Unified School District to identify opportunities to site affordable housing near transit for faculty and staff.
- Provide enhanced assistance during the permit process for transit-oriented development projects.
- Encourage the preservation and adaptive reuse of historic buildings. Preservation can be an important climate protection strategy that does not conflict with the goal of building new transit-oriented housing. Preservation and reuse of existing buildings not only preserves embodied energy in buildings, but also reduces the GHG emissions associated with demolishing a building, transporting demolition debris, and building a new building. Existing buildings can be intensified to create additional housing or commercial space to help meet future demand.

2. Goal: Increase and enhance urban green and open space, including local food production, to improve the health and quality of life for residents, protect biodiversity, conserve natural resources, and foster walking and cycling

Green and open spaces are essential components of Berkeley’s livability, public health and ecological sustainability. Safe and inviting public parks, vibrant community gardens, and high-quality street design help to foster physical activity (and low-carbon mobility) such as walking and cycling. Well-designed open spaces can also serve as parts of an advanced and integrated stormwater system that promotes stormwater quality and reduces downstream flooding. Utilizing natural systems to manage water resources also has the potential to reduce the need for more energy and carbon intensive stormwater infrastructure projects. Further, Berkeley’s parks, gardens and streetscapes can be designed to conserve shrinking water resources by utilizing drought-resistant plants and water-efficient irrigation techniques.

a. Policy: Require new developments in specified areas to contribute to street-level open space on site or in the public realm
Implementing Actions:

- Establish an “Open Space Fee” or similar mechanism for the creation of new and enhancement of existing streetscapes, public open space, and community gardens.

- Allow multi-unit residential projects to provide street-level public open space in lieu of some required on-site private open space.

- Consider the feasibility of establishing policies that would discourage the removal of usable open space in private lots unless such open space would be provided elsewhere on site or the property owner agrees to pay an “Open Space Fee” or similar mechanism which would be used to fund the maintenance of existing or the creation of new public open space.

b. Policy: Promote tree planting, landscaping, and the creation of green and open space that is safe and attractive and that helps to restore natural processes.

A healthy urban forest has several benefits, including:

- Reducing the energy consumption associated with air conditioning buildings by providing shade.

- Reducing local ambient temperatures by shading paved and dark colored surfaces like streets and parking lots that absorb and store energy rather than reflecting it.

- Intercepting and storing rainwater, thereby reducing water runoff volume.

- Improving community quality of life through beautification and by reducing noise pollution and encouraging pedestrian traffic.

Trees also provide a GHG reduction benefit through a process called carbon sequestration. A single mature tree can absorb as much as 48 lbs. of carbon dioxide per year. Estimates are that between 660 and 990 million tons of carbon is stored in urban forests nationally.\textsuperscript{13}

Implementing Actions:

- Maintain and protect mature trees wherever possible and maximize tree planting as part of public open space and street improvements.

- Consider developing street tree master plans for sub-areas within the City. Such plans would guide the selection of appropriate tree species for streets and open spaces and outline a regular maintenance and planting cycle to ensure that hazards to trees are minimized and that the local tree stock continues to increase.

Consider developing a tree preservation ordinance that would articulate strong standards for the preservation and replacement of trees in the public right of way.

Identify opportunities for tree planting and to maintain existing and create new public open spaces in order to increase community access to parks and plazas. The City should ensure that as development increases along certain transit corridors it is accompanied by an appropriate level of tree planting and green and open space enhancements.

Establish standards and guidelines to ensure that ecologically beneficial stormwater quality and retention features and water conservation features are integrated into the design of landscaping features on both public and private land.

Encourage the development of green roofs by providing outreach and guidelines consistent with the building code.

c. Policy: Increase access to healthy and affordable foods for the community by supporting efforts to build more complete and sustainable local food production and distribution systems

The “Victory Garden” movement during World War I and World War II turned the U.S. into a nation of gardeners. This was a time of crisis in which the federal government asked citizens to plant gardens to reduce pressure on the food supply brought on by war. In 1943, Americans planted over 20 million Victory Gardens and the harvest accounted for nearly a third of the vegetables consumed in the country that year.14

Today gardening and a growing local food movement are again making a comeback. Communities’ desire to cut costs, eat healthier, and reduce their carbon footprint, along with concerns about our food system’s dependence on rapidly depleting fossil fuels, is spurring a move toward more sustainable food production and distribution.

Sustainable food systems reduce the distance food must travel to get to our tables. When food is produced, processed and distributed near where it is consumed, transportation miles are minimized as well as are the associated pollutants. According to a WorldWatch Institute study, a typical meal brought from a conventional supermarket chain consumes 4-17 times more petroleum for transport than the same meal using local ingredients.15 Despite California’s massive food production capacity, the state imports 40% of its food, which translates into at least 250,000 tons of GHG emissions per year, according to an NRDC study.16

14 See www.revivevictorygarden.org (2009)
Sustainable food systems also prioritize the consumption of organic food over conventional food, and the consumption of vegetables rather than meat. Organic food production requires far less fossil fuel inputs than conventional systems, which in turn reduces GHG emissions. Likewise, a meat diet requires twice as much energy to produce as a vegetarian diet.17 Globally farm animals generate 18% of GHG emissions, according to estimates by the United Nations.

Local food systems offer a host of social and economic benefits as well. For example, growing a garden can make a difference for a family’s food budget. And efforts to increase access to local, affordable, healthy food for low-income families, the elderly, and others with mobility challenges can improve public health. Local food systems also help to insulate communities from volatile oil prices, which in turn affect food prices. Finally, food localization can create high-quality local green jobs in the farming, food processing and distribution trades.

The City of Berkeley already has a foundation on which to build when it comes to promoting local, nutritious food. The City Council adopted a Food and Nutrition Policy in 2001. Its purpose is to “help build a more complete local food system based on sustainable regional agriculture that fosters the local economy and assures that all people of Berkeley have access to healthy, affordable, and culturally appropriate food.”18 Examples of how this policy is currently being implemented include the City’s financial and logistical support of community gardens and the City has also included local food criteria in Requests for Proposals (RFP) for vendors to prepare and deliver food for the City of Berkeley Summer Food Program.

In response to crises like climate change, Peak Oil, health disparities, a shaky economy, and the loss of greenfields and farmland due to suburban sprawl, the City and its partners must do more to build a resilient and sustainable local food system.

**Implementing Actions:**

- Encourage and support existing community gardens as well as neighborhood initiatives to launch additional community gardens.
- Include community gardens and orchards in the planning for the Santa Fe Right-of-Way.
- Encourage local community gardens to donate excess produce to local food banks.
- Continue to provide compost to community and school gardens.
- In collaboration with local business associations and merchants, continue to expand and promote the Buy Local Berkeley Campaign. The goal of the campaign is to build a vibrant local economy by encour-

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18 The City of Berkeley Food and Nutrition Policy is available at: www.ci.berkeley.ca.us/PUBLICHEALTH/chronicdisease/food-policy-exhibit-a925.pdf
aging consumers and businesses to buy local. Shifting more consumer purchases to local businesses has the potential to increase tax revenue for the City, expand local investments in non-profits and local businesses, and create more local jobs while simultaneously reducing vehicle miles traveled.

- Consider developing and adopting a Buy Local Ordinance that would give preference to local businesses. The ordinance would encourage local institutions, businesses, and consumers to join the City in spending locally.

- In partnership with business associations and others, create incentives for restaurants that feature local, organic foods. Incentives could include marketing and promotion assistance, among others.

- Support local educational institutions such as the Berkeley Unified School District, the Berkeley Adult School and UC Berkeley to continue educating students in growing and preparing their own food. Nearly all of the Berkeley Unified School District's (BUSD) schools have gardens, several of which produce food for school consumption. Through garden and cooking classes, students are introduced to food production, nutrition, composting, and ecological awareness.

- Promote the purchase of food from local producers for schools, senior centers, after-school programs, the summer food program and others. This action can be carried out by including local and nutritious food criteria in Requests for Proposals for vendors to prepare and deliver food for such programs. Currently 30% of the produce BUSD serves to students is sourced locally.

- Support state and federal legislation that prioritizes local food production.

- Continue to make street space available for farmers markets and explore opportunities for additional markets in Berkeley so as to increase access to local, healthy food.

- Encourage and provide guidelines consistent with the building code for buildings to incorporate rooftop gardens that can be used for food production.

- Through the City's website and publications, encourage residents to grow food in home and community gardens using methods that reduce GHG emissions, such as using organic inputs and compost.

- Through the City's website and publications, make information available to the public to facilitate consideration of a less carbon-intensive diet, such as eating less meat and choosing vegetarian or vegan options instead.

- Support local efforts to provide training to residents in farming and gardening techniques.
Work with East Bay Municipal Utility District to consider a program that would provide reduced water rates for community gardens as an incentive for residents to utilize community garden space to grow their own food.

Identify opportunities to open up City-owned vacant land to encourage local food production for local consumption.

Support the development of local food distribution and processing facilities. The City can provide this support in several ways, including: utilizing procurement dollars and City contracts to support local green businesses and providing marketing assistance.

In collaboration with AC Transit, identify opportunities to improve public transportation options to local food markets.

Work with community partners to identify methodologies for better tracking and reporting on the rate of local food production and consumption and the associated cost and GHG impacts, and other indicators.

3. Goal: Manage parking more effectively to minimize driving demand and to encourage and support alternatives to driving

a. Policy: Design and implement parking strategies to create disincentives for driving – especially for single-occupancy commuting – and, where possible, to build revenue for transportation services.

Such services may include:

- Expansion of car sharing
- Improved bicycle infrastructure
- Bicycle-sharing programs
- Sidewalk repair and other pedestrian improvements
- A local shuttle bus network

Implementing Actions:

- Encourage UC Berkeley, the City’s largest employer, to reduce its plans to build new parking spaces and to also revise its parking policies and programs to better encourage, support, and invest in alternatives to driving.

- Identify areas in Berkeley in which increased parking rates would effectively discourage driving and generate new revenue while not having a significant negative effect on local businesses. Such neighborhoods should be well served by alternative transportation options.
Identify areas in Berkeley in which extending parking meter hours of enforcement would effectively discourage driving and build new revenue while not having a significant negative effect on local businesses.

Consider the establishment of Parking Benefit Districts, which would receive a portion of parking revenues generated in the area.

Evaluate the feasibility and efficacy of redesigning the Residential Preferential Parking (RPP) Program so as to apply it citywide (in every neighborhood) and utilize the revenue to design programs and infrastructure that make alternative transportation options more accessible, convenient and attractive.

Structure RPP permit costs so that each additional permit acquired by a given household escalates in cost.

Consider setting RPP permit prices based on the fuel efficiency of the vehicle for which the permit is being acquired.

Install RPP permit holder-exempt parking meters in some RPP zones.

Make on-street parking rates equivalent to or higher than off-street (parking lot) parking rates.

Raise on- and off-street parking rates as appropriate.

Consider putting an increase to the City’s 10% tax on off-street parking revenue on the ballot.

“Un-bundle” prices for housing and parking so that parking spaces require separate payment and are not included in the rent or purchase price of a unit. Those who choose to live car-free should not be burdened with the cost of a parking space they do not need. And those that do require a car should be made aware of the full costs associated with owning it.

In certain popular destinations such as the Downtown, employ parking information signage to direct motorists to available off-street parking. This action minimizes idling and motorists’ need to drive around in search of an open spot.

Ensure that local employers are abiding by state requirements to participate in the parking cash-out program. State law requires certain employers who provide subsidized parking for their employees to offer a cash allowance in lieu of a parking space. The intent of the law is to reduce vehicle commute trips and emissions by offering employees the option of “cashing out” their subsidized parking space and taking transit, walking, cycling, or carpooling to work instead.
Except in cases where certain City staff persons have no alternative to driving to and from work (e.g., emergency personnel who work overnight), phase out free parking assigned to City staff for privately owned vehicles.

4. Goal: Identify opportunities for generating sustained revenue for implementing community transportation demand management programs

a. Policy: Create additional strategic fees/taxes in order to build revenue for transportation demand management (TDM) efforts and to further discourage driving alone

Implementing Actions:

- Institute a “Transportation Services Fee” for new development and utilize funds in part for alternative transportation programs that reduce vehicle trips and traffic congestion.
- Institute an “In-Lieu Parking Fee” on new development and utilize funds in part for alternative transportation programs that reduce parking demand.
- Encourage UC Berkeley to implement a “Transportation Services Fee” on new off-campus projects to mitigate the transportation impacts associated with new development. Fee revenue would go towards funding alternative transportation programs.
- Conduct a feasibility analysis of a City of Berkeley “congestion pricing” program. Congestion pricing is the practice of charging motorists to use a given roadway during times of heaviest use. Its purpose is to ease traffic congestion and promote alternative forms of transportation.
- Support development of a regional “climate mitigation fee” applied to either gasoline or vehicle registration. The revenue would be used to support public transportation and other transportation demand management efforts.

5. Goal: Accelerate Implementation of the City’s Bicycle & Pedestrian Plans

The City of Berkeley is already a recognized leader for its efforts to make walking and cycling a safe, healthy and enjoyable alternative to driving. Our community ranks as the safest of its size in California for walking and bicycling and recently won the National Organization on Disability’s Accessible America Competition.
Continued enhancement of the City’s cycling and walking infrastructure is a longstanding City priority. The City emphasized the importance of a robust cycling network in its 1977 Master Plan and has since adopted and updated a Berkeley Bicycle Plan (last updated in 2005). The City is also currently completing the first citywide Pedestrian Master Plan. These plans are comprehensive blueprints for making alternatives to the automobile more comfortable and safe, thereby encouraging people to shift from driving and toward making trips by bicycle or by foot. The plans seek to address bicycle and pedestrian safety, improvements in the community’s bicycle and pedestrian infrastructure and more.

In 2003, Berkeley established a citywide network of Bicycle Boulevards. Bicycle Boulevards use large pavement markings, attractive signs, traffic calming, and other improvements placed on a convenient, evenly-spaced network of low-traffic, low-speed streets throughout the city.

As of 2000, about 15% of Berkeley residents commuted to work on foot and about five percent commuted by bicycle. Getting more people to leave their car at home for both work and non-work trips is a fundamental component of achieving Berkeley’s greenhouse gas emissions reduction goals.

For example, the Berkeley Bicycle Plan sets a goal of doubling the share of bicycle commuting from five percent to 10% (as a reference, the City of Davis, CA has a bicycle commute mode share of nearly 15% despite the fact that the city is less compact than Berkeley).

City staff estimates that achieving a five percent increase in bicycle commute mode share plus a doubling of the share of non-work commute trips made by bicycle would result in a reduction of over 2.5 million vehicle miles driven annually. This equates to a 1,157 metric tons reduction in GHG emissions annually.

a. Policy: Continue to expand and improve Berkeley’s bicycle and pedestrian infrastructure

Implementing Actions:

- Integrate bicycle boulevards and pedestrian networks into broader alternative transportation system and identify mobility gaps that could be addressed through additional bicycle/pedestrian infrastructure. Additional infrastructure could include bicycle lanes and boulevards, signage showing distance to various destinations, sidewalk lighting, etc. Explore funding from such programs as the “Safe Routes to Transit” program for this purpose.

- Extend Bicycle Boulevard network. For example, construct an extension on the 9th Street Bicycle Boulevard.

- Improve cross-jurisdictional bicycle route connections through signage, bikeway route modification where warranted, and physical improvements.
Identify opportunities to modify City streets to better serve the safety and needs of pedestrians and cyclists. Street modifications that serve to slow or reduce automobile traffic and make walking and cycling more safe and viable include traffic circles and allocating additional roadway space to cyclists. The City should develop and adopt “Complete Streets” design standards, and routinely accommodate bicycle and pedestrian improvements in all streets and sidewalks projects.

Identify and implement opportunities to improve the flow of cycling along bicycle boulevards, consistent with public safety, including consideration of replacing stop signs with yield signs at traffic circles on bicycle boulevards. Many Berkeley cyclists see the stop signs as unnecessary and inconvenient given that the traffic circles already effectively slow automobile traffic, and are designed to function as “all-yield” intersections.

Continue to create additional bicycle parking throughout the community, including near transit centers and other key destinations and as part of any new development projects. Since 1996, the City has installed more than 500 bicycle racks, supported the installation of electronic bicycle lockers at BART and rail stations, and helped to establish the Downtown Berkeley BART Bike Station. In 2008-09, the City plans to add approximately 350 new on-street bicycle racks, with a capacity for 700 bicycles. BART has bicycle storage at the Ashby BART Station, and an expanded Downtown Bike Station is under consideration.

Provide adequate sidewalk width, pedestrian crossing time, “count down” signals, and universal access signal features at all signalized crosswalks.

Evaluate the need for new mid-block pedestrian crosswalks where there are high volumes of pedestrians and a long distance between intersections.

Regularly update the Bicycle and Pedestrian Plans, including updating indicators of pedestrian and cyclist safety.

Consider establishing a network of bicycle rental stations. As a first step, conduct a feasibility analysis to help identify program design, costs and funding options. Bike-sharing programs implemented in other parts of the world have proven to be effective. In Paris, for example, a network of automated bicycle rental stations is placed within a few hundred yards all over the city. Bicycles can be borrowed and used for short trips for a small fee. A much smaller scale program was established in Washington, D.C. in 2008, and a number of other U.S. cities are studying or developing bike-sharing programs.
b. Policy: Partner with local and regional organizations and agencies to promote and market cycling and walking as attractive alternatives to driving

A number of local and regional agencies and organizations are already dedicated to promoting cycling, walking and other alternative forms of transportation. Examples include:

- Sierra Club
- Bicycle Friendly Berkeley Coalition
- East Bay Bicycle Coalition
- The Berkeley Path Wanderers Association
- TransForm (formerly known as the Transportation and Land Use Coalition)
- BART
- AC Transit
- Alameda County Transportation Improvement Authority
- Alameda County Congestion Management Agency
- Metropolitan Transportation Commission
- Bay Area Air Quality Management District
- Livable Berkeley
- Berkeley Design Advocates
- Greenbelt Alliance
- Urban Land Institute

It is important to leverage existing outreach efforts when working to increase the mode share for cycling and walking in Berkeley.

Implementing Actions:

- Secure marketing firm to design a community-wide marketing campaign to increase the mode share of bicycles and walking (and other forms of alternative transportation). The campaign should succeed at encouraging and educating residents and employees regarding how to meet their mobility needs in a safe, healthy and fun way without driving a car.

- Enhance bicycle and pedestrian safety outreach and education for cyclists, walkers and drivers. For example, the City of Berkeley’s Public Health Division, along with other City divisions, should continue to provide safety education and promotion of cycling and walking. Partners in this effort include the California Office of Traffic Safety, the Alameda County Safe Routes to School Program, and International Walk to School Day.

- Promote participation in such bicycle promoting events as Bike to Work Day.
Promote the use of bicycle delivery services and bicycle cargo trailers to local businesses and residents.

**c. Policy:** Partner with BART, AC Transit, and other transit providers to improve bicycle access on trains and buses and at stations and stops

Improvements to bicycle access on BART, AC Transit, UC and LBNL shuttles and at transit stations and bus stops can help reduce car trips by making the combining of cycling and transit a more viable and convenient travel option.

**Implementing Actions:**

- Expand and improve secure bicycle parking at all Berkeley BART stations and bus stops.
- Increase the capacity for bicycles on BART trains by removing some seats and making other changes to select cars.

**d. Policy:** Continue to incorporate bicycles into municipal operations

**Implementing Actions:**

- Maintain and expand the Bicycle Fleet Pool available for City employees and encourage more City staff persons to take advantage of it.
- Continue to provide secure bicycle parking near City Hall and other city employment sites.
- Consider other bicycle fleet programs such as electric bicycles, cargo bikes, and mileage reimbursement for employee’s personal bicycle use for work trips.

6. **Goal: Make public transit more frequent, reliable, integrated and accessible**

The choice to use transit over a private automobile is dependent on many variables, including: reliability, frequency of service, cost, travel time, perceived safety, and comfort. Improvements in any one of these factors can increase transit ridership.

High-density, transit-rich cities experience significant reductions in private automobile use. A study by John Holtzclaw of the Sierra Club found that, in San Francisco, a reduction of nine vehicle miles traveled is achieved for every passenger mile of transit service.\(^{19}\) Other research shows that the total effect of public transportation nationwide is to reduce energy use in the transportation sector by the equivalent of 4.2 billion gallons of gasoline per year. Public transportation reduces GHG emissions from automobile travel by 37 million metric tons per year.\(^{19}\)

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tons per year. For perspective, to achieve parallel savings by planting new forests, one would have to plant a forest larger than the state of Indiana.\textsuperscript{20}

Berkeley is lucky to have generally excellent transit choices, with three BART stations, more than 20 AC Transit routes, numerous shuttles (UC, LBNL, Alta Bates, West Berkeley Shuttle), Capitol Corridor/Amtrak, as well as paratransit, private shuttles, and taxis.

In 1996, Berkeley adopted a Transit First Policy (Resolution 58,731), which states, “It shall be the official Policy of the City of Berkeley that alternative transportation and public transit be given preference over single occupancy vehicles on designated preferential transit streets.”

As of 2000, about 20\% of Berkeley residents used BART or the bus for their work commute. Increasing this percentage requires working closely with AC Transit, BART and community-based organizations to ensure that fares stay low or get lower, more frequent service and more routes are added, and that the safety and comfort of the transit systems are improved. Efforts must also be made to increase the use of transit for non-work trips.

\textbf{a. Policy:} Partner with AC Transit to expand and enhance AC Transit bus service in Berkeley

\textbf{Implementing Actions:}

\begin{itemize}
\item Integrate bus routes into broader alternative transportation system, identify gaps in bus service routes and potential scenarios for addressing such gaps, and improve frequency and reliability of bus service where required. This action would include working with AC Transit to evaluate short-term strategies to reduce “bus-bunching,” which can discourage transit ridership.
\item Improve access to public transportation in the Berkeley hills. Options include shuttle buses, on-demand transit, and more frequent and expanded AC Transit bus service.
\item Encourage more efficient payment systems such as “proof of payment” and level boarding to speed bus transit service.
\item Ensure that transit buses are fuel-efficient, utilize alternative fuels, and are appropriately sized.
\item Install real-time transit signage at bus stations and stops. Knowing when the bus will arrive significantly improves the user-friendliness of the system by lowering the anxiety and uncertainty around waiting. Real-time, multi-route departure signs were installed in the BART Plaza and at the northeast corner of Shattuck and Center Streets in 2008.
\end{itemize}

Real-time have been installed at all the 72R Rapid Bus stops on San Pablo, and are being installed on the 1R Rapid Bus stops on Telegraph and Shattuck. The City can work with AC Transit increase the number of real-time signs at bus stops. Further, real-time transit information should be made available through communication technology, such as the Internet and mobile phones.

- Install and improve bus shelters and benches, and ensure that they are safe, well lit, and well maintained.

- Improve bus flow by removing certain stop signs and on-street parking spaces, by timing signals, and by creating “queue-jumper” lanes where delay occurs regularly. These and similar recommendations are included in the Line 51 Transit Service and Reliability Study and the Line 1R Transit Service and Reliability Study. The City should work with AC Transit to implement the recommendations included in these studies.

- Work with AC Transit and BART to implement the recommendations of the South and West Berkeley Community Based Transportation Plan, which calls for transit service to meet MTC “Lifeline” service standards in low-income areas.

- Enhance sustainable mobility options for seniors and the disabled by providing “universal access” level boarding (e.g., roll-on/roll-off boarding for wheelchairs) on buses and shuttles that easily accommodates wheelchairs, walkers, and other individuals with mobility impairments.

**b. Policy:** Partner with AC Transit, BART and other community stakeholders to consider opportunities for Bus Rapid Transit or light rail systems along certain major transportation corridors (e.g., San Pablo and University Avenues and the Telegraph Ave./Downtown route currently under consideration).

AC Transit has established “Rapid Bus” lines along San Pablo Avenue (72R) and Telegraph/Shattuck Avenues (1R). AC Transit has also released a Draft Environmental Impact Report (DEIR) for the proposed East Bay Bus Rapid Transit (BRT) system from San Leandro to Downtown Berkeley. In Berkeley, BRT would operate on Telegraph Avenue to the UC campus and then terminate in Downtown. The BRT proposal includes dedicated bus lanes and raised stations to make buses more reliable and efficient, especially given projected increases in congestion on most major streets.

**Implementing Actions:**

- Continue timely assessment and development of proposed East Bay Bus Rapid Transit (BRT) system. According to the project’s Draft Environmental Impact Report released in 2007, BRT would be faster and
more reliable than the existing bus line and is projected to draw over 9,000 additional boardings per day by 2025. This is important given the expected significant increase in the Bay Area’s population (and associated traffic congestion) in that same time period. Further, travel corridors served by BRT could provide opportunities for transit-oriented development and streetscape improvements.

BRT also has some potentially significant impacts that must be addressed, generally related to the loss of traffic lanes and parking for private automobiles. AC Transit plans to propose mitigations for potential negative impacts as part of its Final Environmental Impact Report.

c. Policy: Partner with BART to expand and enhance BART service in Berkeley

Implementing Actions:

- Improve the pedestrian, cyclist and transit connectivity at the Downtown Berkeley BART station by implementing the Downtown BART Plaza and Transit Area Design Plan.
- Extend service hours and provide direct service from Berkeley to San Francisco in the evenings.
- Work with BART to install solar electric systems on Berkeley BART stations.

d. Policy: Partner with AC Transit, BART, UC Berkeley and other employers to provide subsidized transit passes and fare-free zones

Cost and convenience of payment are key factors that affect people’s mobility choices. The lower the perceived cost, the more likely community members will choose a given form of transportation. As such, providing free or heavily subsidized universal transit passes (e.g., Easy Pass) and/or free-fare zones have the potential to serve as effective strategies for increasing transit ridership and reducing single-occupancy driving.

Since 2003, City of Berkeley staff has received free AC Transit bus passes as part of their benefits package. These “Easy Passes” (formerly Eco Passes) are used for more than 48,000 rides per year. UC Berkeley students also participate in a Class Pass transit pass program. Students are assessed an annual fee and receive unlimited AC Transit bus rides. UC Berkeley also offers employees a deeply discounted Bear Pass. Most recently, Berkeley City College established a student Easy Pass program.

City staff estimates that providing free bus passes to everyone who works in Berkeley would result in a reduction of 5.7 million miles of driving per year, and an annual reduction of over 2,500 MTCO₂e. This equates to about three percent of the 2020 emission reduction target.
Providing free bus passes to all employed residents in Berkeley is estimated to reduce 4.6 million miles of driving per year, and over 2,000 MTCO₂e. This equates about two percent of the 2020 emission reduction target.

Actions to reduce the cost of traveling by bus and other forms of transit would not only reduce GHG emissions by reducing car trips, but it would also serve as an important travel subsidy for low-income families and those without access to an automobile.

Regional and State government expenditures should be reprioritized so that fares for all public transit can be significantly reduced and, in some cases, eliminated.

Implementing Actions:

- Conduct a Citywide Mobility Study that analyzes the feasibility, efficacy, design, and benefits of providing free bus and BART passes, fare-free zones, and/or shuttles for individuals who live, work, and/or study in Berkeley. The study will include an analysis of potential funding options to support improved and affordable transit, such as parking revenues, a special tax and other options.

- Negotiate conditions of approval for all new residential multi-family developments to provide free or subsidized transit passes for tenants. Incentives can include reduced parking requirements for projects served by transit.

- Provide incentives for and eventually require all businesses to provide free or subsidized transit passes for employees.

- Encourage UC Berkeley to require that transportation alternatives be provided for employees for new on- and off-campus building projects.

- Consider establishing Easy Pass programs for employees of businesses in specific transportation corridors, such as the San Pablo Avenue corridor and the corridor from Downtown Berkeley to Telegraph Ave. to Downtown Oakland and San Leandro.

- Study feasibility of providing fare-free zones in specified travel corridors or citywide. This action is dependent upon the reprioritization of state and regional funding mentioned above.

- Encourage and eventually require all eligible Berkeley employers to enroll in the Alameda County Congestion Management Authority Guaranteed Ride Home Program. The program guarantees participants who use alternative forms of transportation a ride home if unexpected emergencies occur (i.e., family illness, unexpected overtime, etc.). This offer eliminates one of the often-cited reasons that people drive rather than take transit. In 2008, the Downtown Berkeley Association established a pilot program to offer the Guaranteed Ride Home program to employers with fewer than 75 employees.
e. Policy: Expand and integrate community shuttle bus networks

Implementing Actions:

- Partner with BART, AC Transit, Bayer, Wareham Properties, UC Berkeley, LBNL, Alta Bates and others to design an integrated short-route shuttle bus system, including feeder or ‘last mile’ shuttles or bus service that would help customers access BART without driving. A shuttle network should be designed to address transit gaps and to better connect key destinations.

- Continue to enhance mobility options for people with disabilities by expanding existing paratransit, car share, and taxi services.

f. Policy: Encourage additional passenger rail service and ridership in Berkeley

Implementing Actions:

- Pursue joint marketing strategies with Capital Corridor/Amtrak to promote trains as a convenient form of transportation (include in broader alternative transportation marketing campaign).

- Improve bicycle and pedestrian access to passenger rail line, including installing additional signage.

g. Policy: Continue to partner with relevant agencies to establish a ferry service to San Francisco and other locations

Implementing Action:

- Expand bus and other transit service to any ferry terminal established at or near the Berkeley Marina so that there is consistent, coordinated, reliable transit service in conjunction with the ferry. Couple with this action a parking strategy that discourages driving and long-term parking at any future ferry terminal and encourages using an alternative to the personal vehicle to reach the terminal instead.

h. Policy: Support state and regional efforts to launch a high-speed rail system

The California High-Speed Rail Authority has begun implementation of the 800-mile high-speed train system serving Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County and San Diego. High-speed trains will be capable of maximum speeds of 220 miles per hour with an expected trip time from San Francisco to Los Angeles in 2 hours and 40 minutes. The system is forecast to potentially carry over 100 million passengers per year by 2030.

A $9.95 billion dollar bond measure passed on the November 2008 ballot with $9 billion for implementing the high-speed train system and $950 million for improvements to other rail services that connect to the high-speed train service.
Implementing Actions:

- Encourage state, regional, and local policy makers to support the development of a high-speed rail system that links all major California cities, including connecting service to Berkeley.
- Ensure that high-speed rail is fully integrated into existing transit services such as BART and AC Transit.

7. Goal: Enhance and expand car sharing and ridesharing programs

 Increasing the share of drivers that utilize car sharing and/or ridesharing to fulfill their mobility needs is an important piece of Berkeley’s mobility management puzzle. Ridesharing reduces GHG emissions by reducing single-occupancy trips. Car sharing reduces GHG emissions because members of car sharing programs tend to drive less than non-members, and because car share program vehicles tend to be newer and more fuel-efficient than the average vehicle.

Berkeley is currently served by two car share organizations, City CarShare and Zipcar.

A study of the impact of the City CarShare program found that members use 76% less gasoline than non-members, and nearly 30% of City CarShare members sold a vehicle since joining. For every 25 households who joined City CarShare, six give up a car.21

The City of Berkeley has actively supported local car sharing since 2002 when car sharing was first established here through a grant from the City and two parking spaces in the Berkeley Way parking lot. In 2005, the City went further by establishing an innovative fleet car share program that provides City CarShare hybrid vehicles for City employees during working hours. The vehicles are available to all City CarShare members during evenings and weekends. In 2009 the City is partnering with City CarShare to incorporate a plug-in hybrid vehicle into the City’s fleet car share program.

The City has also incorporated car share into the development process by requiring car share parking in the Library Gardens Building and even free car share membership for low-income residents in the David Brower Center/Oxford Plaza. In 2008, the City helped establish the first wheelchair accessible car share van.

In order to estimate the potential GHG reduction benefits of an expanded car share presence in Berkeley, City staff developed an expansion scenario in which Berkeley adds 500 additional car share vehicles by 2020. Although approximate, the estimate shows that if each vehicle serves 15 new members, an addi-

21 Cervero, Robert and Tsai, Yuhsin, San Francisco City CarShare: Second-Year Travel Demand and Car Ownership Impacts. July 2003.
tional 500 vehicles would serve 7,500 more Berkeley residents than today, remove 3,500 cars from the city, and reduce GHG emissions by approximately 9,300 metric tons per year. This reduction equates to about 10% of the 2020 reduction target.

While it is unknown whether market demand would support 500 more car share vehicles in Berkeley, it is possible that widespread availability of shared cars would lead to a convenience “tipping point,” where availability and locations grow to a point that many people feel they can give up their privately owned vehicle without sacrificing mobility.

As well as working to expand car sharing, the City also actively encourages ridesharing. The City offers deeply discounted carpool and vanpool monthly parking permits ($45 per month vs. $150 per month for single-occupancy vehicles) and promotes the ridematching services provided through 511.org. Commuters who share a ride to work also benefit from High Occupancy Vehicle (HOV) lanes and free bridge tolls in the region.

Nevertheless, it has proven difficult to increase the share of commuters ridesharing to work in Berkeley. Berkeley ranks 104th out of 159 cities in the region for carpooling.

The University of California Transportation Center is currently evaluating the feasibility of a Dynamic Ridesharing program for UC Berkeley employees, whereby faculty and staff would be able to log onto an Internet site to find others needing or offering a ride to or from a nearby location at a similar time. There are also a number of new private firms offering ridematching services to employers, event producers, and online social networks.

**a. Policy:** Make car sharing convenient and available to all Berkeley residents by providing additional incentives and by removing disincentives to car sharing

**Implementing Actions:**

- Require that developers of new residential and commercial projects of a certain size (to be specified) make spaces available for car share vehicles (provide decreased parking requirements in return).
- Enhance outreach to promote increased car sharing (include in broader marketing effort).
- Integrate car share pods into broader mobility system by placing more car share pods adjacent to the existing transit network and in neighborhoods underserved by public transportation.
- Designate on-street parking spaces for car share vehicles.
- Encourage car share companies to site vehicles in private driveways by modifying current business license and zoning requirements.
- Provide car share subsidies for low-income residents.
b. Policy: Provide incentives and remove disincentives to ridesharing

Implementing Actions:
- Market existing discounted parking for carpools and vanpools and site such parking spaces near transit when feasible.
- In collaboration with community partners, include existing web and phone-enabled ridesharing programs in comprehensive marketing and outreach effort. Telephone and computer technologies currently exist that enable the development of real-time, or dynamic, ridematching. Dynamic ridesharing can match passengers with drivers for individual ad-hoc trips as opposed to regularly scheduled trips.
- In collaboration with community partners, market and enhance existing casual carpool program.

c. Policy: Expand capacity and service of local taxi fleets to provide an alternative to single-occupancy driving

Implementing Actions:
- Integrate information about the role of taxi service in marketing and outreach efforts.
- In collaboration with regional agencies and local taxi companies, consider studying the feasibility of establishing a discounted zone-based fare or flat fees, especially for travel to/from transit stations.
- Support shared taxi use, including real-time dispatch and routing.

8. Goal: Encourage the use of low-carbon vehicles and fuels

Relatively speaking, municipal governments have limited opportunity to affect the technological improvements necessary to increase vehicle fuel efficiency and to lower the carbon content of fuels. But as residents, employees, business owners, city officials, students, etc., we affect our community’s average fuel efficiency whenever we make a choice regarding the type of vehicle to drive (if we must drive at all). The role of city government and community-based agencies is to promote and provide incentives for low and zero-emissions vehicles as well as create the infrastructure necessary to support low carbon forms of transportation.

The state and federal governments also have an important role to play. For example, the Pavley Bill (AB 1493, became state law in 2002) would require significant fuel efficiency improvements in automobiles sold in California and therefore have a direct impact on community-level greenhouse gas emissions. Under the Pavley Bill, the average motor vehicle in 2020 could be expected to emit approximately 16% fewer GHG emissions compared with today’s average automobile.
Whether a result of the Pavley Bill, a new piece of state or federal level legislation, or a combination of outreach and incentives at the community level, improved fuel efficiency requirements and the utilization of low-carbon fuels (including electricity) are necessary pieces of the puzzle for our community’s GHG reduction targets. However, the City and its partners and citizens must ensure that low-carbon fuels such as bio-diesel are produced in a manner that does not have negative effects on food supply and that is shown to actually create a GHG reduction benefit when analyzed from a lifecycle perspective.

a. Policy: Create incentives for high-efficiency vehicles, including electric vehicles and plug-in hybrids in the community

Implementing Actions:

- Evaluate opportunities to reduce parking rates in City-owned garages for vehicles that achieve a certain high threshold of fuel-efficiency.
- Evaluate opportunities to create additional free parking and charging stations for electric and plug-in hybrid vehicles. Currently, the City provides an electric vehicle charging station in the Center Street garage and two dedicated on-street parking spaces for electric vehicles near City Hall.
- Provide incentives in City parking and transportation demand management policies for developers and business owners that provide plug-in locations for electric vehicles and plug-in hybrids.
- Include information about electric vehicles in broader marketing campaign.

b. Policy: Provide leadership in building a market for plug-in hybrids

Implementing Actions:

- Purchase [City government] plug-in hybrids when they become available and partner with car share organizations to provide plug-in hybrids to car share pods throughout the city.

c. Policy: Encourage the responsible production of low-carbon bio-fuels

Implementing Actions:

- Initiate efforts to convert local restaurant grease into bio-fuel for City-owned and private vehicles.
- Partner with local organizations and bio-fuel providers to educate the community on the role responsibly produced bio-fuels can play to reduce local emissions.
9. Goal: Enhance and expand outreach, marketing and education regarding land use and transportation

Personal choice underlies many of the transportation-related changes that will have to occur in order for the community to achieve its GHG-reduction goal. Enhancing and expanding current education and outreach efforts is therefore fundamental to this plan. Such efforts are aimed at providing community members with access to information that enables them to make informed choices. For example, specific information about the economic and environmental impact of riding public transit or a bicycle as opposed to driving a car may influence the transportation choices one makes. Along with the City government, regional agencies and local community-based organizations are already playing a key role in providing information that can inform community members’ choices.

The actions outlined below represent a strategic start rather than a comprehensive list of the things our community can do to affect behavior change. New and innovative ideas for creating social change happen all the time. The City and its partners will continue to seek and harness those ideas in order to make alternative transportation the mainstream. See the chapter on Community Outreach & Empowerment for more.

**a. Policy:** Work with regional and local community partners to provide sustained outreach and education to Berkeley citizens and visitors regarding alternative forms of transportation

**Implementing Actions:**

- Launch marketing and branding campaign that informs community members of their alternative transportation options.
- Include transportation-related education materials in a welcome package for all new homebuyers/renters.
- Consider expanding existing TravelChoice-Berkeley program. Coordinated by the Oakland-based TransForm, TravelChoice is an innovative program aimed at reducing single occupancy vehicle trips and congestion while promoting healthy physical activity. Through door-to-door canvassing and connecting with people by phone, the program provides interested residents with information and incentives to add more walking, biking, public transit and carpooling into their daily routines.

  In 2007-08, TravelChoice started in Berkeley, contacting over 7,500 households in south and west Berkeley. In early 2008 an additional 9,000 households were contacted in north Berkeley and along San Pablo Avenue.

- Sustain and expand the Safe Routes to School Program (SR2S.) The program promotes walking and cycling to school and improving traffic safety around schools through education, incentives, increased law
enforcement, and engineering measures. The program not only addresses GHG emissions, but also has health-benefits for children. SR2S is currently being implemented in Berkeley through a partnership between TALC and the Berkeley Public Health and Public Works Departments.

- Design and implement an annual 'Berkeley Car-Free Day' campaign.
- Actively promote and participate in annual Bike to Work Day.
- In collaboration with local businesses and community partners, identify incentives for telecommuting. Telecommuting has the potential to reduce vehicle trips related to commuting to and from work.
- Partner with hotels, motels, and other visitor destinations to provide visitors with information regarding public transit, bicycle and pedestrian facilities.
- Partner with local business associations to market the “Buy Local” campaign. Buying local has the potential to reduce GHG emissions by eliminating car trips to more remote destinations.

10. Goal: Green the vehicle fleet used by the City government and increase alternative transportation options for employees of public institutions

The Berkeley City government has an active alternative fuel vehicle program, including a variety of electric, natural gas, and bio-diesel vehicles. In 2003 Berkeley became the first City government to utilize 100% bio-fuel in its fleet.

Today the City uses 20% bio-diesel (B20) blend and is investigating other alternative fuel options. The Berkeley Unified School District (BUSD) also utilizes B20 bio-diesel for its buses.

Berkeley also showed innovative leadership in retiring underused fleet vehicles and replacing them with City CarShare hybrid-electric vehicles.

a. Policy: Increase fuel efficiency and use of alternative fuels in City government fleet

Implementing Actions:

- Retire underused and inefficient City fleet vehicles.
- Replace additional City fleet vehicles with City CarShare vehicles.
- Partner with City CarShare to integrate plug-in hybrid vehicles into the City’s fleet.
- Purchase plug-in hybrids for City fleet when available.
- Ensure that bio-fuel utilized by the City fleet is responsibly produced and creates a GHG emissions reduction benefit when analyzed from
a lifecycle perspective. Investigate using recycled grease from local restaurants as a fuel alternative.

- Consider increasing bio-fuel mix used by the City from B20 to B50 or higher.
- Increase the fuel and route efficiency of Office of Solid Waste trucks by converting trucks to low-emission engines; utilizing route-efficiency software; and utilizing a higher percentage bio-diesel or other low-carbon fuel.
- Institute a City purchasing policy that requires the procurement of low-emissions vehicles whenever new vehicles need to be acquired.

**b. Policy:** Encourage the use of alternative transportation for City employees and elected officials

**Implementing Actions:**

- Continue to supply City employees with the Easy Pass (formerly Eco-Pass). Work to include BART ridership as part of the Easy Pass benefit.
- Continue to supply City employees with pre-tax transit subsidies such as Commuter Check.
- Continue to offer deeply discounted carpool and vanpool monthly parking permits at City parking facilities.
- Except in cases where certain City staff persons have no alternative to driving to and from work (e.g., emergency personnel who work overnight), phase out free parking assigned to City staff for privately owned vehicles.
- Consider phasing out free parking assigned to City Councilmembers.
Chapter 4: Building Energy Use Strategies

A. Building Energy Use in Berkeley: An Overview

Electricity and natural gas consumption in our homes, businesses, industries and public institutions (including the City government) results in over 310,000 metric tons CO₂e (MTCO₂e) per year emitted into the atmosphere – about 53% of Berkeley’s total GHG emissions. The energy we consume in our homes contributes about half of the total emissions from building energy use while energy consumption in non-residential buildings contributes the other half. Natural gas consumption, mostly for space and water heating, is by far the largest source of emissions related to building energy use.

To stay on track to achieve the community’s interim emissions reduction target,¹ the community must reduce the emissions that result from building energy use by 35% by 2020.

This is no easy undertaking. In simple terms, the community’s task is to ‘reduce conventional energy use in every existing Berkeley home, business and institution through high-quality energy efficiency retrofits and a greater reliance on renewable energy such as solar. It also requires ensuring that any new construction meets high standards of energy performance.

The goals outlined in this chapter are designed to serve as a guide for meeting the task before us. They are the following:

- **Green New Construction and Remodels:** The City’s goal is for new construction to meet “zero net energy” (ZNE) performance by 2020. A ZNE building combines energy efficient building design and systems with on-site renewable energy generation (e.g., solar) to result in zero net energy purchases from the grid. To achieve this goal the City will set minimum standards for how energy is used in buildings; encourage innovative strategies that minimize energy and water

¹ Berkeley’s GHG reduction targets are explained in more detail in Chapter 2. The interim, year 2020 target for community-wide emissions is a 33% reduction below year 2000 emissions levels.
consumption, maximize the recycling of construction debris, and make for a more comfortable indoor environment; and assist property owners to lower the upfront cost of applicable energy saving solutions.

■ **Energy Efficient Homes:** Vast amounts of potential energy and cost savings are locked up in Berkeley’s existing residential building stock. The plan lays out strategies for enhancing and lowering the cost of energy efficiency services and standards for existing residential properties in order to make those properties as energy efficient as possible. Because more than half of Berkeley’s housing units are rental properties, special programs must be developed to enable energy upgrades in this sector.

■ **Energy Efficient Businesses and Institutions:** The efficient use of energy saves businesses money and minimizes GHG emissions. The plan makes recommendations for enhancing energy efficiency services and standards for existing commercial and industrial properties, both large and small. Like in the residential sector, the City’s goal is to enhance demand for energy upgrade services while at the same time helping to lower the cost of employing those services.

■ **Renewable Energy:** Efficiency alone will not achieve the Measure G targets. The community is also tasked with developing a local, clean, decentralized renewable energy supply to meet a portion of our energy needs. The City’s goal is to eliminate at least 11,600 MTCO₂e per year by 2020 through decentralized solar installations on residential and nonresidential buildings. The City is developing several strategies to address the main barrier to going solar: the upfront cost.

■ **Green Public Buildings:** Institutions such as the City government and School District demonstrate important leadership by improving building energy efficiency and utilizing renewable sources of energy such as solar and wind. The solar installation on Washington Elementary School and the combination of solar and wind energy systems on the City’s Shorebird Park Nature Center are just two of several examples of the City and School District taking a leadership path.

■ **Community Education, Outreach, and Marketing:** Behavior change underlies the success of each of the components outlined above. The City of Berkeley and its partners must combine efforts in the policy arena with targeted education and social marketing for residents, businesses and institutions.

■ **Local Green Jobs:** Enhancing local demand for services such as energy retrofits and solar installations not only reduces energy consumption and GHG emissions, but it also results in increased demand for skilled labor that can do the work. Through youth development and job training and placement programs, the City and its community
partners will match local residents with quality jobs in the emerging green economy.

As is described in more detail below, developing and implementing actions to achieve these goals entails continuous improvement in building energy use services offered to the community.

This means that minimum standards for energy efficiency in the residential and commercial sectors should continuously be ratcheted up and become more effective at saving energy and money over time. This plan provides recommendations for improving minimum energy standards in new and existing buildings. The plan does not create mandates or requirements. Any future recommended requirements in the plan must be approved by the City Council after a thorough review by commissions and community members. Consideration of any future requirements will include noticed public hearings.

Likewise, voluntary energy service programs offered in the community should be continuously expanded and integrated to become more effective and cutting edge over time.

Successfully implementing these actions also requires sustained collaboration across all sectors, including homeowners; tenants and landlords; business owners; real estate professionals; builders, architects, engineers, and contractors; city staff persons and elected officials; students, educators and school administrators; and others. Such collaboration has the potential to result not only in reduced GHG emissions, but also in an improved Berkeley building stock, reduced energy costs, and increased demand for “green jobs” in the building and energy service industries.

B. Building Energy Use Actions

The goals, policies and actions outlined in this section build on energy-related programs and services currently implemented by the City government and partner agencies in Berkeley. Though progressive when compared to many communities, we cannot count on the portfolio of energy-related services and mandates currently offered to achieve the scale of emissions reductions required to meet Berkeley’s GHG reduction target. The measures described below represent a more aggressive, integrated approach to improving building energy efficiency, shifting toward decentralized sources of renewable energy, and connecting local residents to jobs in the energy services sector.

See the table in Appendix A for a consolidated list of goals, policies and implementing actions related to building energy use. The table also includes an implementation timeline and funding sources.
1. Goal: Make green building business as usual in the new construction & remodel market

The green building movement is about building better buildings and more livable communities, not just protecting the environment. Green buildings conserve resources, save money on energy and water bills, provide a more comfortable and healthy environment for building occupants, and are proving to be more valuable than conventional buildings. Rapidly increasing numbers of government agencies, utilities, builders, architects, designers, contractors, developers and building material suppliers are embracing green building ideals and transforming the market place in the process. Many of the green building movement’s ideas have come from the building industry itself because they make good business sense for the industry.

Green building encompasses:

- **Sustainable Sites:** Appropriate project locations reduce vehicle miles traveled and protect agriculture, open space and other environmentally sensitive areas. This results in development that is oriented towards pedestrians, cyclists and public transit, as well as reduces urban sprawl. Green buildings maximize the site’s unique properties, including solar orientation, wind direction, and slope.

- **Passive Design:** Green buildings reduce the need for artificial lighting, heating, cooling and ventilation by incorporating these components as “passive” systems. This means that the buildings require very little external energy because they take advantage of the site for daylight and natural ventilation and are constructed or remodeled to reduce unwanted air infiltration and heat loss.

- **Water Efficiency:** Green buildings conserve water both inside and outside and often integrate innovative wastewater technologies such as gray water for irrigation. These measures often result in cost savings and pay for themselves many times over during the life of the building.

- **Materials & Resources:** Green buildings re-use existing materials to the fullest extent possible, use new materials that minimize impacts on
the environment, and minimize construction debris by recycling con-
struction materials.

- **Indoor Environmental Quality:** Green buildings provide optimal air qual-
ity for building occupants over the lifetime of the building by eliminat-
ing materials that release volatile organic compounds and other toxic
contaminants, and by providing proper ventilation. Enhancing the
indoor environment for building occupants includes considering light-
ing and air quality, thermal comfort and access to daylight and views.

In putting green building for new construction and remodels into practice, it is
important to have a standard by which to rate and compare the relative "green-
ness" of projects. The standard commonly used throughout the U.S. for new
nonresidential projects is Leadership in Energy and Environmental Design (LEED).
The U.S. Green Building Council provides the LEED standard. The City’s current
green building policy requires LEED silver certification for new City buildings.

A standard commonly used in California for new residential projects is GreenPoint
Rated (GPR). StopWaste.Org and the Berkeley-based non-profit Build It Green
(BIG) developed the GPR standard and BIG now administers the program state-
wide. Both the GPR and LEED standards are important tools for helping Berkeley
to promote and track local green building efforts.

One important way that the City is working to promote green building practices is
through the Berkeley's Best Builders program. As part of the program, applicable
residential and commercial projects must adhere to the following requirements:

- **Green Building Consultation:** Applicants for discretionary projects must
  consult with a green building expert where green building practices
can be explained and encouraged.

- **Green Building Checklist:** Large-scale development projects and new
  buildings with one or more dwelling units are required to complete a
  “green building checklist” (either LEED or GreenPoint Rated) and
  update it throughout the project.

- **Energy Conservation Analysis:** Projects with over 10,000 square feet of
  new nonresidential floor area are required to submit an “energy
  conservation analysis” (provided at no-cost by PG&E).

These requirements serve our community well and have done much to set the
stage for a surge of green building projects in Berkeley. But given the increasing
clarity around the multiple benefits of green building, the City’s goal for new
construction to achieve zero net energy by 2020, and the community’s aggressive
GHG emissions reduction target, the City and its partners need to do more
to enhance existing green building services and standards. Specific policies and
implementing actions include:
**a. Policy: Improve local energy and green building standards**

In an effort to reduce energy usage in California, in 1978 the California Energy Commission (CEC) adopted part 6 of Title 24 of the California Code of Regulations: Energy Efficiency Standards for Residential and Nonresidential Buildings. The Title 24 energy standards are updated on a triennial basis and the most recent standards become effective in 2009.

The City of Berkeley is evaluating establishing local minimum energy and building performance standards that are more aggressive than Title 24. New standards for Berkeley buildings would be linked to nationally recognized green building standards such as, ENERGY STAR for New Homes, ENERGY STAR for Affordable Homes, LEED, and GreenPoint Rated.

**Implementing Actions:**

- Establish and continually ratchet up minimum energy standards for residential and nonresidential buildings that exceed the current Title 24 energy code for various building types specific to Berkeley’s climate zone. An example of a minimum standard for a specific building type would be a requirement that all new multifamily buildings meet federal ENERGY STAR standards for new construction. ENERGY STAR standards exceed Title 24.

- Require that new projects achieve a minimum point level on an appropriate green building checklist (e.g., GreenPoint Rated Checklist for residential buildings or LEED checklist for nonresidential) and report projected GHG emissions.

- Expand and eventually require the monitoring, testing and commissioning of residential and non-residential building systems to ensure that buildings in Berkeley are performing as intended. It is important to verify and document that buildings are performing as intended by the design. This process is known as commissioning for commercial buildings and performance testing for residential buildings.

- Require that all new multi-unit buildings be “sub-metered” to enable monitoring of energy and water consumption on a unit-by-unit basis.

**b. Policy: Simplify project review and permit approval process to encourage innovative green building measures**

The City strives to continually improve the service it provides to those seeking building permits. Planned service improvements include dedicating a building inspector to assist with green building questions, providing education materials related to green building, and ensuring that Planning & Development Department staff is up to date on the latest green building technologies.
Implementing Actions:

- Dedicate a Senior Green Building Inspector to make it easier to use green building technologies under the building code and provide upfront coordination and assistance for builders committed to achieving a high level of green building.

- Identify funding sources and other incentives that can subsidize City permit fees for innovative or pilot green building projects.

- Adopt a green building curriculum and provide ongoing training for zoning and building permit plan-checkers in the City’s Planning Department to enable them to be knowledgeable about the latest green building techniques. The training curriculum should be updated regularly to reflect changes in building technologies and techniques.

- Increase green building throughout the region by sharing best practices with other area cities through such entities as the Green Building Public Agency Council (PAC). The PAC is a unique collaborative effort of over 100 participating public agencies that meet quarterly to share information, create consistent green building standards in their regions, and support each other’s programs and initiatives.

c. Policy: Identify and develop financial incentives and low-cost financing tools to enable increased green building in the private sector

Implementing Actions:

- Develop and catalogue financing options for consumers. The City and partnering organizations such as the East Bay Energy Watch, Build It Green, and StopWaste.Org should provide such resources in a coordinated way.

d. Policy: Enhance outreach to encourage developers to adopt national green building and energy performance standards, such as ENERGY STAR, GreenPoint Rated and LEED.

Implementing Actions:

- Highlight existing green buildings and cutting edge green technologies through green building tours. Build It Green currently offers self-guided tours that showcase single and multi-family buildings that were built or remodeled using green materials and practices.

- Highlight existing green buildings in Berkeley through case studies made available at the City’s Permit Service Center and on City and partnering agency websites.

- Working with partner organizations and nearby jurisdictions, identify a sponsor and launch a green building awards competition. Residential and commercial building projects would receive recognition and awards.
based on metrics related to energy and water consumption, accessibility to alternative forms of transportation, and others and be showcased at the City’s Permit Service Center.

- Expand the green building display in the City’s Permit Service Center and utilize it to showcase innovative green build materials and practices.

2. Goal: Enhance energy services and standards and reduce costs of energy upgrades for existing residential properties

Electricity and natural gas consumption in residential buildings accounts for 26% of Berkeley’s GHG emissions. The bulk of residential emissions – 76% – are from natural gas, which is used primarily for space and water heating.

The vast majority of Berkeley’s residential structures were built before State-mandated energy standards for new construction were put into place. Many homes are drafty and have poor insulation and inefficient heating systems. While some homes have since been retrofitted with insulation, high-efficiency windows, new major appliances and systems, and other improvements, most existing homes have significant room for additional enhancements to reduce energy consumption. Indeed, the vast majority of GHG reductions from buildings to be gained over the next 30 years will be from energy-efficiency improvements to existing buildings, both residential and nonresidential.

Achieving a 35% reduction in residential sector GHG emissions requires substantial public and private investment, but will also result in substantial cost savings (and job opportunities) over time. According to estimates conducted by the California Building Performance Contractor Association (CBPCA), a typical pre-war 1,500 square foot home in Berkeley could reduce its overall energy consumption by 35-45% with a $5,000-$10,000 investment in energy efficiency improvements. Cost effective energy improvements include sealing air leaks, insulating the attic and walls, upgrading lighting and appliances, and reducing losses from phantom energy loads [i.e., appliances and electronic devices that consume energy even when turned off]. Each home and occupant is unique, but one could expect a typical payback period for an investment similar to the one outlined above to be less than 10 years. Collectively, a 35% reduction in total residential energy use would reduce Berkeley residents’ cumulative energy costs by approximately $300 million by 2020.

Capturing these opportunities to save energy and money, as well as to garner valuable co-benefits such as job creation and improved building comfort, requires making existing services and standards more aggressive, providing a suite of energy saving tools and resources to residents, and finding ways to remove barriers to action. Important pieces of the puzzle include:
Aggressive local standards for energy use in existing buildings: The City seeks to adopt local energy efficiency standards for existing residential buildings in order to create a consistent, thorough approach for achieving increased energy efficiency through energy retrofits. Berkeley’s standard will be linked to existing accepted standards such as HERS II (recently adopted by the State of California).

Education and marketing: Many property owners are aware of “low-hanging-fruit” energy saving measures such as utilizing ENERGY STAR appliances and compact-fluorescent light bulbs (CFLs). Fewer are aware of a deeper, more integrated, performance-based approach to maximizing energy efficiency and cost savings in a home. This approach starts with a robust analysis of where energy is being wasted and how that waste can be eliminated in a cost-effective manner. Once a home energy analysis is conducted, the next step is connecting residents to a full suite of resources and trained service providers that can implement the energy upgrades. As this plan outlines, the City is developing programs and services that will help inform residents of their energy saving options and the multiple benefits of taking advantage of opportunities to improve their home’s energy performance.

Financial incentives and financing assistance: Though the return on investment of energy-saving measures is often quite good, the upfront cost remains the single largest barrier to making substantial energy efficiency improvements in one’s residence. The City and a number of community agencies are working to provide various tools and incentives to address that barrier.

Outlined below are policies and implementing actions that will serve to make it easier and more cost effective for Berkeley residents to increase the energy efficiency of their homes.

**Policy:** Establish a standard for home energy audits and energy improvements that provides thorough guidance on achieving deep, sustained energy savings in existing residential buildings

Most existing residential buildings in Berkeley can be improved to use substantially less energy. Nevertheless, given the diversity of the building stock, the appropriate combination of integrated energy improvements is often specific to a building. By establishing a standard for energy audits and upgrades, the City will help to ensure that energy improvements are done in the most comprehensive and cost-effective manner.

The City can achieve compliance to local energy standards throughout the residential sector in different ways. One is to identify incentives and rebates for early compliance. Compliance could be one basis for eligibility for various energy-related incentives and financing provided by the City government. Another approach is to require improvements to a building’s energy performance when a building undergoes a
major renovation, is sold, or is converted to condominiums. These events are also a good opportunity to conduct targeted outreach and education to residents. Finally, the City could establish a goal to have all residential buildings achieve local energy standards by a certain date.

The City has an existing standard, the Residential Energy Conservation Ordinance (RECO), which was adopted in 1980. RECO requires that every home or apartment building sold or transferred in Berkeley or undergoing renovations with a total value of $50,000 or more must meet a prescriptive list of energy and water efficiency requirements for a range of building systems and features, including: toilets, showerheads, water heaters, attic insulation, exterior door weather stripping and common area lighting (for multi-unit buildings).

RECO has served Berkeley well and has been copied and implemented by other U.S. cities. As a vehicle for energy and water efficiency improvements it has a far reach because it is mandatory and is applied whenever a home or apartment building is being sold or renovated.

That being said, it is important to note that the impact of RECO is limited to the time of sale and major renovations. Also, because it is a minimum standard that will apply to all residential buildings, RECO does not require consideration of more comprehensive and expensive measures that might be pursued on a voluntary basis given the proper information and support infrastructure.

The average energy savings associated with RECO measures currently ranges from an estimated 10-20% per building.

**Implementing Actions:**

- In collaboration with energy service providers, community stakeholders and local governments in the region, develop and phase in a local energy standard for existing residential buildings that is designed to facilitate deep, cost-effective reductions in energy use. The standard will ensure that existing residential buildings in Berkeley achieve aggressive, measurable energy efficiency improvements.

- Phase in energy standards for existing residential buildings by requiring compliance in order to take advantage of certain incentives and financing and by triggering a compliance requirement at certain events such as major renovations, point of sale, and condo conversions. The City should benchmark, track, and report on implementation progress at regular intervals.

- Engage and train energy service providers (e.g., organizations that can conduct comprehensive energy audits and upgrades) to become well versed in Berkeley’s energy standard so that they can serve the market.

- Provide a suite of energy-saving programs, resources, education, incentives, rebates and financing options (as described in more de-
tail below under policies b - d) to assist property owners and tenants to comply with the local energy standard.

- Partner with the Berkeley Association of Realtors and other real estate professional groups in an effort to conduct targeted outreach and education to new Berkeley homeowners.

**b. Policy:** Develop and provide comprehensive energy services for local residents

**Implementing Actions:**

- In collaboration with PG&E and state and federal government, provide financial incentives for compliance with local energy standards. PG&E uses ratepayer money, collected through the public goods charge, to fund various incentives for energy improvements. The public goods charge is a surcharge placed on the bills of all PG&E (and other investor-owned utilities) customers. While helpful, the incentives funded through the public goods charge are generally not structured to achieve the scale of savings required under Berkeley’s Climate Action Plan. The City seeks to work with relevant agencies to establish additional incentives geared toward Berkeley’s local energy standards, i.e., designed to encourage a deeper, more comprehensive set of energy improvements. Such incentives could include providing property owners and tenants with rebates that could be applied to energy services provided by independent service providers.

- **Launch the Smart Solar Program.** The purpose of the program is to make it as easy and inexpensive as possible to make a home (or business) energy efficient and to utilize a solar photovoltaic (PV) and/or solar thermal system. The program achieves this purpose by removing market barriers that inhibit the widespread adoption of these technologies.

  Through the Smart Solar program, community agencies will conduct marketing and outreach and offer personalized consultations for potential customers. The consultations will provide guidance and resources to help property owners navigate through the multitude of technology options and incentives that are available. Qualified energy service providers that have experience and in-depth knowledge of the solar and energy efficiency markets will conduct the consultations. Customers will take away from each consultation a better understanding of the cost and benefits associated with potential energy saving solutions.

  Smart Solar is modeled after the highly successful Smart Lights Program, operated locally by the Community Energy Services Corporation. Smart Solar is being funded through the U.S. Department of Energy’s Solar America Initiative.

  The program is scheduled to launch in pilot mode in April 2009.
- Provide Berkeley FIRST (Financing Initiative for Renewable and Solar Technology) financing for solar photovoltaic energy systems and if feasible, expand the program to include financing for other renewable energy systems and energy efficiency improvements. Berkeley FIRST is designed to address the financial hurdles facing property owners that wish to “go solar” and make significant investments in energy efficiency. The program enables the City to provide financing for the upfront cost of major energy improvements in privately owned buildings and recoup that cost through a 20-year assessment on the building owner’s tax bill. The City launched Berkeley FIRST as a pilot program in the fall 2008 for solar PV installations as a test of the concept. If successful, the goal is to expand the program to support solar thermal installations and energy efficiency measures.

- Explore the feasibility of amending the existing program allowing a rebate of a portion of the City of Berkeley’s transfer tax for seismic safety upgrades to also include major energy efficiency and solar improvements.

- Partner with Rising Sun Energy Center and other community partners to implement a 3-tier energy efficiency and job-training program. The program delivers energy efficiency services to residents and on-the-job training for youth and people with barriers to employment. Energy services are provided through three progressive tiers:
  
  - **Tier I: California Youth Energy Services (CYES)** – Upon appointment, CYES sends two Youth Energy Specialists to a given home to do a basic check of household electricity, natural gas and water consumption and to provide free energy, water and cost savings devices. CYES serves as an energy reduction program as well as a valuable source of training and employment for local high school, community college and trade school students. According to program staff, on average CYES serves about 325 Berkeley households per year and achieves collective reductions of 150,000 kWh and 1,600 therms annually. This equates to an annual greenhouse gas emissions reduction of 43 metric tons and cost savings exceeding $21,000.

  - **Tier II: Green Energy Training Services (GETS)** – GETS is an energy efficiency training program and internship geared toward young adults between the ages of 18-35 with barriers to employment. The GETS program will follow up where CYES leaves off by developing program participants’ analytical and installation skills, offering residents a comprehensive energy audit, and working with RSEC’s High Performance Homes (HPH) program to install advanced energy savings measures in homes.
• Tier III: High Performance Homes (HPH) – HPH provides residents with more comprehensive energy efficiency measures, including attic, wall and floor insulation, duct sealing and pipe wrapping. This is a professional level, subsidized service for residents who want to make their home as energy efficient as possible. Trainees from the GETS program will work closely with the HPH contractors as pre-apprentices. RSEC will actively engage contractors working in moderate-to-low income programs to leverage their work with low-income homeowners to provide additional energy efficiency measures.

• Tier IV: Pre-Apprenticeship Trades Training & Postsecondary Career Pathways – Tier IV provides postsecondary classroom training and on-the-job training in the building trades, in business development and marketing, and in green energy and green building careers.

■ Develop targeted energy services for home-based care facilities. This program would fund performance-based audits and energy-saving measures for qualified childcare facilities, including home-based facilities that do not qualify for other energy programs offered for residential or commercial properties. The program would focus on energy saving measures (e.g., sealing air leaks) that provide several health-related co-benefits. Example co-benefits include elimination of moisture and mold, reduced pest infiltration and debris and other asthma triggers, reduced drafts and improved indoor air quality, reduced radon, and enhanced building durability and fire safety.

■ Partner with East Bay Municipal Utility District (EBMUD) to identify additional opportunities for distribution of free water saving devices and education.

■ Rather than having ratepayer funds for energy efficiency and other energy saving programs (Public Goods Charge) be distributed through utilities, consider the feasibility and effectiveness of having those funds given directly to the City or some other agency or organization.

c. Policy: Expand and better integrate programs for low-income households

Climate protection strategies have both costs and benefits. It is important to ensure that the costs of reducing GHG emissions are not a burden on those who can least afford to pay them, and that everyone shares the benefits of the climate protection effort.

A number of programs currently offered in Berkeley are specifically designed to both reduce energy costs for low-income households and protect the environment at the same time. The programs include:

• City of Berkeley Weatherization Program: Created in 1982, the City’s weatherization program addresses health and safety issues in low-income homes and enables increased energy efficiency and
conservation. The program is funded through federal grants and the City’s General Fund. Like the LIEE Energy Partners program mentioned below, the weatherization program offers numerous free services to low-income households, including new energy efficient appliances, water heaters and water heater blankets, attic insulation, door and window repair and replacement, low-flow showerheads, and more. Additional funds leveraged from Community Development Block Grants are able to provide “Super Weatherization,” which includes a more sophisticated, in-depth energy audit and more comprehensive energy measures.

- **Low-Income Energy Efficiency (LIEE) Program**: Funded by the State of California, the LIEE program provides no-cost weatherization services and energy education to low-income households in Berkeley and other communities throughout the state. The services are administered in Berkeley through PG&E’s Energy Partners program. Energy services provided for free to low-income households include: attic insulation, energy efficient refrigerators, floor and wall repair, and more.

Together, the Energy Partners and City weatherization programs serve about 520 low-income households in Berkeley per year, or about four percent of all low-income households annually. Program staff estimates that on average each household served by these programs reduces annual energy consumption by 10-25%, saving residents over $100,000 on collective energy costs every year.

Despite the success of these programs, the City, PG&E and the appropriate state and federal agencies can take steps to increase the effectiveness of services offered to low-income households. Better integrating existing programs and expanding the services provided to include additional energy saving measures and a more comprehensive home energy audit would result in increased energy efficiency and cost savings, and would eliminate the need to return to the property to capture additional energy savings later.

**Implementing Actions:**

- **Conduct a “gap analysis” or baseline study to determine how to effectively expand and enhance energy services for low-income clients.** The gap analysis will determine how to eliminate duplication in services, how to provide more efficient and integrated services and, when funding is available, how to expand services to clients who have not yet been served.

- **Combine the delivery of City and agency programs with other income-qualified assistance programs.** An integrated suite of low-income programs will provide increased potential for energy and cost savings and health-related benefits as well as more cost-effective program delivery. Existing programs to be incorporated include:
• Community Development Block Grant (CDBG) funded programs: A program provided by the U.S. Department of Housing and Urban Development (HUD), CDBG funding supports the Home Safety & Repair program, administered locally by Community Energy Services Corporation (CESC). Eligible low-income homeowners are entitled to free home repair services such as plumbing, electrical and carpentry repairs; mobility and access installations (grab bars, hand rails, lifts, ramps, etc.); and fire and earthquake safety measures.

• Senior and Disabled Home Rehabilitation Loan program: This program assists low-income senior and disabled homeowners in repairing their homes, to eliminate conditions that pose a threat to their health and safety, and to help preserve the City housing stock. Qualified borrowers can receive interest-free loans of up to $35,000.

• City of Berkeley Weatherization Program: As described above, this program offers energy services to low-income residents.

■ Develop and implement Green LEEP (Low-income Energy Efficiency Program). Green LEEP would provide comprehensive, performance-based energy testing and installation of energy saving measures for qualified low-income residents.

■ Develop and implement the Rental Housing Energy Efficiency Loan (RHEEL) program. The RHEEL program would provide up to $10,000 per housing unit to reimburse landlords of low-income residents for comprehensive energy analyses and upgrades. The loan would be interest-free and repayable after either ten years or when the property is sold. The program would be implemented on a pilot basis for a relatively small number of rental properties for the first year and then, if successful, be expanded to include a larger number of buildings.

■ Partner with agencies such as GRID Alternatives to provide low-cost solar installations to low-income residents. GRID Alternatives provides low-cost solar electric systems to qualified low-income homeowners. By using utility rebates, grants and sweat equity, GRID Alternatives is able to offer substantially reduced cost systems sized and installed for low-income homeowners. This program can be leveraged for property owners receiving new roofs under Berkeley’s Senior and Disabled Home Loan program.

d. Policy: Identify and capture opportunities for energy and water savings in renter-occupied units

One significant barrier to achieving GHG reductions in residential buildings is what is referred to as the “owner/tenant split financial incentive.” Building owners have little incentive to invest in energy or water efficiency improvements since
any gains will primarily flow to the tenants who often pay the utility bill. Conversely, tenants have little incentive to invest in structural efficiency improvements when they do not own the building and their tenure in a unit is generally of shorter duration relative to the “pay-back” on the investment.

Given the fundamental economic barrier to action that the split incentive represents, one plausible solution is to create a situation in which the landlord can more easily gain some financial benefit from her/his investments in building energy and water improvements so long as the tenants receive an overall reduction in expenses on their energy bill. This is much easier in theory than in practice.

In order to overcome the “split incentive” barrier, the Rent Board along with the appropriate City departments, community agencies and other stakeholders should begin a process to evaluate potential outreach efforts, incentive structures and mandatory requirements that enable both the landlord and the tenant to benefit from building energy and water efficiency improvements.

**Implementing Actions:**

- Work with the Rent Board to explore ways in which the cost of high quality energy and water efficiency measures can be paid for by both property owners and tenants. Such an analysis would consider the impacts that rent increases would have on tenants.
- Work with community partners to design a program that would require that upon vacancy, an energy rating system be applied to rental units so as to inform future occupants of the costs and relative energy and water efficiency associated with the unit.
- Develop and market a green landlord database. The database will include information about landlords that have implemented a defined set of energy and water saving measures. The database will help to inform potential tenants’ housing choices.

**3. Goal: Enhance Energy Services and Standards for Existing Commercial Properties**

Similar to the City’s residential structures, most of Berkeley’s commercial/industrial building stock predates the State’s existing energy standards. Many Berkeley businesses have considerable potential for energy (and money) savings through lighting upgrades, efficiency improvements made to heating, ventilating and air conditioning (HVAC) systems, and other measures.

The actions outlined in this section seek to expand existing efforts in large part by establishing aggressive local energy standards and enhancing and increasing access to tools such as more comprehensive energy audits, increased energy-related services, and financing assistance.
a. Policy: Establish a standard for energy audits and energy improvements in nonresidential buildings that provides thorough guidance on achieving deep, sustained energy savings

The City will establish a standard for energy audits and upgrades to help ensure that energy improvements are done in the most comprehensive and cost-effective manner.

As with residential buildings, the City can achieve compliance to local energy standards throughout the commercial sector in a few different ways. One, identify incentives and rebates for early compliance. Two, compliance can form the basis of a given building owner’s eligibility for various energy-related incentives and financing provided by the City government. Three, requirements for improving building energy performance can be triggered during certain events, such as building renovation or point of sale or lease. These events are also a good opportunity to conduct targeted outreach and education to building managers and owners. Finally, the City could set a goal to have all nonresidential buildings achieve the local energy standards by a certain date.

The City has an existing standard, the Commercial Energy Conservation Ordinance (CECO), which was adopted in 1985. CECO requires that every commercial property owner that plans on selling a property, doing a major renovation (costing $50,000 or more), or building additions that will increase the “conditioned” area of the commercial property by more than 10% must initiate CECO compliance. Its intent is to help protect commercial property owners and tenants from energy price increases by reducing the amount of energy used for space ventilation, heating and cooling, hot water, and lighting.

Like its counterpart in the residential sector, CECO is an effective vehicle for energy and water efficiency improvements and has a far reach because it is mandatory whenever a commercial building is sold or substantially renovated. The average energy savings associated with the current CECO are about 10 - 15% per commercial building. Like the residential standard, the City will develop a new set of standards to be more broadly applied to the existing commercial stock.

Implementing Actions:

- In collaboration with energy service providers, community stakeholders and local governments in the region, develop and phase in a local energy standard for existing nonresidential buildings that is designed to facilitate deep, cost-effective reductions in energy use. The standard will ensure that existing nonresidential buildings in Berkeley achieve aggressive, measurable energy efficiency improvements.

- Phase in energy standards for existing nonresidential buildings by requiring compliance in order to take advantage of certain incentives and financing and by triggering a compliance requirement at certain events such as major renovations and point of sale or lease.
Consider requiring that a “cool roof” be installed anytime the roof of a commercial building is being built or re-roofed. A cool roof reflects solar radiation rather than absorbing it. Most roofs have a typical solar reflectance of 10-20%. Using reflective materials can increase reflectance to 70-80%, which has GHG reduction and heat-island mitigation benefits. Researchers estimate that a building with 1,000 square feet of reflective roof area offsets the equivalent of 10 MTCO$_2$e over the lifetime of the roof.\(^2\)

Require all fluorescent lamps, magnetic ballasts, and incandescent lamps be retrofitted for higher efficiency technology for commercial building permits to be issued.

Engage and train energy service providers (e.g., organizations that can conduct comprehensive energy audits and upgrades) to become well versed in Berkeley’s energy standard so that they can serve the market.

Provide a suite of energy-saving programs, resources, education, incentives, rebates and financing options (as described in more detail below under policies b-d) to assist property owners and tenants to comply with the local energy standard.

Partner with property management firms and real estate professional groups in an effort to conduct targeted outreach and education to building owners.

b. Policy: Develop and provide comprehensive energy services for local businesses and commercial property owners

Implementing Actions:

- In collaboration with PG&E and state and federal government agencies, provide financial incentives for compliance with local energy standards. PG&E uses ratepayer money, collected through the public goods charge, to fund various incentives for energy improvements. The public goods charge is a surcharge placed on the bills of all PG&E (and other investor-owned utilities) customers. While helpful, the incentives funded through the public goods charge are generally not structured to achieve the scale of savings required under Berkeley’s Climate Action Plan. The City seeks to work with relevant agencies to establish additional incentives geared toward Berkeley’s local energy standards, i.e., designed to encourage a deeper, more comprehensive set of energy improvements. Such incentives could include providing property owners and tenants with rebates or mini-

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grants that could be applied to energy services provided by independent service providers.

- **Launch the Smart Solar program.** As is described above under Goal #2, the purpose of the program is to make it as easy and inexpensive as possible to make one’s home or business energy efficient and to utilize a solar photovoltaic (PV) and/or solar thermal system. See additional detail in previous section.

- **Provide Berkeley FIRST (Financing Initiative for Renewable and Solar Technology) financing for solar photovoltaic energy systems and if feasible, expand the program to include financing for other renewable energy systems and energy efficiency improvements.** As is described above under Goal #2, the program enables the City to provide financing for the upfront cost of major energy improvements in privately owned buildings and recoup that cost through a 20-year assessment on the building owner’s property tax bill. See additional detail in previous section.

- **Enhance the Smart Lights program energy audit process to make it more comprehensive.** The Smart Lights program provides businesses with hands-on assistance in assessing specific lighting needs and delivering significant discounts on the installation of high-quality, energy efficient lighting and refrigeration improvements. Based on the program’s records, Smart Lights has conducted lighting system audits and retrofits in about 700 small businesses since 2002. The program has enabled energy savings approaching five million kWh in that same timeframe. The result is a reduction in Berkeley’s greenhouse gas emissions of approximately 1,400 metric tons over the past six years. There is potential to further leverage the program’s existing outreach and operations by expanding its services to include a more comprehensive energy audit for small businesses that would identify additional energy and cost saving measures.

- **Develop and implement the Berkeley Cleaner Solar program.** This grant program of up to $2,000 in direct subsidies for solar thermal projects would assist laundry facilities to offset natural gas consumption. Laundromats provide either heat or heated water for laundry and are therefore particularly vulnerable to natural gas price fluctuations. This subsidy would be leveraged with utility incentives, state and federal tax deductions, and assistance provided through the Berkeley Smart Solar program.

- **Improve marketing of energy-related rebates for small businesses.** Rebates from entities such as PG&E and the California Energy Commission should be better marketed through City and partner agency websites and outreach.
Market Demand Response Programs where appropriate. Such programs offer incentives for business owners who curtail their facilities’ energy use during times of peak demand.

**c. Policy:** Identify opportunities for energy savings in renter-occupied/leased commercial buildings

Similar to the residential market, there is an owner/tenant split incentive in the commercial market: commercial renters usually pay the utility bill and have little incentive to invest in building improvements related to energy; the owner does not pay utilities and therefore has little incentive to invest in improvements that would reduce energy consumption and costs. Unlike the residential rental market however, commercial property owners are not subject to rent control and can therefore pass through the costs of improvements without going through the procedures mandated for rented residential properties.

CECO (described above) increases the implementation of energy saving measures in buildings being sold or undergoing major renovations. However, that is a relatively small number of buildings. To address buildings that are not being sold or renovated, it will be worthwhile to establish standards, incentives and programs to make it easier for property owners to make energy upgrades.

In addition, the City and its partners must do more to educate commercial entities on state law (AB 1103, 2007) requiring energy consumption disclosure at the point of lease and point of sale in nonresidential buildings.

**Implementing Actions:**

- Develop model lease provisions that would encourage commercial landlords and tenants to share the liability and benefit of energy saving measures.

- Develop and market a green landlord database. The database would include information about building owners that have implemented a defined set of energy and water saving measures.

- Encourage commercial building owners to use Portfolio Manager for energy tracking. Portfolio manager is a free, web-based database operated by the EPA for commercial buildings and their energy consumption. Building owners only need to fill in basic information on the building, upload the information, and Pacific Gas and Electric energy information will automatically be uploaded every month for easy tracking and monitoring. Energy information can easily be downloaded for new tenants, or at time of sale.

**d. Policy:** Expand energy saving opportunities for large commercial properties

With energy prices turning increasingly volatile, forward-thinking large commercial and industrial building owners and operators are already looking for ways to reduce energy consumption and cut costs. It helps that large commercial/
industrial properties generally have an account manager at PG&E who can provide up-to-date rebate and resource information. In collaboration with PG&E and relevant state agencies, the City can play a role to identify additional services and resources that make it easier for large commercial properties to save energy and money.

Implementing Actions:

- Partner with local community agencies to encourage large commercial businesses to retire old HVAC systems. The success of this effort depends on access to state-level subsidies and incentives.

- Partner with local community agencies to implement commissioning and re-commissioning for new development, major renovations, and existing buildings.

- Improve marketing of rebates. Rebates from entities such as PG&E and the California Energy Commission should be better marketed through City and partner agency websites and outreach.

- Market Demand Response programs to large businesses in order to reduce high-carbon peak load. Demand Response programs are designed to encourage and assist consumers to reduce electricity demand during times when demand for electricity is at its peak. During times of peak electricity demand, utilities often must utilize “dirtier” sources of energy in order to meet consumer demand.”

- Encourage local large businesses to track the energy consumption in their facilities through ENERGY STAR Portfolio Manager. Portfolio Manager is a free, web-based energy management tool that enables businesses to track and assess energy and water consumption across a building portfolio.

4. Goal: Increase residential and commercial renewable energy use

The energy efficiency actions outlined above represent an irreplaceable step toward meeting the Measure G goals. It is also critical to “green” the energy supply we consume through increased utilization of renewable energy sources.

Essentially, the community has two main options for changing the composition of its energy supply:

- Develop a local, clean, decentralized, renewable energy supply, mostly in the form of residential and commercial solar PV and solar thermal installations. The City’s goal is to achieve an annual GHG reduction of 11,600 metric tons by 2020 as a result of local solar installations. This goal is based on a preliminary analysis of unshaded
rooftops in Berkeley. The analysis indicates that there is more than two million square feet of roof space that is unshaded by adjacent structures. About 30% of this space is shaded by trees or otherwise unavailable for solar. The 2020 goal is to cover 70% of the available roof space with solar thermal or solar electric panels.

- **Add more renewable energy sources to the electricity grid.** This option can be accomplished by either working with PG&E and relevant State agencies to achieve a higher Renewable Portfolio Standard or through Community Choice Aggregation, also known as Community Choice Energy (CCE). Under CCE, the City government would be empowered to choose the community’s energy provider and the source of electricity.

The City of Berkeley is committed to implementing the first option. It is not mutually exclusive with the second. The City must decide in the short term how best to implement the second option given existing and future policy priorities, market conditions, and risks to taxpayers and ratepayers.

Each of these options, along with policies and implementation actions for increased wind generation and other renewable technologies, is outlined in more detail below.

**a. Policy:** Implement targeted assistance and outreach to increase decentralized solar installations in homes and businesses

The first solar electric cell was created in 1954. Solar technology has come a long way since then. The basic principles of the technology have not changed, but the cost of installing a solar electric or solar thermal or hot water system has become increasingly competitive with conventional forms of energy. Globally, the use of solar electric systems has experienced growth rates of about 30% per year over the last decade and the cost of the technology has dropped at least three percent per year for the last 20 years.

Solar radiation can be captured to produce emissions-free electricity and heat for our homes, businesses and public institutions. Decentralized, solar generated power has a number of important advantages, including:

- **It reduces our reliance on fossil fuels and the greenhouse gas emissions that result from fossil fuel consumption**
- **Decentralized energy production is less vulnerable than grid energy during natural disasters**
- **It reduces stress on our local electricity infrastructure by reducing peak load**
- **Local production reduces electricity distribution costs and increases distribution efficiency by being installed close to energy loads,** such
as on a roof (10-20% of energy can be lost in the transmission of grid energy)

- It eventually pays for itself and subsequent energy cost savings can go straight to one’s bottom line

In Berkeley, a hundred square feet of solar photovoltaic panels can save about 1,500 pounds (680 kg) CO$_2$e per year. On a per capita basis, Berkeley has the highest number of solar photovoltaic (PV) installations of any large city in Northern California. According to the California Energy Commission (CEC), there is 2,070 kilowatts (DC kW) worth of solar PV systems installed or approved for installation at 527 different sites within the City of Berkeley, including 22 kW at two municipal sites. While these installations represent a good start, it is still only a start.

A hundred square feet of solar thermal panels for hot water can save about 3,000 pounds (1,360 kg) CO$_2$e per year. Increasing the number of solar thermal installations in Berkeley is a particularly effective GHG reduction measure since the emissions that result from natural gas consumption in Berkeley buildings are more than double the emissions that result from electricity consumption. Solar thermal installations on a home or business can eliminate or greatly reduce the natural gas consumed to heat our water and our buildings. The cost for solar thermal installations is generally less than half the cost of a solar electric system for residential buildings; moreover, the technology is very simple, and long lasting. Many systems that were installed in Berkeley in the 1970s are still in operation today. Because of its low installation and operational costs, solar thermal is also an excellent choice for many small commercial applications that use significant amounts of hot water, such as laundromats, restaurants, hair salons, and fitness centers, as well as larger institutions, such as hospitals, schools, hotels and conference centers.

**Implementing Actions:**

- **Launch Smart Solar program.** As is described above under Goal #2, the purpose of the program is to make it as easy and inexpensive as possible to make one’s home or business energy efficient and to utilize a solar photovoltaic (PV) and/or solar thermal system. See additional detail under Goal #2.

- **Provide Berkeley FIRST (Financing Initiative for Renewable and Solar Technology) financing for solar photovoltaic energy systems and if feasible, expand the program to include financing for other renewable energy systems and energy efficiency improvements.** As is described above under Goal #2, the program enables the City to provide financing for the upfront cost of major energy improvements in privately owned buildings and recoup that cost through a 20-year assessment on the building owner’s property tax bill. See additional detail in previous section.
Launch an on-line Solar Map. The application estimates the solar energy potential for commercial and residential structures and allows building owners to estimate the potential environmental benefits and monetary savings that would result from installing solar energy panels on their property. The user enters an address and sees a map view of that location.

Identify funding sources to subsidize and eliminate solar permit fees (including solar thermal) for residential dwellings and lower fees for solar permits for commercial buildings.

b. Policy: Partner with the State government and utilities to green the energy mix that supplies the region’s grid electricity

Should the City of Berkeley continue to rely on PG&E for its electricity supply, then that electricity supply will have to become significantly “greener.” Achieving a green electricity supply relies heavily on the Renewable Portfolio Standard (RPS), a standard set at the state-level that is designed to gradually increase the portion of electricity produced or purchased by PG&E and other utilities from renewable energy sources such as solar, wind, geothermal and biomass.

The current RPS is 20% renewable energy by 2010. Governor Schwarzenegger set a goal of achieving 33% renewable sources by 2020 and the State Air Resources Board included that goal in its adopted Scoping Plan as part of implementation of AB 32 (Global Warming Solutions Act).

In 2007, PG&E received about 11.4% of its power supply from renewable sources.

Implementing Actions:

- Support the California Air Resources Board recommendation to increase the Renewable Portfolio Standard to 33% by 2020. Urge PG&E to achieve that standard.
- Urge Congress to maintain tax credits for renewable power developers. Such tax credits increase the supply of renewable energy sources, thereby making it easier for utilities such as PG&E to achieve the RPS.
- Urge the State to revise net metering rules to enable residential and commercial customers to earn refunds for excess energy generated.
- Urge the State to allow utilities to count decentralized energy sources toward the RPS requirement and to raise the RPS a commensurate amount.

c. Policy: Consider Community Choice Energy

Community Choice Energy (CCE) would involve the City of Berkeley partnering with other cities to form a joint powers authority to purchase electricity. CCE
enables participating cities to choose the community’s electric provider and source of electricity, including bulk purchases of renewable energy for residents and businesses. CCE involves the City in the purchase, sale, and possible generation of the energy commodity. Under CCE, Berkeley and its partner cities would enter into long-term agreements to purchase electricity, including renewable energy. PG&E would ultimately provide the electricity to residents using their transmission and delivery systems (i.e., the utility poles and wires).

CCE has potential benefits, including the increased use of renewable energy sources for electricity generation and local control of energy policy and electricity rates. CCE also has risks, such as costs to the City (particularly during start-up), potentially higher electricity rates and the potential that PG&E’s electricity generation mix could emit fewer GHG emissions than what would be achieved by CCE in the short-term. Note that PG&E’s 2007 power mix does include 23% nuclear and 13% large hydroelectric sources.

In the fall 2008, the cities of Berkeley, Oakland and Emeryville released a feasibility study (revised from an earlier draft) and business plan. At that time, staff recommended not to proceed with CCE due to risks and uncertainties associated with the program, including known and unknown financial and legal risks associated with creating and operating an enterprise with a $230 million dollar annual budget. Emeryville has since decided not to proceed with CCE, and Oakland may consider the issue later in 2009. Several Marin cities are considering CCE under an effort sponsored by the County, as are several cities in the San Joaquin Valley, under an effort sponsored by King’s River Conservation District (KRCD). Given the potential for CCE to contribute to the City’s GHG reduction goals and motivations regarding local control of our energy supply, the City will monitor market conditions, the efforts of other jurisdictions, and PG&E’s ability to comply with their renewable energy requirements. Based on this information, the City should consider whether or not to reexamine CCE in the future.

**Implementing Action:**

- Continue to consider CCE and to monitor the efforts of other jurisdictions and PG&E’s ability to comply with their renewable energy requirements.

**d. Policy:** Identify and implement opportunities for increased wind generation and the use of other renewable energy technologies

For centuries societies have harnessed the wind to generate clean, emissions-free power. Today the basic concept is the same though the technology is much improved. In fact, in the U.S. and other parts of the world we are beginning to see a resurgence of small wind turbines that can be used in the urban/suburban setting to generate electricity. Wind energy is now cost-competitive with grid energy and, like solar, small wind turbines can save customers money and protect us from rising energy costs.
In June 2007 the City of Berkeley became the first city in the nation to install a wind turbine for one of its buildings. The City’s Shorebird Park Nature Center classroom utilizes a small, 1.8 kW wind turbine to offset some of its electricity needs. The wind turbine supplements the building’s existing solar PV and solar thermal systems. The clean electricity the turbine supplies will eliminate about 900 pounds (408 kg) of GHG emissions from entering the atmosphere every year. Further, the tower is expected to be safe for area birds. The Golden Gate Chapter of the Audubon Society wrote a letter in support of the project.

The City of Berkeley hopes that the Shorebird Park Nature Center’s wind turbine will serve as a pilot for the installation and utilization of wind energy systems on a local scale. Lessons learned can be applied to any future efforts to install appropriately sited wind turbines in the community. The City will work with various partners to consider and evaluate the feasibility of additional turbines that can serve as sources of clean, renewable, decentralized energy.

**Implementing Actions:**

- Conduct a study to identify the wind energy generation potential in various parts of Berkeley (taking into consideration potential impact on wildlife) and identify opportunity sites where wind energy can best be implemented.

- Based on the study above and working with stakeholders, evaluate modifications to the building code that may be necessary to facilitate the installation of wind turbines within city limits. Work with the State to modify the building code, if necessary.

- Investigate the potential and possible sites for combined heat and power (CHP) systems in Berkeley. Combined heat and power systems represent an efficient approach to generating power and thermal energy from a single fuel source such as natural gas. CHP systems provide onsite generation of electricity as well as waste-heat recovery that can be used for space conditioning (heating and cooling), hot water systems and other processes such as refrigeration and food processing. Such a system requires a large and steady demand for thermal energy in a central location. CHP systems usually have an “anchor site” such as a hotel or industrial operation, and “client sites” that can use the excess thermal energy. They are typically powered by natural gas but have much lower emissions than traditional separate systems because of the higher efficiencies.

- Research the potential for a grid-connected wave energy system in the San Francisco Bay. Wave energy systems utilize the motion of waves to drive turbines that generate electricity.

- Evaluate the effectiveness of a green waste anaerobic digester for collected waste. The methane captured by an anaerobic digester can be used to power vehicles, boilers, etc.
5. Goal: Increase Energy Efficiency and Renewable Energy Use in Public Buildings

The GHG emissions that result from energy and water use in municipal buildings account for about one percent of Berkeley’s total community-wide emissions. As such, actions to reduce energy use in City government buildings will have a relatively minor impact on our community’s overall carbon footprint in the long run. However, climate action in municipal buildings and in schools demonstrates leadership that extends beyond the magnitude of the amount of greenhouse gases reduced.

Along with community partners such as KyotoUSA, the City and the Berkeley Unified School District (BUSD) are consistently investigating the potential for additional energy efficiency and renewable energy actions. Outlined below are some of the ways in which the City government and BUSD are already showing leadership:

- The City partnered with the Smart Lights program to conduct lighting upgrades in the City’s building at 1947 Center Street. This lighting retrofit alone is expected to save the City about $9,000 per year in energy costs and reduce electricity consumption by 64,000 kWh. The result is an annual reduction in greenhouse gas emissions of about 15 metric tons.

- The City’s red and green traffic lights and orange pedestrian signal lights function with energy efficient LEDs (light-emitting diodes) at all of Berkeley’s 127 intersections. LEDs emit a strong light but use far less energy than conventional incandescent bulbs. Making the switch to more energy efficient street signal lighting is saving the City $143,000 per year in taxpayer money and reducing annual greenhouse gas emissions by approximately 225 metric tons.

- The City is also working to reduce the energy it takes to heat and distribute water by increasing water efficiency in all of its facilities. Measures include:
  - Conducting regular audits of indoor and outdoor water use
  - Installing low-flow toilets and faucet aerators
  - Minimizing water leaks in plumbing
  - Implementing smart landscaping that requires less irrigation

- A number of City buildings/structures already have solar installations, including:
  - The corporation yard has a 20 kW solar PV system. The installation offsets 31,000 kWh of electricity annually.
• The Berkeley West Campus Swimming Pool boasts a solar hot water system that offsets approximately 70% of the natural gas consumed to heat water for the showers.

■ The City’s Shorebird Park Nature Center employs a combination of renewable energy technologies. The Nature Center is a straw-bale building that incorporates passive day lighting and thermal mass for heat retention, solar PV and solar hot water panels for domestic hot water and space heating and a 1.8 kW wind turbine to offset its conventional electricity load.

■ The U.S. Green Building Council awarded LEED certification to the City’s Shasta Hills Fire Station. Green design and construction elements featured in the project include landscaping that conserves water and reduces waste; diversion of more than 75% of the project’s construction waste from the landfill; and reduced energy use through high-performance windows and efficient lighting, appliances and building systems.

■ Washington Elementary recently became the first BUSD School to go solar. The school’s 100 kW solar PV system will produce enough electricity to meet the needs of the main facility without increasing BUSD’s energy costs. Conceived by the local volunteer group KyotoUSA, the initiative will not only reduce local GHG emissions, but also assist in educating students about renewable energy and its benefits.

**a. Policy:** Continue to identify and implement opportunities for increased energy and water efficiency in public buildings

**Implementing Actions:**

■ Maintain and continually update the City Capital Improvements Plan. The plan serves as the City’s performance-based guide for identifying and implementing energy and water saving measures in City buildings.

■ Ensure that the City and BUSD purchase high efficiency computer equipment and other office appliances and operate the equipment as energy efficiently as possible. By activating sleep settings on employee computers the City’s Department of Information Technology is reducing City government energy consumption by 238,680 kWh per year. This results in an annual reduction of 116,950 pounds (53,000 kg) CO$_2$e and an annual cost savings of approximately $32,500.

■ Replace the few remaining incandescent traffic signals with high-efficiency Light-Emitting Diode (LED) lamps.

■ Consider replacing existing streetlights with high-efficiency LED lamps.

■ Benchmark and track public building energy performance through ENERGY STAR’s Portfolio Manager.
Launch an on-bill financing pilot program with PG&E. On-bill financing would enable the City and BUSD to pay for the upfront cost of a given set of energy saving measures through the cost savings achieved by those measures.

Establish an annual energy reduction target for each City department. Each department would be responsible for initiating programs to achieve its target.

Draft and implement an Administrative Regulation for energy and water efficiency in all City buildings. An Administrative Regulation would provide formal guidance to City employees regarding how to use energy and water in an efficient manner.

b. Policy: Continue to actively identify and implement cost-effective opportunities to utilize renewable energy systems in public buildings

Implementing Actions:

- Require that re-roofing projects on City buildings evaluate the feasibility of incorporating “solar ready” features, including mounting posts for panels and roof penetrations for conduit and/or pipes.
- Install solar thermal systems on Berkeley Fire Stations to offset natural gas consumed for water heating.
- Identify potential sites for solar parking lot and solar bus stop canopies.
- Partner with KyotoUSA and other community groups and agencies to identify additional solar opportunities on BUSD schools.

6. Goal: Enhance and expand marketing, outreach and education regarding building energy use

Personal choice underlies many of the building energy use-related changes that will have to occur in order for the community to achieve its GHG-reduction goal. As such, enhancing and expanding current education and outreach efforts is fundamental to this plan. Such efforts are aimed at providing community members with access to information that enables them to make informed choices.

The actions outlined below represent a strategic start rather than a comprehensive list of the things our community can do to affect behavior change. New and innovative ideas for creating social change happen all the time. The City and its partners will continue to seek and harness such ideas. See the chapter on Community Outreach & Empowerment for more.

a. Policy: Work with regional and local community partners to provide sustained outreach and education to Berkeley citizens regarding energy efficiency and renewable energy use
Implementing Actions:

- Include building energy use-related education materials in a welcome package for all new homebuyers/renters, including available rebates and incentives for energy measures.

- Partner with the Berkeley Board of Realtors on an outreach and education effort that targets new Berkeley homeowners.

- Coordinate outreach between City divisions that provide related services to the community, including energy services, child and low-income health programs, housing programs, and safety programs.

- The City’s Office of Energy & Sustainable Development should continue to produce and distribute information at community festivals and to offer free energy education events and presentations for the public.

- Identify and catalogue existing energy efficiency showcases within the community. Showcase innovative projects on City and partner agency websites.

- Design and implement a “Lights Out at Night” campaign to reduce the amount of energy being wasted by local institutions (including the City government) and businesses.

- Launch an annual “Get Off Your Gas” contest to encourage Berkeley residents to reduce natural gas consumption during the winter months. The Office of Energy and Sustainable Development is to manage the contest. Prizes will be awarded in several categories, including greatest amount of natural gas reduction from the previous year, lowest overall natural gas bill and most creative energy efficiency strategy.

- Initiate a voluntary home energy and water-monitoring program. Energy and water monitoring in commercial and residential buildings has the potential to enhance the long-term value of the energy audits and upgrades outlined in this chapter. The City should explore opportunities to work with PG&E, East Bay Municipal Utilities District and others to provide residents and business owners with personalized energy consumption reports. Such reports would not only help households and businesses to track consumption patterns over time, but could also be used to suggest targeted energy and water saving measures.

7. Goal: Prepare local residents for green collar job opportunities

Step one toward creating green collar job opportunities is a commitment to enhance demand for energy services such as building retrofits and solar installations. These services not only reduce energy consumption and GHG emissions, but also create increased demand for people that can do the work. Importantly,
this demand for labor is local, because it requires improving our local built environment. It cannot be outsourced. The City must work with neighboring cities and community agencies to connect local residents to emerging job opportunities. In doing so we will protect the environment and provide pathways to sustainable employment at the same time.

The City of Berkeley and several partners have already begun the task of preparing local residents for jobs in the emerging green economy. Together, through a cooperative effort called the East Bay Green Corridor Partnership, the Cities of Berkeley, Oakland, Richmond and Emeryville are joining with leaders from UC Berkeley and Lawrence Berkeley National Laboratory (LBNL) to design a regional program that supports green workforce development. The goal is to provide the training and education necessary to meet future workforce demand in the green economy and to continue to attract green energy investment in the region. The partnership works collaboratively to 1) identify regional employer demand, and 2) develop new technical and soft skills training and education programs to help meet the industry demand. The overarching vision is to develop Green Energy Education and Career Pathways that provide multiple entry points into the training and education system and that lead people into jobs with career ladders and benefits.

a. Policy: Prepare and promote our local workforce for local and regional green jobs that offer stable employment, career growth and living wages

Implementing Actions:

- Identify projected demand for skilled labor associated with implementation of the Climate Action Plan and other sustainability strategies through partnerships with economic development agencies, local universities, community colleges, certified apprenticeship programs, workforce development and training programs, businesses, and community agencies.

- Integrate energy and climate-related education into the public school curriculum and after school learning programs and explore development of a high school Green Career Technical Academy by partnering with the Berkeley Unified School District, Berkeley High School and the Berkeley Technical Academy (B-Tech). Berkeley High School’s School of Justice and Ecology received funding to be a Community Partnership Academy incorporating career education and climate change education through their biology and environmental science courses. Students also take part in a range of hands-on activities and internships outside the classroom.

3 For an in depth analysis of green jobs potential and policies see: Green Collar Jobs: An Analysis of the Capacity of Green Businesses to Provide High Quality Jobs for Men and Women with Barriers to Employment. This report is a case study specific to Berkeley and was funded by the City’s Office of Energy and Sustainable Development.
Strengthen and expand job training partnerships and opportunities that prepare young adults, many with barriers to employment (e.g., lack of education, language/cultural barriers, etc.), to seize existing and future green collar job opportunities. The East Bay Green Corridor Partnership and other community partners such as Rising Sun Energy Center are actively developing training in life and job readiness skills, career counseling, specific skilled labor training, job placement assistance, assistance in meeting apprenticeship program requirements, and long-term follow-up support for participants.

Assist Berkeley residents to enroll in pre-apprenticeship trades training programs, such as those that prepare students for jobs in green construction, energy retrofits, and solar photovoltaic installation. Work with agencies such as Rubicon Workforce Services (the North County One-Stop Center), Berkeley Youth Alternative (the North County agency funded with Workforce Investment Act funds for youth), City of Berkeley Programs, and schools and community programs reaching out to South and West Berkeley youth to expose them to green job education and training opportunities.

Provide ongoing support for local green businesses and industries that provide green collar jobs. The City can provide this support in several ways, including: utilizing procurement dollars and city contracts to support local green businesses; providing marketing assistance; and helping local green businesses access energy efficiency and renewable energy services.

Stimulate demand for energy services and an energy service workforce by strengthening and improving the administration and performance of the City’s First Source Employment Ordinance and by developing additional provisions and incentives to encourage green businesses and contractors to hire local and provide high-quality employment. The First Source Employment Ordinance will be strengthened to ensure that local workforce development efforts produce qualified candidates for jobs in the energy services sector. Berkeley’s Department of Planning and Development and the Office of Economic Development will work together to explore incentives for businesses and contractors to hire local workers. Such incentives could include, but are not limited to, rebates on permits related to solar installation or energy efficiency improvements for contractors that hire local.

Consider developing and adopting a Local Hire Ordinance that would serve to create additional opportunities for local residents to get jobs.
Chapter 5: Waste Reduction & Recycling

A. Solid Waste Management in Berkeley: An Overview

Efforts to achieve Zero Waste are an essential piece of reducing the emissions that cause global warming. Zero Waste means that all discarded material is recycled, composted or reused, and none is sent to landfills. Recycling and reducing consumption in homes, businesses and public institutions serve to decrease upstream, energy intensive production processes and the associated GHG emissions and to keep waste out of landfills where it releases methane (CH₄), a powerful greenhouse gas.

In March 2005, the Berkeley City Council adopted the goal of achieving Zero Waste by 2020. The resolution also reaffirms the City’s commitment to the Alameda County-wide goal of achieving a 75% waste diversion rate by 2010. While the City has worked hard to create and implement several successful waste diversion programs, achieving the 75% diversion rate remains difficult due to several challenges, including the shrinking market for recyclables and declining revenues from waste fee collection.

In 2007, landfills reported receiving 102,000 tons (short tons) of refuse originating in Berkeley. The community’s waste diversion rate was 59%.¹

Increasing the City’s diversion rate to achieve the City’s Zero Waste goal and the associated GHG emissions reductions requires sustained collaboration across sectors to:

- **Eliminate solid waste at its source**, i.e., the point of production, through such efforts as promoting deconstruction and reuse of building materials and holding manufacturers responsible for their products and packaging through the entire product lifecycle.

- **Maximize recycling and composting** through expanding residential and commercial collection programs, increasing capacity at recycling and composting facilities, and enhancing public education and outreach.

The principle that guides the City’s and its partners’ waste diversion programs and policies is to **strive to ensure the “highest and best use” of all discarded materials**. For some materials this may mean the reuse of the material for its original purpose, e.g., reusing building materials to build another structure. For others, such as organic

¹ A diversion rate for 2008 has not yet been finalized.
waste, this would mean ensuring that the materials are composted or used as mulch. Discarding materials in the landfill that could otherwise be reused or recycled is inconsistent with the principle of “highest and best use.”

As is explained in Chapter 2 (Berkeley’s GHG Emissions Estimates) of this report, despite the connection between solid waste management and climate protection, the Berkeley greenhouse gas emissions inventory does not currently include the emissions that result from solid waste sent to the landfill or the upstream energy consumption associated with producing new materials. This is a barrier to counting increases or decreases in solid waste-related emissions against the community GHG emissions reduction target. This barrier notwithstanding, Berkeley should not let current constraints in the community-level emissions inventory methodology limit community waste diversion efforts.

The Climate Action Plan affirms the important connection between climate change and solid waste by including solid waste diversion actions below and an estimate for the scale of GHG reductions that could be achieved by implementing the actions. Further, the City is partnering with ICLEI, the organization that provides cities like Berkeley with an emissions inventory protocol, to update its community-level inventory methodology to include solid waste emissions. Once the update is complete Berkeley will measure and report these emissions in subsequent GHG emissions inventories.

B. Berkeley’s Current Solid Waste Management Efforts

The City of Berkeley has long been a leader in the effort to divert solid waste from landfills. Berkeley was the first city in the nation to offer curbside recycling. In 1976 City Council established a 50% waste diversion goal, 13 years before the goal was mandated by the State through the California Integrated Waste Management Act (AB 939).

Today Berkeley is one of the few municipalities in California that owns its own waste management facility and manages fleet operations. This enables the City to directly operate and oversee the implementation of a progressive array of source reduction, recycling, and composting programs and policies. It also provides high-quality jobs for local residents.

The City’s Solid Waste Management Division, a part of the Department of Public Works, operates many programs directly and contracts through private entities for other services. As for programs it operates directly, the City provides recycling collection for businesses as well as residential and commercial refuse and organic waste collection. The City operates the Transfer Station where the public can dispose of trash and recycle items such as electronics, mattresses, metals,
carpet padding, construction materials, and compostable waste. All the materials collected by City trucks are also processed at the Transfer Station. The City employs Urban Ore, Inc., a local reuse company, to salvage reusable items discarded by Transfer Station customers.

In collaboration with neighboring cities and community groups, the City’s Solid Waste Management Division engages in innovative, targeted outreach and education efforts. For example, the Division provides a liaison to local restaurants to help them take better advantage of existing recycling and composting programs. The City also works closely with the Ecology Center and StopWaste.org on various public education campaigns. In addition, the City collaborates with the City of Albany to provide a local “Reuse Guide” to area residents. The booklet helps residents find businesses that buy, sell, trade, rent, and repair reusable goods.

The Ecology Center operates the City’s residential curbside recycling program, including public outreach and education on the benefits of recycling.

The Community Conservation Center, Inc. (CCC) operates the City’s materials recovery facility, sorting materials collected by the Ecology Center and the City, and preparing them for market. CCC also collects and processes scrap metal, batteries and compact fluorescent light bulbs, and a host of other discards.

In addition to activities directly operated or contracted out by the City, several private refuse and recycling companies do business in Berkeley. Four private refuse companies have non-exclusive franchises that allow them to collect dry rubbish from Berkeley businesses. These companies pay a franchise fee to the City and report their activities quarterly. Many other Berkeley businesses also have arrangements with private recycling companies that provide customized service.

In 2004 Berkeley adopted a far-reaching Environmentally Preferable Purchasing Policy (EPP) mandating that the City institute practices reducing waste generated from City government purchases. One example of this policy in action is the City government-wide practice of purchasing only 100% post-consumer recycled Process Chlorine Free paper. A related effort is the adoption by the Zero Waste Commission of an Extended Producer Responsibility (EPR) policy, joining in a statewide association of local governments to require the producers of products sold in California to reclaim discarded products, reduce packaging that ends as discards at the local level, and eliminate toxics from products and their waste.

UC Berkeley and the Berkeley Unified School District (BUSD) are also partners with the City to divert waste from the landfill and educate community members. For example, the University and the City work together to collect and divert discards during the time when students are moving out for the summer. City staff and UC representatives also worked together to encourage recycling and composting in sororities and fraternities.

On campus, UC Berkeley’s Campus Recycling and Refuse Services (CRRS) manages a series of programs to increase recycling. These services include mixed
paper recycling in every office on campus; beverage container recycling in nearly every campus building; food waste collection in the dining halls; and green waste collection by the campus grounds service workers. Student Sustainability Education Coordinators oversee outreach to the student population to encourage greater reuse and recycling in residence halls. The University also requires its contractors to recycle all construction and demolition waste. The campus achieved a 50% diversion rate in 2008.

BUSD is also proactively implementing recycling and composting programs in all of its schools. It is saving an estimated $80,000 per year as a result of reduced waste collection-related costs.

As a result of these and other efforts in our community, the State calculated that Berkeley diverted an estimated 57% of its solid waste from the landfill in 2006, and 59% in 2007. The overall annual diversion rate includes materials diverted from the landfill through City collection programs and facilities as well as recycling services provided by the private sector. The diversion rate also includes independent actions by residents and businesses to reduce waste, such as stopping junk mail or changing production and packaging practices.

Of the tons of waste diverted as a direct result of City programs and facilities, the curbside recycling and residential green waste collection programs account for 48% of the estimated diversion. A combination of waste “self-hauled” to the transfer station by local community members and roll-off containers accounted for about 33% of the total diverted waste. Recyclables and organic waste collected from local businesses accounted for an additional 19%.

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2 Estimate for total tons of waste from Berkeley that were landfilled in 2008 is projected from data reported from landfills in first 3 quarters of 2008. Diversion estimates by sector are from the City’s weigh-master database and invoices from contractors.

3 The City does not currently have an estimate for total waste diverted from the landfill by private refuse and recycling companies.

4 Numbers are estimated from the City’s weigh-master database and invoices from contractors. Numbers include only materials brought to the Berkeley Transfer Station from Berkeley sources.
C. Waste Reduction & Recycling
Actions

The goals, policies, and actions outlined in this section focus on achieving greenhouse gas emissions reductions through eliminating waste at its source and maximizing recycling and composting in homes, businesses and institutions. The recommended actions build on existing waste mitigation efforts, including those outlined in the Berkeley Solid Waste Management Plan Update.

As previously mentioned, solid waste-related GHG emissions are not included in the current community emissions inventory. These emissions will be included in subsequent Berkeley inventories. For the purposes of this report, City staff employed the U.S. EPA’s Waste Reduction Model\(^5\) (WARM) to estimate the total GHG emissions that could be avoided by implementing the policies outlined in this chapter. **Assuming Berkeley reduces the amount of solid waste it sends to the landfill by 50%, the community would avoid nearly 68,000 MTCO\(_2\)e per year by 2020.**

See Appendix A for a consolidated list of goals, policies and implementing actions related to waste reduction and recycling. The table also includes an implementation timeline and funding sources.

1. **Goal: Increase residential recycling, composting, and source reduction**

The City recently expanded its residential curbside waste diversion efforts by adding food scraps and compostable paper to its existing plant debris collection program and by increasing the frequency of green cart collection to weekly. To help increase participation in the program, the City distributed a small green pail to each single-family home for convenient collection of food scraps in the kitchen and for transporting food waste from the kitchen to the green cart.

The composting program is paying dividends. Collectively, Berkeley residents are shifting an additional 300 tons per month of food scraps, food related paper and garden trimmings to their green carts as compared to before the program was launched. Nearly 40% of households participate each week.

The City and its community partners can divert additional organic waste and other recyclables from the landfill in a number of important ways. See specific policies and actions that Berkeley can implement to achieve this goal below.

**a. Policy:** Enhance recycling and composting outreach and assistance to single-family homes

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\(^5\) To access the U.S. EPA’s WARM Model visit: [www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html](http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html)
The single-family residential waste stream accounts for about 15% (about 15,000 tons) of the waste sent to landfills from Berkeley. The main program designed to divert this waste from the landfill is the City’s weekly curbside recycling and green waste collection. The current estimated diversion rate for this sector is 57%, the highest rate of any sector. However, a recent waste composition study shows that 50% of the remaining waste is compostable food and paper, and that about 13% of the remaining waste is recyclable. Obviously, there is significant potential to increase the diversion rate in this sector.

Implementing Actions:

- Initiate a ‘split-cart’ program to increase convenience and recycling capacity for residents of single-family homes. Wheeled split-carts would replace the existing blue bins provided to Berkeley residents. Split-carts have a center divider, allowing for the collection of a mix of plastic, glass, and aluminum containers on one side and recyclable paper and cardboard on the other side. In other cities with prior high participation, changing from bags and tubs to a split cart increased the tons recovered by 20%. Carts have the added advantage of freeing residents from the need to stock paper bags to set out paper.

- Increase participation in the residential green cart program by enhancing education and outreach to residents on the topic of composting household organic waste and yard trimmings. The Solid Waste Management Division’s goal is to double current participation in the green cart program.

- Integrate a “waste audit” into local efforts to conduct residential energy audits, such as the Rising Sun Energy Center’s California Youth Energy Services program. This action is also included in the multi-family building-related actions outlined below.

b. Policy: Target expanded recycling outreach and services to multi-family residential buildings, including apartment buildings, fraternities and sororities, and cooperative housing

About 10% of Berkeley’s landfilled waste is generated in multi-family buildings. The main programs that address this waste stream are the City’s curbside recycling and commercial recycling programs. The City collects glass bottles, cans and plastic bottles mixed together, corrugated cardboard, newspaper, and mixed papers (office papers, packaging, junk mail, and catalogs) from apartment buildings of 10 units or more. Buildings with fewer units are served by the Ecology Center. Although the City offers free recycling service to all multi-family buildings, many buildings do not participate, or do not participate optimally. Others fully participate, including separating food waste for collection.
Implementing Actions:

■ Provide on-site assistance and containers for building managers to set up recycling and composting systems in existing buildings.

■ Design model lease language that outlines the responsibility of building managers to provide recycling systems and of tenants to recycle waste.

■ Organize tenant meetings to provide recycling education and training.

■ Develop standards to ensure new and remodeled buildings are designed to include appropriate space and facilities for recycling and green waste receptacles/systems.

■ Enact a local ordinance requiring managers of multi-family buildings to provide tenants with the opportunity to recycle, including the provision of the appropriate receptacles and tenant education.

■ Integrate a “waste audit” into local efforts to conduct residential energy audits, such as the Rising Sun Energy Center’s California Youth Energy Services program. The waste audit would be designed to educate tenants regarding what materials can and cannot be recycled and when and where to recycle.

2. Goal: Increase recycling, composting & waste reduction in the commercial sector

Local businesses can significantly reduce refuse bills through increased recycling and composting. The City collects glass bottles, various forms of plastic, aluminum cans, paper, and cardboard from commercial customers. Also offered is food waste collection for restaurants and food producers. The combination of these services can help a typical restaurant to reach 85-90% diversion. The City also provides a “green restaurant liaison” to help restaurants design convenient, space-efficient recycling and composting systems. This program is also available to offices and multi-family buildings. A common barrier to participation in recycling programs is lack of space to store recycling carts within the business.

The City and its community partners can work to increase commercial recycling, composting and waste reduction in a number of ways. See specific policies and actions below.

a. Policy:  Enhance recycling and composting outreach and assistance to local businesses

Implementing Actions:

■ Provide on-site assistance and containers for building managers and owners to set up recycling and composting systems.
Design model lease language that outlines the responsibility of building managers to provide recycling systems and of commercial tenants to recycle waste.

Partner with the Chamber of Commerce, the Sustainable Business Association and other business associations to conduct expanded marketing and outreach to local business owners.

Design and administer recycling and composting training sessions for local building maintenance companies.

Refer large businesses to StopWaste.org’s recycling partnership program, which provides free waste analysis and consulting services for waste reduction.

Enact a local ordinance requiring managers of commercial buildings to provide commercial tenants with the opportunity to recycle, including the provision of shared storage containers and tenant education.

Utilize the interaction between the City government and local businesses at the time a business license is issued to distribute resources and information regarding setting up recycling and composting systems.

Design and implement a more effective space allocation ordinance to ensure that new and remodeled buildings provide adequate space for storage of recycled materials.

Continue to promote participation in the Alameda County Green Business Program. The Green Business program recognizes small businesses that comply with environmental standards and take additional steps to conserve resources and reduce waste. The program provides small businesses with a checklist where “green” measures are selected and a green business certification for businesses that undertake a certain amount of such measures. In 2004, there were 17 green certified businesses in Berkeley. In 2008 there were over 100.

Identify and implement opportunities to assist local businesses to aggregate purchasing power for the purchase of sustainable product alternatives such as compostable take-out fare and reusable bags.

Work with franchised haulers, private recycling companies, and their customers to identify opportunities to recycle and reduce waste in the commercial sector.

b. Policy: Make recycling and composting mandatory at public events and provide more public recycling containers

The City is implementing a policy to require waste reduction, recycling and composting at public events. The Solid Waste Division provides advice and loans recycling containers to sponsors of any event, large or small. As a result, in 2008, 60-90% of the waste discarded at major city events such as the Solano
Stroll, Earth Day, How Berkeley Can You Be, the Kite Festival and the Spice of Life Festival was recycled or composted.

**Implementing Actions:**

- Continue to require recycling plans and to provide recycling containers and assistance to public event organizers upon request.
- Prepare a recycling guide for local event organizers/planners.
- Provide more public recycling containers on commercial corridors and in parks and public places and create a system for collecting these recyclables.
- Explore the feasibility of providing composting receptacles in the public right of way.

### 3. Goal: Increase recycling of construction & demolition (C&D) debris

According to StopWaste.Org, construction and demolition (C&D) debris represents a significant portion of the total waste stream in Alameda County – over 21%. In fact, a typical new home produces approximately 17,000 pounds of C&D waste.\(^5\) This waste generally consists of wood, drywall, metal, concrete, dirt and cardboard, most of which is recyclable. Once it is sent to the landfill, the organic materials break down and emit methane, a potent greenhouse gas.

Recycling C&D waste not only keeps it from ending up in the landfill, but also reduces the upstream energy consumption required to manufacture new construction materials. Further, businesses can often save money by taking their C&D debris to recycling and reuse facilities. Such facilities may have lower fees than landfills and may even buy back selected materials.

The City adopted an ordinance that requires a recycling plan as a condition of construction and demolition permits for projects over $100,000.00 in value, with a recycling report required at the time a large project closes. The Solid Waste Management Division must approve the plan and is currently working to enhance the ordinance to include stricter diversion goals for any project permitted by the City. The Division is also working to provide more convenient recycling of construction materials. In order to increase the diversion of C&D debris from the landfill, the City requires increased capacity to review and enforce recycling plans and to educate contractors regarding their recycling options.

In 2008 the City recovered 6,851 tons of construction waste from the Transfer Station. Construction waste diversion began in July 2008.

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\(^5\) Based on waste studies for three residential developments in Alameda County. Compiled by Matthew J. Southworth, P.E. Assumes a house size of 2,000 square feet.
a. Policy: Enhance C&D recycling outreach and assistance to improve enforcement of existing ordinance and convenience of compliance for local builders

Implementing Actions:

- Promote deconstruction and reuse of building materials through written outreach materials such as a brochure on residential remodeling, and through direct consultations with builders.
- Pending site design and feasibility analysis, create capacity to process C&D materials at new Berkeley Transfer Station. Until the new Transfer Station is built, the City is sending mixed C&D materials to an outside facility for recycling.

4. Goal: Expand local capacity to process recycled materials

Expanding local capacity to process recycled materials has the potential to reduce the vehicle miles traveled (and GHG emissions) associated with transporting materials elsewhere as well as to create local jobs in the waste management sector.

a. Policy: Rebuild the Berkeley Transfer Station and material recovery facility into a state-of-the-art Zero Waste facility in order to increase local capacity to recover a high percentage recyclable materials

The facilities at 2nd and Gilman Streets in Berkeley have been used for recycling and solid waste management services by the City of Berkeley and various partnering organizations since the early 1980’s. The site includes the Transfer Station as well as the City’s bin storage, truck parking and washing, household hazardous waste collection areas, salvage areas, and administrative offices of the Solid Waste Division, among other uses. The Ecology Center and materials recovery facility are also located on this site.

As recycling efforts have intensified over the years, the facilities that support waste diversion efforts are being strained by growing vehicle fleets, increased personnel, and the need to process more types of materials. The site at 2nd and Gilman has become an increasingly complex mix of activities and use of space. The facility requires major updating.

The City is committed to rebuilding its waste processing facilities in order to better meet a variety of needs and to reach the Zero Waste goal, including increased levels and types of material recovery, better traffic flow to reduce idling and waiting time, and more space for equipment maintenance. The City’s goal is to design and build a state-of-the-art zero waste facility that utilizes resources efficiently and increases local capacity to divert waste from landfills.
Implementing Actions:

- Conduct a feasibility study that results in recommendations regarding the design of a rebuilt Transfer Station and material recovery facility as well as recommendations regarding what types of waste-processing equipment and material recovery systems to incorporate. The new facility should meet nationally recognized green standards.

- As part of the Transfer Station rebuild, examine the costs and benefits of installing a “single-stream” sorting system, or a sorting system that can accept both single and dual-stream recyclables. Currently, residents must sort recyclables before the Solid Waste Management Division collects them. A single-stream system would enable residents to put all recyclables in one bin. Advantages of single stream recycling include reduced sorting by residents, reduced space required in buildings for multiple recycling receptacles (which is especially important in apartment buildings), and the use of one collection truck rather than two. However, a two-stream system makes it easier to sort recyclables into clean marketable materials, giving the City flexibility to sell these materials for their “highest and best use.”

b. Policy: Expand the types of materials that can be recycled locally and identify local markets for recycled products

Implementing Actions:

- Evaluate the feasibility of partnering with the East Bay Municipal Utility District to divert commercial food waste to its anaerobic digester. An anaerobic digester breaks down biodegradable waste (in the absence of oxygen) and captures the resulting methane and carbon dioxide. The captured methane gases can be used as a renewable source of energy for vehicles or be converted into electricity, among other uses, and the material residue can be used for compost.

- Expand the types of materials that are collected for recycling, such as rigid plastic packaging (e.g., yogurt containers), as soon as an environmentally sound market for the materials are found. This will increase diversion and reduce confusion among the public about what items are recyclable.

- Investigate additional options to sell recycled materials for domestic use, rather than for export.

5. Goal: Expand efforts to eliminate waste at its source

a. Policy: Encourage the use of reusable bags at local retail locations
Implementing Actions:

■ Institute a ban on single-use plastic bags and establish a fee on paper shopping bags at Berkeley retail locations.

■ Explore bulk purchase of reusable bags with the City’s Office of Economic Development, coordinating with the Buy Local Berkeley program. The City should work with community partners such as the Ecology Center to identify grant funds to purchase or subsidize reusable bags for citizens.

b. Policy: Increase producer responsibility for product waste and packaging

Current practice places the cost of dealing with product waste and packaging discards on local communities. “Extended Producer Responsibility” (EPR) is a strategy that holds manufacturers accountable for their products and packaging through their entire lifecycle. In this way, product producers are responsible for designing products to be durable or easily recyclable, taking back spent products from consumers and either reusing or recycling them, and/or contributing to recycling infrastructure. Given that Berkeley will not reach its Zero Waste goal without addressing the generation of waste by manufacturers and packagers, action to extend producer responsibility is of utmost importance.

The City government’s Environmentally Preferable Purchasing policy addresses this issue for government operations, but the policy needs further traction among businesses in the community, in the region, and beyond. To further EPR and EPP efforts, the City will partner with other community entities and with other levels of government to take the actions below.

Implementing Actions:

■ Evaluate options and opportunities for extending producer responsibility for product waste at the local level. These opportunities include expansion of retail businesses engaging in take-back programs and grant-funded education programs.

■ Support policies at the state level that provide incentives for efficient product design, reduced product and packaging waste, and elimination of toxics in the discard stream through mandatory compliance programs.

■ In collaboration with the Chamber of Commerce and other business associations, enhance outreach and education to local businesses about the waste embodied in products and packaging and support local manufacturers’ efforts to reduce packaging.

c. Policy: Continue to promote reuse and repair businesses and organizations
Implementing Action:

- Promote the utilization of reuse and repair businesses in outreach to businesses and residents. Reuse and repair organizations in Berkeley include the Berkeley Tool Lending Library, the Alameda County Computer Resource Center, Urban Ore, and over 200 other reuse and repair and rental businesses cited in the Reuse Guide. Information about these entities should be integrated into the different types of outreach outlined below under Goal #8 (enhanced marketing and outreach).

d. Policy: Reduce yard and garden waste produced by residents and businesses

Implementing Actions:

- Promote participation in StopWaste.Org’s Bay Friendly Landscaping program. Bay-Friendly Landscaping is a whole systems approach to the design, construction, and maintenance of the landscape in order to reduce waste and recycling materials, as well as reduce storm water runoff and create wildlife habitat, among other benefits.

- Explore the feasibility of initiating a local “excess harvest program” in which residents are encouraged to donate excess produce from gardens and fruit trees to local food banks and homeless assistance programs.

6. Goal: Revise the City solid waste disposal rate structure in order to maintain and enhance incentives, outreach programs and other activities designed to increase waste diversion

New programs and services to achieve Zero Waste require sustained, substantial funding. The City’s Refuse Fund, which pays for Solid Waste Division services, is affected by a number of factors including the market price for recycled materials (declining in 2009) and increasing landfill fees. The City is currently updating its solid waste disposal rates. As it restructures its finances, the City will endeavor to maintain and expand incentives and programs to increase recycling and composting while also maintaining necessary operating revenue in an environment of increased waste diversion.

Implementing Actions:

- Update solid waste disposal billing rates to cover costs of providing basic refuse, recycling and composting service to the community. Analyze new rate structure options with the goal of maintaining and enhancing incentives to recycle.
Review the service impacts and operational and financial aspects of offering every-other-week residential refuse service. As the amount of waste is reduced at given locations, there may be less need for weekly pick-up. The cost reductions available through reduced pick-ups could reinforce actions taken by residents and businesses to generate less waste.

7. Goal: Increase recycling, composting, and waste reduction in public institutions

Action to reduce waste and increase waste diversion in municipal buildings and in schools demonstrates important leadership for the community.

a. Policy: Maximize waste reduction and recycling and composting at all City buildings, including leased buildings, and at all City events

Implementing Actions:

- Ensure that every City department is equipped with the appropriate recycling containers and undergoes basic training on how and where to recycle.

- Initiate a recognition program to encourage City departments to recycle 100% of recyclable materials.

- Ensure that all City departments coordinate event planning with the City’s Solid Waste Management Division. The Solid Waste Division will provide the appropriate recycling containers as well as compostable utensils, cups, plates, etc.

- Limit the use of single-use plastic beverage bottles in City buildings and at City events.

- Track City government paper use and limit its consumption by making duplex the default setting for printers and by encouraging the electronic distribution of documents whenever possible.

b. Policy: Sustain and enhance waste diversion efforts at the Berkeley Unified School District

Implementing Action:

- Support BUSD efforts to identify a funding source for ongoing staffing in support of waste diversion systems in schools.
8. Goal: Enhance and expand marketing, outreach, and education regarding waste reduction and recycling

Personal choice underlies many of the changes that will have to occur in order for the community to achieve its Zero Waste and GHG-reduction goals. As such, enhancing and expanding current education and outreach efforts is fundamental to this plan.

The actions outlined below represent a strategic start rather than a comprehensive list of the things our community can do to affect behavior change. New and innovative ideas for creating social change happen all the time. The City and its partners will continue to seek and harness such ideas. See the chapter on Community Outreach & Empowerment for more.

a. Policy: Work with regional and local community partners to provide sustained outreach and education to Berkeley citizens regarding waste reduction and diversion

Implementing Actions:

- Incorporate information about waste reduction services into expanded marketing and outreach print and web-based materials, including City and partner agency newsletters, the City website, and door-to-door marketing.
- Include waste diversion resources and information in a “welcome basket” for new Berkeley homeowners and renters.
- Enhance the City Solid Waste Division website to serve as a one-stop web portal for waste diversion resources.
Chapter 6: Adapting to a Changing Climate

A. Preparing for the Impacts

Despite our best efforts to reduce GHG emissions, some climate change is already occurring and additional change is inevitable. Even as we ramp up our efforts to mitigate heat-trapping emissions, it is critical that our community start today to prepare for the impacts of a changing climate. Waiting until the impacts grow more severe increases the risk of being poorly equipped to manage the public health, economic, quality of life and environmental consequences. We live in a region of the world that knows well the importance of preparedness. It is time we apply our preparedness doctrine to the risks associated with climate change.

New, more accurate information about the current and future effects of climate is becoming more and more available. Researchers at institutions such as UC Berkeley, Lawrence Berkeley National Labs (LBNL), the San Francisco Bay Conservation and Development Commission (BCDC), and the Union of Concerned Scientists are generating models that governments can and should incorporate into strategic and capital planning efforts.

For example, according to a report released by the California Climate Change Center, if heat-trapping emissions continue unabated, the Sierra Nevada spring snow-pack could shrink by 90% by the end of the century. How will the shrinking snow-pack affect this region’s water supply? How will it affect our electricity supply, which is largely generated through hydroelectric technology?

According to the SFBCDC, the San Francisco Bay rose by seven inches over the past 150 years. What would it mean for Berkeley if sea levels rose one meter by 2100, consistent with many scientists’ projections? Is Berkeley’s coastal development vulnerable to sea-level rise? Should Berkeley limit any new coastal development or redevelopment in order to avoid the hazards associated with sea-level rise?

Scientists also project that global warming will affect Californians’ health by exacerbating air pollution and causing more extremely hot days. Extreme heat events increase the risk of dehydration, heat exhaustion, and respiratory distress, among other things. Children, the elderly, and people who are already ill are especially at risk. How will vulnerable members of Berkeley’s population be affected? What is Berkeley doing to prepare?

It is imperative that our community finds answers to these and many other questions regarding vulnerability to climate change. This chapter is intended to further that pursuit.

B. Climate Adaptation Actions

The efficacy of the policies and actions outlined in this section rest on their being developed and implemented in partnership with other local governments and with relevant regional and state agencies. Partnering with other affected entities not only enables the pooling of resources, but also ensures that a consistent adaptive strategy is applied across boundaries.

Given the serious threat of sea level rise to California’s water supply and coastal resources and the impact it would have on our state’s economy, population and natural resources, in 2008 Governor Arnold Schwarzenegger issued Executive Order (EO) S-13-08 directing state agencies to enhance the State’s management of climate impacts from sea level rise, increased temperatures, shifting precipitation and extreme weather events. As part of implementation of EO S-13-08, the California Resources Agency, along with the Cal/EPA, the Business Transportation and Housing Agency, the Department of Health and Human Services, and others, is developing the State’s first comprehensive Climate Adaptation Strategy (CAS). Berkeley and other local governments should participate in the planning and implementation of the CAS. This will help each level of government better understand its role in developing robust adaptive strategies. Further, cooperation across levels of government will assist cities, counties, regional agencies and the state to become better informed regarding adaptation efforts already underway and the resources available to become more resilient to a changing climate.

See the table in Appendix A for a consolidated list of goals, policies and implementing actions related to climate adaptation.

1. Goal: Make Berkeley resilient to the impacts of climate change

**a. Policy:** Launch and sustain a collaborative process for increasing Berkeley’s and the region’s preparedness for climate change impacts

**Implementing Actions:**

- In collaboration with neighboring cities and relevant regional and state agencies, conduct an assessment of Berkeley’s (and the region’s) vulnerability to climate change impacts. A regional climate vulnerability assessment would serve to inventory the risk to infrastructure, public health, economy, and energy, urban forest and water resources. The assessment should be kept up to date based on emerging climate science. An accurate assessment will assist
our community and the region to prioritize resource allocation for adaptive
management strategies.

- Develop and implement a strategic plan for climate change adapta-
tion. Based on the findings of a vulnerability assessment, a coalition
of local governments, with support from regional and state agen-
cies, should put forth a preparedness vision, set goals, and design a
plan of action for climate adaptation. An effective plan would serve
as a blueprint for making the region more resilient to climate change
and would dovetail with the state Climate Adaptation Strategy. The
plan would include measures that:

- Increase public awareness about the impacts of climate change on
  the community and on all species
- Build strong partnerships across sectors (e.g., public health, environ-
  ment, economic development, public works) and across the region
  so as to increase communication and reduce vulnerability
- Increase the adaptive capacity of the region’s infrastructure

The plan would serve as a first step toward a comprehensive adaptation policy
for the region. Such a plan could benefit from the input of an “adaptive planning
task force” consisting of scientists, engineers, insurance experts, local and re-
gional policy makers and planners, emergency preparedness officials, public
health officials and others.

**b. Policy:** In preparation for the impacts of climate change on the region’s water
resources, partner with local, regional, and state agencies to encourage water
conservation and efficiency and expand and diversify the water supply

**Implementing Actions:**

- Examine the potential of developing new, local groundwater sources
  for various purposes, including irrigation, showers, and toilets.

- Encourage water recycling and gray water use through the develop-
  ment of outreach materials and local guidelines that are consistent
  with the Building Code. Gray water is any water that has been used
  in a given building, except water from toilets. Gray water can be
  reused for other purposes, especially landscape irrigation. Using
  gray water saves water (and the energy used to treat and transport
  it) by reducing fresh water use.

- Partner with East Bay Municipal Utility District (EBMUD) to provide
  and market incentives for residents, businesses and institutions to
  conserve water. EBMUD offers a variety of watersaving programs
  and services to its residential, commercial, industrial and institutional
  customers. Offerings include free water saving devices, rebates for
high-efficiency toilets, and grants for projects that demonstrate water-saving principles.

- Encourage the use of water conservation technologies, such as waterless urinals and cisterns, through the development of local guidelines that are consistent with the Building Code.

- Partner with agencies such as EBMUD and StopWaste.org to encourage private property owners and public agencies (including the City government) to use sustainable landscaping techniques that require less water and energy to maintain.

- In collaboration with community partners, increase public awareness by including information on climate change impacts to water supplies and riparian and coastal habitats and on how residents and businesses can use water more efficiently in various newsletters and newspapers and on City and partner websites, among other places.

c. Policy: In preparation for rising sea-levels and more severe storms, partner with local, regional, and state agencies to reduce the property damage associated with flooding and coastal erosion

As global temperatures continue to increase, the combination of rising sea levels and increasingly severe winter storms is expected to cause more frequent flooding and the associated coastal erosion and damage to infrastructure. Coastal cities such as Berkeley should increase preparedness through enhancing local capacity to manage stormwater and coastal floods.

Implementing Actions:

- Use development review to ensure that new development does not contribute to an increase in flood potential. This action is consistent with Policy S-27 in the Disaster Preparedness and Safety Element of the Berkeley General Plan.

- Design public improvements such as streets, parks and plazas, for retention and infiltration of stormwater by diverting urban runoff to bio-filtration systems such as greenscapes.

- Expand local tree planning efforts and continue to maintain the health of existing trees by providing local outreach and guidelines for residents, businesses and public institutions. Trees store rainwater, reducing runoff and delaying peak flows. Further, the exposed soil directly surrounding trees has higher infiltration ability than compacted soils. Tree roots loosen the soil and increase water penetration.

- Maximize permeable surfaces in both greenscape and hardscape areas for retention and infiltration of stormwater.

- Encourage the development of green roofs by providing local outreach and guidelines consistent with the Building Code. Green roofs
reduce the amount of stormwater runoff and delay the time at which runoff occurs.

d. Policy: In preparation for more extreme heat events, partner with local, regional, and state agencies to protect and increase urban tree cover.

In addition to the many social, public health, and environmental benefits trees provide, an urban forest can help reduce local air temperatures by shading buildings and by shading paved and dark colored surfaces such as roads and parking lots that absorb and store heat. Also, because higher temperatures contribute to conditions conducive to air pollution formation, trees play an important role in improving local air quality.

Implementing Actions:

■ Expand local tree planning efforts and continue to maintain the health of existing trees and gain support for urban forestry efforts by providing local outreach and guidelines for residents, businesses and public institutions.

■ Consider developing street tree master plans for sub-areas within the City. Such plans would guide the selection of appropriate tree species for streets and open spaces and outline a regular maintenance and planting cycle to ensure that hazards to trees are minimized and that the local tree stock continues to increase.

■ Consider developing a vegetation and fuel management plan in parts of the City designated as high fire hazard areas. The plan would reduce the risk of catastrophic wildfires, thereby protecting homes, wildlife and air quality as well as mitigating the impact on GHG emissions of the loss of trees due to wildfire.
Planning for Peak Oil

The same reasons that make communities like Berkeley uniquely capable of addressing the climate challenge also make communities well positioned to address “Peak Oil.” As its name suggests, Peak Oil refers to the transition from many decades in which the available supply of oil grew each year to a period in which the rate of oil production enters its terminal decline. There is still debate about when the actual peak of oil production will occur (some believe it has occurred already), but there is little debate that it will occur.

Our community and region should care about the coming of Peak Oil and act quickly to prepare for it because it has implications for virtually every part of society. For the last 100 years or so, oil has been both cheap and convenient compared with other energy sources, and has thus become fundamental to our mobility, agricultural production, the production of plastics and chemicals, and our building energy needs. In short, we are addicted to oil and need to begin preparing to wean ourselves off of it.

On December 18, 2007 the Berkeley City Council passed a resolution acknowledging the enormous challenge that Peak Oil presents and directing the City Manager to “come up with a proposal for the City staff to consider the impact of sharply rising energy prices and oil depletion in future transportation and land use plans, in any updates to the General Plan, future budget processes, policies and practices, and the City of Berkeley’s dependence on products that require substantial amounts of oil to produce and ship.”

In fact, many of the strategies outlined in this plan reduce our vulnerability to the volatile oil market by reducing our overall dependence on oil as an energy source. Examples include land use and alternative transportation measures designed to reduce vehicle miles traveled and promote low-carbon fuels (see Chapter 3) and building energy use measures designed to increase energy efficiency and the utilization of renewable energy sources such as solar and wind (see Chapter 4).

As is addressed in Chapter 3 of this plan as well as in the Open Space & Recreation Element (Policy OS-8) and the Environmental Management Element (Policy EM-34) of the Berkeley General Plan, the community should also partner with the Berkeley Unified School District, UC Berkeley and other organizations to encourage local organic food systems. Local organic food systems reduce dependence on oil by reducing the miles food must travel and energy intensive agricultural inputs such as synthetic fertilizer.

City staff will work with city commissions and community groups such as Oil Independent Berkeley and Bay Localize to institutionalize City Council’s directive.

In the meantime, we as individuals all have an immediate role to play:

- ✔ Buy local, organic produce
- ✔ Grow your own food by joining a community garden or planting a garden in your yard
- ✔ Conserve energy by driving less: Walk or bike to work, take public transit or buy an electric car
- ✔ Extend your community by getting involved with local groups working on the peak oil issue
Chapter 7: Community Outreach & Empowerment

A. Building a Climate Action Movement

From the beginning, implementing Measure G has been about more than just developing a Climate Action Plan. It has been about building a climate action movement.

A movement starts with leading edge, early adopters and builds toward a critical mass. As a result of ongoing outreach efforts by community-based organizations, City staff and elected officials, and powerful forces outside our community such as Mr. Gore’s Inconvenient Truth, more and more residents in Berkeley and beyond are beginning to heed the call to action.

Because Berkeley is a diverse community it is important to involve all sectors in the local climate protection effort in a meaningful way, including those who may be historically left out or less oriented to action. Berkeley will achieve its GHG reduction goals only when the entire community plays a role.

B. Community Outreach & Empowerment Actions

The actions proposed in this section largely build on existing outreach, education, and empowerment efforts in the community. Their goal is to contribute to building a critical mass of Berkeley citizens and businesses engaged in achieving a community-wide goal.

1. Goal: Mobilize the community at large to turn the climate plan into climate action

Significant ongoing outreach efforts are already underway in Berkeley. The City government, in cooperation with local residents, business leaders, and regional and local agencies, should work to enhance these efforts and further align them with the voter-mandated goal of achieving aggressive greenhouse gas emissions reductions.

a. Policy: Establish an implementation framework that enables the City to more efficiently and effectively distribute information and resources to a wide range of community partners and to report progress on achieving the goals outlined in this plan.
Implementing Actions:

- Design a climate action “stakeholder database” that identifies the many stakeholders that are playing or will play a role in implementing local climate protection strategies. Essentially serving as a contacts management database, the application will be searchable and include given stakeholders’ contact information and areas of focus or expertise (e.g., green jobs development, energy services, recycling, economic development, etc.). The main goal of the database is to enable the efficient distribution of information and resources to a wide range of entities. For example, the database could be queried to consolidate the contact information of organizations that have expertise in water resource management. Such information would be useful when designing a community outreach effort to conserve water. The City will take the lead on developing the database, with the goal of eventually making it available on-line so as to be utilized by the broader community.

- Establish community working groups that take ownership for mobilizing a given group of individuals or sector of the community or for promoting a given climate protection program. One example may be a “Low Carbon Diet” working group, composed of various community members that take responsibility for building participation in the Low Carbon Diet (LCD) program. The Low Carbon Diet is a program based on a workbook that walks people through simple steps for reducing household GHG emissions (see more on the LCD program below).

- Launch and maintain a web-based portal that enables:
  - Community members, including individuals, households, and businesses, to quantify their own emissions baseline, pledge to achieve GHG emissions reductions, report actions taken to reduce GHG emissions, and report progress toward individual goals; and
  - The City to track and report progress toward achieving the goals outlined in the Climate Action Plan in a transparent and engaging way.

- Provide an annual report to City Council that highlights community climate protection actions and progress toward the Measure G goals.

b. Policy: Launch a coordinated outreach and education campaign, utilizing a range of tools, programs and partnerships, to mobilize and educate residents

A climate action outreach and education campaign must be designed to effectively communicate the urgency of addressing the climate crisis while also empowering individuals, businesses, and institutions to be a part of the solution. An effective outreach campaign will benefit from the perspectives of many City departments and community agencies with expertise in community engagement.
For example, the City’s Public Health Division is in regular contact with several types of community groups that will be impacted by climate change but that may not list the environment as their main focus. Such groups include youth and youth organizations; faith-based organizations; food, nutrition, and cultural organizations; and advocacy groups for low-income and other vulnerable populations. Such groups must be included in community outreach efforts to ensure broad input and participation in turning the plan into action.

**Implementing Actions:**

- **Promote the Berkeley Climate Action Pledge as a means by which individuals can commit to reducing their own emissions.** Approximately 1,000 people signed the Berkeley Climate Action Pledge since May 2007 (see Appendix to read the pledge). The pledge is a non-binding means of securing individual commitments to achieving a collective goal. Individuals who sign the pledge periodically receive helpful action ideas for how to fulfill their commitment. The City and its community partners should continue to promote the pledge and work to enhance the climate-related resources and information that individuals have access to once they have made their commitment.

- **Support local efforts to launch a “local carbon offset” project.** The project would include a web-based carbon calculator that would enable local businesses and residents to track their GHG emissions over time and contribute to local carbon reduction projects (e.g., solar in schools) in order to “offset” those emissions.

- **In collaboration with community partners, develop and implement a public information strategy that serves to highlight climate-related information and resources in multiple mailings, newsletters and local media outlets, including radio, television and news publications.** Examples include placing notices of upcoming events and climate action-related resources in local publications such as UC Berkeley’s CalNeighbors newsletter, the City of Berkeley’s Annual Report, Lawrence Berkeley National Laboratory’s Science on the Hill newsletter and others. A public information strategy would also include partnering with local radio stations and newspapers to spotlight local community leadership and highlight opportunities for action.

- **Partner with Berkeley’s network of neighborhood associations to hold various community workshops and events focused on reducing GHG emissions at the neighborhood level.**

- **Partner with the Ecology Center and others to promote the Low Carbon Diet program as means for helping households reduce their GHG emissions.** The Low Carbon Diet is a “30-day program to lose 5,000 pounds” of CO₂. The foundation of the program is a workbook that walks individuals through a step-by-step process, from calculating one’s current
carbon footprint, to implementing emissions saving measures, to tracking one’s progress along the way. The City is partnering with a number of community-based organizations to find ways to generate participation in this program community-wide.

- In collaboration with community partners, launch a “Green Neighborhood Challenge” and “Green Star Household” program. The challenge would utilize friendly competition and recognition as motivators for action. The Low Carbon Diet program could serve as the guide for neighborhood-level climate protection activities. The neighborhood that collectively reduces the most emissions through the Low Carbon Diet program wins. In combination with the “Green Neighborhood Challenge,” households that have significantly reduced their GHG emissions could be recognized as “Green Star Households.” Such recognition could serve as a source of pride for households that have made a conscious effort to achieve GHG reductions and contribute to a community-wide effort. Neighborhoods and households could track their progress on the web-based climate action portal outlined above.

- Partner with PG&E to provide residents with monthly personalized energy consumption reports. The reports would include an analysis of a given household or business’s energy consumption patterns over time and resources and ideas for consuming less. Such “energy monitoring” reports have the potential to enhance the long-term value of the energy services outlined in the Building Energy Use chapter.

- Educate Berkeley residents and employees about the significant environmental impact of air travel and about potential travel-mode alternatives. Per passenger mile, air travel is the most carbon-intensive form of travel. The City can incorporate information about the impacts of air travel and alternatives into print and web-based outreach materials.

- In partnership with the Berkeley Board of Realtors, design a “welcome package” for new homeowners and business owners that includes resources related to energy use, transportation choices, and waste diversion and reduction.

- Hold speaker series and other educational events at the Berkeley Public Library. Given its educational mission and high volume of foot traffic, the library is an important resource for raising awareness about the climate issue and empowering community members to take action.

- Partner with the Civic Arts Commission to encourage and fund art projects that serve to heighten awareness of the climate issue. One example may be a GHG emissions reduction thermometer that tracks community
progress toward achieving the emissions reduction goal. Another potential project is commissioning local artists to design "artful bike racks"—bike racks that are painted or designed to serve as public art.

- Partner with biologists, botanists, and other scientists to raise awareness regarding the impact of climate change on local ecosystems.

2. Goal: Enhance outreach and incentives to the business community

Actions by Berkeley’s business community are already showing results: The GHG emissions that result from energy consumption in the commercial sector decreased by 13% between 2000 and 2005. Maintaining and building on this remarkable trend requires ongoing, collaborative efforts to showcase effective climate action and to engage additional local businesses in the climate protection effort.

The Berkeley Chamber of Commerce, the Sustainable Business Alliance, local business improvement districts, the emerging Green Chamber of Commerce and others are leading the way at engaging local businesses in an effort to reduce GHG emissions and increase overall sustainability. The City and other organizations should continue to look to local business associations for ongoing leadership in the effort to achieve the Berkeley GHG reduction goal.

a. Policy: Continue to showcase effective climate protection efforts in the business community and to engage additional businesses in the local climate protection effort

Implementing Actions:

- Continue to promote participation in the Alameda County Green Business Program and enhance the program’s ability to efficiently administer the green business certification process and track GHG-related metrics. The Green Business Program exists to provide recognition and assistance for local businesses that operate in an environmentally friendly manner. The program provides a checklist and inspections to verify that local businesses meet higher standards of environmental performance. The Berkeley community boasts a large number of businesses (over 100), including the Berkeley Chamber of Commerce, that are certified as green. The City is working with local business associations to promote participation in the program and to increase the efficiency of the certification process. Starting in 2009, the Green Business Program will provide guidance and metrics to assist businesses to measure GHG emissions reductions achieved by the measures they implement. Since program requires that businesses get re-certified every three years, this is an excellent way for businesses to monitor their emissions and set goals for reductions into the future.
Expand the local green economy through the East Bay Green Corridor Partnership. In January 2008, the Cities of Berkeley, Emeryville, Richmond and Oakland joined with leaders from UC Berkeley and LBNL to launch a cooperative effort to lead the world in environmental innovation, emerging green business and industry, green jobs, and renewable energy. The partnership is serving as a conduit for sharing and implementing climate protection, economic development, and workforce development strategies on a regional scale.

In collaboration with local business associations and merchants, continue to expand and promote the Buy Local Berkeley Campaign. The goal of the campaign is to build a vibrant local economy by encouraging consumers and businesses to buy local. Shifting more consumer purchases to local businesses has the potential to increase tax revenue for the City, expand local investments in non-profits and local businesses, and create more local jobs while simultaneously reducing vehicle miles traveled.

Recognize and celebrate the environmental leadership of local businesses, business associations, and community groups. Examples of local existing efforts to recognize environmental leadership in the business community include the Green Gathering, Sustainability Summit, and Champions of Sustainability Awards. These three events have recently been integrated to focus community awareness on efforts to make Berkeley a world leader in building a sustainable community.

3. Goal: Enhance climate change-related education at local schools

Representatives from the City, the Berkeley Unified School District, UC Berkeley, Lawrence Berkeley National Labs, and local museums, among others, should identify opportunities for sharing resources that will help to increase climate awareness and education in local K-12 schools.

a. Policy: Continue to showcase existing climate protection efforts in our schools and to expand opportunities students have to learn and take action on climate change

Implementing Actions:

- Integrate climate-related activities and education into existing after-school programs such as Berkeley LEARNS (Links Enrichment, Academics, and Recreational Needs to Students).

- Partner with Parent Teacher Associations (PTAs) to promote programs such as the Low Carbon Diet and to integrate climate-related information into school gatherings and fairs.
In collaboration with community partners, support Berkeley High School’s School of Social Justice and Ecology by providing internship opportunities and climate-related resources to integrate into its curriculum.

In collaboration with UC Berkeley, provide internships and educational programs to K-12 students on topics related to climate science and on impacts of climate change on the community and local ecosystems.

4. Goal: Increase awareness in the City government

The City government accounts for only one percent of our community’s total greenhouse gas emissions. As a minor contributor to total emissions, actions in the City government will have a limited impact on Berkeley’s overall emissions levels. However, actions by City government officials have symbolic value and demonstrate leadership that extends beyond the magnitude of actual emissions reduced.

a. Policy: Launch a sustained effort to increase awareness in the City government regarding the climate issue and to provide training on how to achieve increased sustainability at home and in the workplace

Implementing Actions:

- Hold regular “brown bag” events for each City department on various topics related to the climate change issue and on actions employees can take to reduce their own GHG emissions.

- Establish a “Sustainability at Work and at Home” class as part of the required City of Berkeley Core Courses for City employees. The class will cover existing sustainability related policies affecting employee duties, as well as training on how to increase resource efficiency throughout City operations and at home.

- Establish energy consumption reduction targets for each City department and provide assistance in achieving those targets.

- Establish recycling and composting systems in each City building and recycling training for employees and maintenance staff.
Chapter 8: Implementation, Monitoring & Reporting

A. Institutionalizing Climate Action

The preceding chapters illustrate where Berkeley’s GHG emissions come from and set forth a series of policies and actions for achieving the community’s aggressive emissions reduction targets. Extensive community and expert input went into developing the content of these chapters, but the component of Berkeley’s climate action effort that matters most still lies ahead: Implementation.

Although significant GHG reduction policies and programs are already in place, the actions proposed in this plan, by necessity, far surpass the scale of existing efforts. Implementing the plan and ensuring that it results in real, additional GHG emissions reductions necessitates new and sustained resources, increased coordination across sectors, and a system for evaluating and reporting progress. In short, it requires institutionalizing climate protection efforts throughout the community.

This chapter outlines the main components of the process for turning this plan into action and identifies policies from earlier chapters that City staff recommends for short-term implementation, i.e., by the end of 2010.

The main components of the implementation process are summarized here and described in more detail immediately below:

1. Establish an implementation timeline for actions included in the Climate Action Plan

2. Establish, monitor, and report on indicators that enable the community to gauge progress toward the goals outlined in the Climate Action Plan and to continuously evaluate implementation priorities

3. Continue to identify funding opportunities and develop sustained revenue streams to support climate protection initiatives

4. Establish a stakeholder “infrastructure” that facilitates the efficient distribution of information to multiple community stakeholders and also enables community members to effectively report climate protection actions
1. Establish an implementation timeline for actions included in the Climate Action Plan

The Climate Action Plan reflects the City’s current implementation priorities. It does so by including an “implementation timeframe” for every implementing action included in the plan. The implementation timeframe designates each action for short, medium or long-term implementation (See Appendix A).

City staff generated the “package” of policies recommended for short-term implementation (see table at the end of this chapter for the list of short-term policy priorities) on the basis of several factors, including:

- Estimated volume of GHG reductions that could be achieved from a given strategy.
- The likelihood of a given policy’s success: Staff gauged the likelihood of success of a given policy by considering factors such as level of community support and consistency with the City’s or relevant community agencies’ priorities and readiness to implement.
- The estimated cost.
- The availability of funding (see more on estimated implementation costs and funding sources in the next section below).
- Expected benefits of implementation other than GHG emissions reductions, such as reduced local air pollutants due to less driving; cost savings associated with increased energy efficiency in buildings; the potential for creating local, green jobs; public health benefits; and consistency with efforts to prepare the community for Peak Oil; among others.

Actions not included in the list of short-term measures are targeted for implementation in either the medium (2010 – 2015) or long-term (2015 – 2020). As circumstances change and as implementation of the plan moves forward, there may be cases where medium or long-term strategies become short-term priorities and vice-versa.

Several of the recommendations in the plan require Council approval separate from adoption of the Climate Action Plan and also require additional funding in order to be implemented. Implementation priorities will be reviewed annually by the City Council.

2. Establish, monitor, and report on progress indicators

For each goal outlined in the Climate Action Plan, the City is working to define, monitor and report on measurable indicators that assist the community in determining to what extent a given goal is being achieved. Regular, transparent
reporting on community progress toward achieving the goals outlined in this plan serves to:

- increase accountability for implementing agencies, including the City government;
- assist the City and its partners to evaluate the effectiveness of the policies and actions associated with each goal; and
- enable the City and the community as a whole to continuously evaluate implementation priorities and revise and build upon them as necessary.

City staff is currently working to do additional modeling of the relative contribution each strategy or group of strategies could make toward achieving the Measure G targets. The models are based on assumptions derived from a series of data points, such as past performance of a given program or set of programs, expected level of community participation and behavior change that may be associated with implementing a given program or set of programs, and peer-reviewed studies on the effects of various sustainability policies. This analysis will be used to do a more robust assessment of cost-effectiveness and to refine how the plan will be implemented over time.

Given the range of assumptions that can be made when modeling the emissions impact of a given strategy, it is often difficult to estimate with precision the GHG reductions that will occur upon implementation of the actions in this plan. There is considerable ongoing research by many organizations and research institutions into measuring the impacts of different GHG reduction strategies. City staff has made its best effort to make determinations regarding the strategies proposed in this plan based on the state of current information, but these estimates will need to be refined over time.

What is clear from initial analysis is that while the City of Berkeley can do a great deal on its own to reduce GHG emissions, the 2020 emissions reduction target will only be achieved with help from the state and federal levels. Examples of external policies that could help Berkeley achieve the local target include the Renewable Portfolio Standard, a standard set at the state-level that is designed to gradually increase the portion of electricity produced or purchased by PG&E and other utilities from renewable energy sources; vehicle fuel efficiency standards; low-carbon fuel standards; and Senate Bill 375 (Steinberg, 2008), which requires the California Air Resources Board to establish regional targets for reduction of GHG emissions due to transportation and land use and for regional Metropolitan Planning Organizations to develop plans for achieving those targets. The City will join with other stakeholders and local public agencies throughout the State to work with legislators at all levels of government to put such policies in place and to ensure their implementation.
Because of the difficulty associated with modeling potential emissions reductions with precision, it is especially important to monitor and report actual reductions over time, as well as other indicators, as part of the implementation process. A number of tools and practices exist that can enable the City and its community partners to track and report progress toward achieving the goals outlined in this plan. Steps the City and its partners will take to ensure transparent, sustained evaluation and continuous improvement of GHG reduction strategies include:

- Provide annual reports to City Council in order to receive guidance on implementation priorities, resource allocation, and potential revisions to the City’s GHG reduction target; to present updates on the latest scientific assessments of the scale of GHG reductions necessary to achieve climate stabilization; and to report progress made on specific indicators and metrics to be used for tracking the implementation of actions in the plan, including:
  - Estimated GHG reductions
  - Implementation costs
  - Costs savings and payback for given strategies
  - Other co-benefits of implementation
  - Ongoing barriers to implementation
- Launch and maintain a web-based portal that enables the City to effectively and transparently communicate the goals outlined in the Climate Action Plan and progress toward achieving those goals
- Track community-wide aggregate emissions by conducting greenhouse gas emissions inventories at least every other year

3. Continue to identify funding opportunities and develop sustained revenue streams to support climate protection initiatives

Implementing the Climate Action Plan requires significant investment. However, a concerted effort to reduce GHG emissions will result in cost savings over time by reducing ongoing costs associated with energy consumption. Staff estimates that measures taken to achieve our 2020 goal could save the community nearly $500 million and that the cost of most of the measures recommended in the plan will be less than the amount saved. Achieving a 35% reduction in building energy use through energy efficiency improvements and renewable energy use in the residential sector alone will result in cumulative savings that exceed costs by an estimated $28 million. A similar cost-benefit analysis for the commercial sector results in an estimated $75 million net savings for local businesses by 2020. See Appendix F to review staff’s analysis and assumptions. These findings are consistent with a McKinsey &
Company study\(^2\) of U.S. greenhouse gas reduction measures, which found that significant reductions could be achieved at no net societal cost. The challenge we face is overcoming market barriers that have prevented us from achieving these savings.

The benefits of saving money on energy and reducing greenhouse gas emissions are in addition to other societal benefits associated with these actions, such as reduced local air pollutants, improved public health due to more active mobility modes, less reliance on fossil fuels, and an increased demand for energy services and green jobs.

The majority of the costs will be made by individuals and the private sector as homeowners and business owners improve the energy efficiency of their buildings, as individuals make different choices about mobility and their everyday access to transportation alternatives, and as companies (such as PG&E) make additional needed investments in renewable energy resources and increased energy efficiency to reduce our dependence on fossil fuels.

Implementing the plan also requires sustained, strategic public investment by the City, by regional government agencies, and by the state and federal governments. Public funding will play an important role in helping to provide the education and outreach, services, incentives and capital projects that are needed to achieve the plan’s goals.

Table 8.1 (above) illustrates the estimated annual City government and partner agency funding associated with implementing the actions in the plan designated for short-term implementation. Part 1 of the budget includes the combination of funding provided by the City and funding provided to the City by non-City agencies (e.g., foundations, PG&E and state and federal government agencies) that is dedicated to programs and policies that the City is implementing that either directly or indirectly address GHG emissions.

\(^1\) Part 1 of the budget includes the combination of funding provided by the City and funding provided to the City by non-City agencies (e.g., foundations, PG&E and state and federal government agencies) that is dedicated to programs and policies that the City is implementing that either directly or indirectly address GHG emissions.

non-City agencies (e.g., foundations, PG&E and state and federal government agencies) that is dedicated to programs and policies that the City is implementing that either directly or indirectly address GHG emissions. Part 2 of the budget includes additional targeted funding the City will seek, with City Council’s guidance and in collaboration with community partners, from outside agencies such as PG&E; regional, state and federal government agencies; and private foundations.

Table 8.2 (above) summarizes estimated funding for implementation of the Climate Action Plan by source.

City expenditures associated with the Solid Waste Management Division’s (SWMD) operations are not included in the table below largely because it is difficult to isolate the staffing and other expenditures that are associated with the GHG reduction aspects of solid waste programs. The SWMD houses about 33 staff positions between residential and commercial recycling programs and Transfer Station personnel. In addition, as part of the implementation of the Climate Action Plan the SWMD plans to expand its capacity for community outreach and education.

In addition to maintaining City resources for implementation of the Climate Action Plan and seeking new sources of outside funding, this report also outlines various strategies that would be designed to both create disincentives for practices that are energy intensive (e.g., driving) and build sustained revenue for services and programs that help the City achieve its emissions reduction goal along with other important co-benefits. Such strategies include:

- Redesigning the Residential Preferential Parking (RPP) Program so as to apply it citywide. Properly structured, the RPP could discourage multiple vehicle ownership and help fund alternative modes of transportation.
- Instituting a “Transportation Services Fee” (TSF) for new development. A TSF would help fund projects and programs that mitigate the impacts of new development on transportation services and infrastructure.
- Establishing an “Open Space Fee” on new development, or similar mechanism for the creation and enhancement of streetscapes, parks and other public open space. Increased amenities in the community make it more attractive for current residents and encourage appropriate transit-oriented development.

* Included in the “Grants” and “Targeted Grants” rows are grants to the City and to non-City agencies (e.g., East Bay Energy Watch) that have a direct role in implementing the Climate Action Plan.

**The total Energy Efficiency and Conservation Block Grant is $1,015,500 over three years.
See more on the above strategies in Chapter 3.

The City is also evaluating the feasibility, benefits, and drawbacks of initiating a “carbon tax” on residential, commercial and industrial electricity and natural gas consumption. The tax would be designed to fund GHG reduction strategies in Berkeley such as subsidized energy audits and energy efficiency upgrades for residents and businesses. Exemptions would be provided for special needs and low-income households. Instituting a “carbon tax” would require a two-thirds vote of the people.

Each of these strategies requires further vetting and development, especially to ensure social equity in any fee mechanisms or services. These strategies have the potential be innovative tools for generating sustained revenue for implementation of climate protection policies and actions. Sustained revenue is often the difference between a plan that gets implemented and a plan that does not.

4. Establish a stakeholder infrastructure for mobilizing the community and turning the plan into action

As is also emphasized in the Community Outreach & Empowerment chapter, no one entity in the community — not the City government, not industry or small businesses, and not residents — can achieve the GHG reduction targets alone. The targets will only be achieved through building a movement that achieves sustained action and coordination across stakeholders and sectors.

Building sustained coordination across a range of community entities requires developing a strong “stakeholder infrastructure,” or network, that enables the City and other agencies to more efficiently and effectively distribute information and resources to a wide range of partners. To build and leverage such a network, the City is working with community partners to:

- Design a climate action “stakeholder database” that identifies the many stakeholders that are playing or will play a role in implementing local climate protection strategies. The database will enable the efficient distribution of information and resources to a wide range of entities. It will be searchable and include given stakeholders’ contact information and areas of focus or expertise (e.g., green jobs development, energy services, recycling, economic development, etc.).

- Establish community working groups that take ownership for mobilizing a given group of individuals or sector of the community or for promoting a given climate protection program. One example is a “Low Carbon Diet” working group, composed of various community members that take responsibility for building participation in the Low Carbon Diet (LCD) program. The Low Carbon Diet is a program based on a workbook that walks groups of neighbors or colleagues through simple steps for reducing household GHG emissions.
B. Climate Protection Policies Recommended for Short-Term Implementation

The following table (Table 8.3) represents the package of policies City staff recommends be targeted for short-term implementation (prior to the end of calendar year 2010). The table includes policies recommended on the basis of the factors already outlined above. While the table illustrates current short-term priorities, note that priorities can and do shift based on funding availability, advances in technology, new and better ideas, and others. Several actions associated with the policies in the table below can be implemented with funding budgeted by the City for fiscal years 2009-2010. However, implementation of some of the actions associated with the policies listed below is pending Council’s approval of continuing the actions beyond the end of fiscal year 2010 (fiscal year ends June 30th). Staff will review policy priorities and resource allocations with City Council on an annual basis.

See corresponding chapters for additional details and background information regarding each of the policies included below. Note that each policy has one or more “implementing actions” associated with it. If a policy is included in the table below, then at least one of its associated implementing actions is targeted for short-term implementation. Refer to Appendix A for the list of more specific implementing actions associated with each policy.
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<tr>
<th></th>
<th>GHG Reduction Policy</th>
<th>Discussion</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Continue to expand and improve Berkeley’s bicycle and pedestrian infrastructure</td>
<td>The community expressed widespread support for more resources to be devoted to enhancing the safety, convenience and quality of Berkeley’s bicycle and pedestrian infrastructure. The City’s first Pedestrian Plan is nearing completion, and the Bicycle Plan will be updated in 2010.</td>
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<tr>
<td>2.</td>
<td>Encourage development of housing (including affordable housing), retail services, and employment centers in areas of Berkeley best served by transit</td>
<td>The City is currently working with community stakeholders to update the Downtown Area Plan, and the Southside Plan, and to provide zoning flexibility within the West Berkeley Plan. Land use policy that prioritizes access to transit and enhanced green and open spaces and promotes cycling and walking reduces VMT and creates several additional co-benefits.</td>
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<tr>
<td>3.</td>
<td>Make car sharing convenient and available to all Berkeley residents by providing additional incentives and by removing disincentives to car sharing</td>
<td>A dense network of car share vehicles has the potential to help reduce vehicle ownership and VMT while providing access to a motor vehicle when needed. There is significant community support for additional car share pods placed in strategic locations throughout the city. The first discounted car share program for affordable housing residents is being established at the Oxford Plaza in 2009.</td>
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<td>4.</td>
<td>Partner with AC Transit to expand and enhance AC Transit bus service in Berkeley</td>
<td>Increasing the frequency, reliability, and safety of local bus service is a key component of providing an alternative to the private vehicle. Support for enhanced bus service was a consistent theme of public comments associated with this plan.</td>
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<td>5.</td>
<td>Create additional strategic fees/taxes in order to build revenue for transportation demand management (TDM) efforts and to further discourage driving</td>
<td>This policy includes a local Transportation Services Fee (TSF) as an implementing action. The TSF has the potential to create revenue for services such as an improved bicycle and pedestrian infrastructure and an expanded network of car sharing pods. The fee would include incentives for developments that take steps to reduce vehicle trips. Other mechanisms include an increase to the City’s current 10 percent parking tax on off-street parking (requires voter approval), and parking price increases.</td>
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<td>6.</td>
<td>Partner with AC Transit, BART, and other employers to provide subsidized transit passes and fare-free zones</td>
<td>Cost and convenience are important factors in people’s choice to ride transit. The provision of subsidized transit passes (e.g., Easy Pass) and commuter benefits has the potential to significantly improve the mode share of buses and BART. There is significant community support for this policy and several employers already provide subsidized transit passes for their employees.</td>
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<td>GHG Reduction Policy</td>
<td>Discussion</td>
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<tr>
<td>7. Design and implement parking strategies to create disincentives for driving -</td>
<td>Research is emerging that establishes parking pricing strategies as having a significant impact on travel mode choice. Some parking strategies can also generate revenue for local sustainable mobility projects, such as expanding car share pods and improving the bicycle and pedestrian infrastructure. Successful implementation of this policy requires coordination with UC Berkeley and others.</td>
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<td>especially single-occupancy commuting and, where possible, to build revenue for</td>
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<td>alternative transportation</td>
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<td>8. Increase access to healthy and affordable foods for the community by supporting</td>
<td>Community members and agencies expressed significant support for integrating local food issues into the climate plan. Growing, processing, and distributing food locally reduces GHG emissions by minimizing transport miles and also offers a host of additional health, social and economic benefits.</td>
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<tr>
<td>efforts to build more complete and sustainable local food production and distribution</td>
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<td>systems</td>
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**Ch. 4: BUILDING ENERGY USE**

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<th>GHG Reduction Policy</th>
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<tr>
<td>1. Establish a standard for energy audits and energy improvements that provides</td>
<td>City staff in the Office of Energy &amp; Sustainable Development is already in the process of developing robust local standards for energy audits and upgrades. In combination with increased services and financial incentives, these standards will result in reduced energy consumption, substantial cost savings, improved building comfort, and increased demand for green jobs. New standards are subject to Council approval.</td>
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<td>thorough guidance on achieving deep, sustained energy savings in existing</td>
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<td>residential and nonresidential buildings</td>
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<tr>
<td>2. Improve local energy and green building standards for remodeling and new</td>
<td>City staff in the Office of Energy &amp; Sustainable Development is already in the process of developing energy standards for new construction and remodels that go beyond what is required by the State of California. New standards are subject to Council approval.</td>
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<tr>
<td>construction</td>
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<tr>
<td>3. Develop and provide comprehensive energy services for local residents and</td>
<td>The City is currently developing increased services related to building energy use for residents and businesses. These services include financing assistance for energy improvements and personalized energy consultations for residents and businesses.</td>
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<td>businesses</td>
<td></td>
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<tr>
<td>4. Simplify project review and permit approval process to encourage innovative green</td>
<td>The City strives to continually improve the service it provides to those seeking building permits. Planned service improvements include dedicating a building inspector to assist with green building questions and providing education materials related to green building.</td>
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<tr>
<td>building measures</td>
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<td>GHG Reduction Policy</td>
<td>Discussion</td>
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<tr>
<td>5. <em>Implement targeted assistance and outreach to increase decentralized solar installations in homes and businesses</em></td>
<td>The City’s Office of Energy &amp; Sustainable Development is implementing or developing several services related to this policy. These services include financing assistance for energy improvements, personalized energy consultations for residents and businesses and an on-line solar map that estimates solar energy potential for homes and businesses.</td>
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<tr>
<td>6. <em>Prepare and promote our local workforce for local and regional green jobs that offer stable employment, career growth and living wages</em></td>
<td>Enhancing local demand for services such as energy retrofits and solar installations results in increased demand for skilled labor that can do the work. Through youth development and job training and placement programs, the City and its community partners seek to match local residents with high-quality green jobs.</td>
</tr>
<tr>
<td>7. <em>Expand and better integrate programs for low-income households</em></td>
<td>The goal of this policy is to provide an integrated and expanded suite of low-income programs that results in increased potential for energy and cost savings and health-related benefits as well as more cost-effective program delivery.</td>
</tr>
<tr>
<td>8. <em>Identify and capture opportunities for energy and water savings in renter-occupied/leased units (residential and nonresidential)</em></td>
<td>Several community members emphasized the need for this policy during the climate plan’s public comment period. In the short-term the City will work with the Rent Board and other partners to implement strategies that enable both the building owner/landlord and the tenant to benefit from building improvements.</td>
</tr>
<tr>
<td>9. <em>Continue to identify and implement opportunities for increased energy and water efficiency and utilization of renewable energy systems in public buildings</em></td>
<td>Energy efficiency improvements and solar installations on schools and City buildings set an important example for the community. The City is working with the School District and other community partners to identify additional opportunities for energy and cost savings in public buildings.</td>
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**Ch. 5: WASTE REDUCTION & RECYCLING**

1. *Target expanded recycling outreach and services to multi-family residential buildings*                                                                                                               | In the short-term, the City plans expanded outreach and assistance for multi-family building managers. Eventually the City will require building managers to provide tenants with the opportunity to recycle. |
<p>| 2. <em>Enhance recycling and composting outreach and assistance to single-family homes</em>                                                                                                                           | The main action associated with this policy in the short-term is to initiate a ‘split-cart’ program to increase convenience of recycling for single-family homes. |</p>
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<th>GHG Reduction Policy</th>
<th>Discussion</th>
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<tbody>
<tr>
<td>3. Enhance recycling and composting outreach and assistance to local businesses</td>
<td>This policy can result in not only less waste being sent to landfills, but also cost savings due to lower refuse bills for local businesses.</td>
</tr>
<tr>
<td>4. Encourage the use of reusable bags at local retail locations</td>
<td>The main implementation action associated with this policy is instituting a ban on single-use plastic bags and a fee on paper bags at Berkeley retail locations.</td>
</tr>
<tr>
<td>5. Make recycling and composting mandatory at public events and provide more public recycling containers</td>
<td>The City already provides recycling and composting services at public events. The City is also working to provide more recycling containers along commercial corridors and in parks and other public spaces.</td>
</tr>
<tr>
<td>6. Expand the types of materials that can be recycled locally and identify local markets for recycled products</td>
<td>The effort to expand the types of materials that can be recycled curbside or dropped off at the Transfer Station is ongoing and the feasibility of expanding the program is dependent upon the market for recyclable goods.</td>
</tr>
<tr>
<td>7. Increase producer responsibility for product waste and packaging</td>
<td>“Extended Producer Responsibility” (EPR) is a strategy that holds manufacturers accountable for their products and packaging through their entire lifecycle. Implementing this policy requires the City to identify opportunities for extending producer responsibility for product waste at the state and local levels.</td>
</tr>
<tr>
<td>8. Enhance construction &amp; demolition debris recycling outreach and assistance to improve enforcement of existing ordinance and convenience of compliance for local builders</td>
<td>Construction waste diversion began in July 2008 and in that year the City recovered 6,851 tons of construction waste from the Transfer Station. To achieve additional diversion the City is developing outreach materials and conducting consultations with builders.</td>
</tr>
<tr>
<td>9. Reduce yard and garden waste produced by residents and businesses</td>
<td>The main action associated with this low-cost policy is promoting participation in StopWaste.Org’s Bay-Friendly Landscaping program through written and web-based outreach materials.</td>
</tr>
<tr>
<td>10. Update solid waste disposal rates to cover costs of providing basic refuse, recycling and composting service to the community</td>
<td>The City is currently updating its solid waste disposal rates. As it considers restructuring these finances, the City will endeavor to maintain and expand incentives and programs to increase recycling and composting while also maintaining necessary operating revenue in an environment of increased waste diversion.</td>
</tr>
<tr>
<td>11. Maximize waste reduction and recycling and composting at all City buildings, including leased buildings, and at all City events</td>
<td>Action to reduce waste and increase waste diversion in municipal buildings and in schools demonstrates important leadership for the community.</td>
</tr>
<tr>
<td>GHG Reduction Policy</td>
<td>Discussion</td>
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<tr>
<td>Ch. 6: ADAPTING TO A CHANGING CLIMATE</td>
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<tr>
<td>1. In preparation for more extreme heat events, partner with local, regional and</td>
<td>Trees sequester carbon dioxide as well as provide a range of additional health and quality of life benefits to the community. Several community members voiced support for this policy during the plan’s public comment period.</td>
</tr>
<tr>
<td>state agencies to increase urban tree cover</td>
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<tr>
<td>2. In preparation for the impacts of climate change on the region’s water resources,</td>
<td>Rising temperatures and droughts are having significant impacts on the availability of water supplies throughout the state. The community can and must prepare for increasingly constrained water resources through water conservation, recycling, and other methods.</td>
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<tr>
<td>partner with local, regional and state agencies to encourage water conservation and</td>
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<td>efficiency and expand and diversify the water supply</td>
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<tr>
<td>3. In preparation for increasing sea-levels and more severe storms, partner with</td>
<td>Impacts of warming temperatures include a rising sea level and increasingly severe winter storms. As a coastal city, Berkeley must increase its capacity to manage stormwater and coastal floods.</td>
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<td>local, regional and state agencies to reduce the property damage associated with</td>
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<td>flooding and coastal erosion</td>
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<tr>
<td>Ch. 7: COMMUNITY OUTREACH &amp; EMPOWERMENT</td>
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</tr>
<tr>
<td>1. Establish an implementation framework that enables the City to more efficiently</td>
<td>The City is already working with several community partners to turn the climate plan into climate action. This includes the development of community “working groups” formed to mobilize around a specific component of this plan. The City is also launching a website to report on progress on achieving the goals of this plan.</td>
</tr>
<tr>
<td>and effectively distribute information and resources to a wide range of community</td>
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<tr>
<td>partners and to report progress on achieving the goals outlined in this plan</td>
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</tr>
<tr>
<td>2. Continue to showcase existing climate protection efforts in our schools and to</td>
<td>Representatives from the City, the Berkeley Unified School District, UC Berkeley, Lawrence Berkeley National Labs, and local museums, among others, should identify opportunities for sharing resources that will help to build on existing climate awareness and education in local K – 12 schools.</td>
</tr>
<tr>
<td>expand the opportunities students have to learn about and take action on climate</td>
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<tr>
<td>change</td>
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<tr>
<td>3. Launch a coordinated outreach and education campaign, utilizing a range of tools,</td>
<td>A climate action outreach and education campaign must effectively communicate the urgency of addressing the climate crisis while also empowering individuals, businesses, and institutions to be a part of the solution.</td>
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<tr>
<td>programs and partnerships, to mobilize residents</td>
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<tr>
<td>4. Continue to showcase effective climate protection efforts in the business</td>
<td>Several local businesses are already leaders in the effort to integrate ecological consciousness into their business practices. The City is working with local businesses and business associations to support and showcase such efforts.</td>
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<tr>
<td>community and to engage additional businesses in the local climate protection effort</td>
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</tr>
<tr>
<td>GHG Reduction Policy</td>
<td>Discussion</td>
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<td>-----------------------------------------------------------------------------------</td>
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<tr>
<td>5. <em>Launch a sustained effort to increase awareness in the City government regarding the climate issue and to provide training on increasing sustainability at home and in the workplace</em></td>
<td>Although the City government accounts for a very small portion of the total community emissions, climate action at the City government is a policy tool in and of itself. Such action demonstrates leadership that extends beyond actual emissions reduced.</td>
</tr>
</tbody>
</table>
Glossary

ABAG: Association of Bay Area Governments

AC Transit: The bus system for the East Bay

BAAQMD: Bay Area Air Quality Management District

BART: Bay Area Rapid Transit

BCDC: San Francisco Bay Conservation and Development Commission

BIG: Build It Green, a Berkeley-based non-profit that provides green building assistance

BRT: Bus Rapid Transit

BUSD: Berkeley Unified School District

C&D: Construction and demolition debris

CCA: Community Choice Aggregation (also known as Community Choice Energy) a term used to describe an arrangement that enables a local government to supply electricity to customers within its borders and involves the local government in the purchase and sale of the energy commodity

CEC: California Energy Commission

CECO: Commercial Energy Conservation Ordinance

CH₄: Methane, a powerful greenhouse gas

CO₂e: Carbon dioxide equivalent units, converting all emissions to equivalent carbon dioxide units allows for the consideration of different greenhouse gases on comparable terms

CPUC: California Public Utilities Commission

CYES: California Youth Energy Services, a program that employs local youth to promote energy awareness

EPP: Environmentally Preferable Purchasing, a City policy designed to require purchase of products and services that minimize environmental and health impacts, toxics, pollution, and hazards to worker and community safety

Fiscal year (FY): The City of Berkeley’s fiscal year runs from July 1 – June 30.

GHG: Greenhouse Gas, the term used for gases that trap heat in the atmosphere. The principal greenhouse gases that enter the atmosphere as a result of human activity are carbon dioxide, methane, and nitrous oxide
**GPR:** GreenPoint Rated, a green building standard used in California for new residential projects

**ICLEI:** The International Council for Local Environmental Initiatives, a membership association of local governments focused on addressing the climate challenge

**kW:** A kilowatt, equal to 1,000 watts

**kWh:** A kilowatt hour (1,000 watt-hours), the work performed by one kilowatt of electric power in one hour

**Kyoto Protocol:** The United Nations Treaty that targets the reduction of greenhouse gas emissions

**LBNL:** Lawrence Berkeley National Laboratory

**LED:** Light emitting diode

**LEED:** Leadership in Energy and Environmental Design, a commonly used green building standard developed by the U.S. Green Building Council

**LIEE:** Low Income Energy Efficiency program

**Measure G:** The Berkeley ballot measure that established an 80% greenhouse gas emissions reduction target for Berkeley’s community-wide emissions and directed the City to develop a plan for achieving that target and interim targets. The measure passed with 81% of the vote in November 2006

**Metric ton:** 1,000 kilograms (or 2204.6226 lbs.). Also known as a “tonne.”

**MTC:** Metropolitan Transportation Commission

**Peak Oil:** A term used to describe the transition from many decades in which the available supply of oil grew each year to a period in which the rate of oil production enters its terminal decline

**PG&E:** Pacific Gas & Electric

**PV:** Photovoltaics, a solar power technology that converts sunlight into electricity

**RECO:** Residential Energy Conservation Ordinance

**RPP:** Residential Permit Parking

**RSEC:** Rising Sun Energy Center

**Solar thermal:** A technology that captures solar energy for heat

**SR2S:** Safe Routes to School program

**StopWaste.Org:** The Alameda County Waste Management Authority and the Alameda County Source Reduction and Recycling Board serving as one agency
**Therm:** 100,000 British Thermal Units (BTUs), equivalent to approximately 100 standard cubic feet of natural gas

**Title 24 Energy Code:** California’s energy efficiency standards for residential and nonresidential buildings

**UCB:** University of California, Berkeley

**VMT:** Vehicle miles traveled

**Zero Net Energy Buildings:** A building that achieves maximum energy efficiency so that any remaining energy needs can be met through onsite renewable energy systems, such as solar water and space heating, solar electricity, or wind energy

**Zero Waste:** The City’s goal to eliminate waste sent to the landfill by 2020. All of the community’s discarded material would be recycled or reused
APPENDIX A: Consolidated Implementation Tables

Sustainable Transportation & Land Use: Implementation table

Key to Acronyms:

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACTIA</td>
<td>Alameda County Transportation Improvement Authority</td>
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<td>BAAQMD</td>
<td>Bay Area Air Quality Management District</td>
</tr>
<tr>
<td>BART</td>
<td>Bay Area Rapid Transit</td>
</tr>
<tr>
<td>BUSD</td>
<td>Berkeley Unified School District</td>
</tr>
<tr>
<td>CMA</td>
<td>Congestion Management Authority</td>
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<tr>
<td>CMO</td>
<td>City Manager Office</td>
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<tr>
<td>COB</td>
<td>City of Berkeley</td>
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<tr>
<td>DP&amp;D</td>
<td>Department of Planning &amp; Development</td>
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<tr>
<td>DPW</td>
<td>Department of Public Works</td>
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<td>GHG</td>
<td>Greenhouse gas</td>
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<tr>
<td>HHS</td>
<td>Department of Health &amp; Human Services</td>
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<tr>
<td>OED</td>
<td>Office of Economic Development</td>
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<tr>
<td>MTC</td>
<td>Metropolitan Transportation Commission</td>
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<tr>
<td>RPP</td>
<td>Residential Preferential Parking</td>
</tr>
<tr>
<td>UCB</td>
<td>University of California, Berkeley</td>
</tr>
<tr>
<td>VMT</td>
<td>Vehicle Miles Traveled</td>
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<td>ZAB</td>
<td>Zoning Adjustments Board</td>
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</table>

Lead implementing agency is in **bold**. Where possible, City staff identified a funding source for all short-term implementing actions.
### TLU 1. Goal: Increase density along transit corridors

1. Conduct a “land use scenario study” in order to help visualize, quantify, and compare the impacts on VMT (and the associated GHG and local air pollutant emissions) of various land use scenarios
   - **Implementing Agencies**: COB DP&D
   - Funding Source: X

2. Implement zoning adjustments to facilitate a mix of housing and commercial development (including retail services and employment centers) in certain transit-served areas (see chapter text for examples)
   - **Implementing Agencies**: COB DP&D, COB
   - Funding Source: X, X, X

3. In order to improve livability and reduce VMT in existing neighborhoods that are not well served by transit, consider where in-fill neighborhood-serving retail, that is oriented to basic daily needs such as “corner stores” and small markets, may be feasible.
   - **Implementing Agencies**: COB DP&D
   - Funding Source: X, X

4. Develop tools and guidance that the ZAB, Planning Commission and City Council can utilize in order to effectively consider and reduce the impact on GHG emissions of a given land use-related proposal (see chapter text for examples)
   - **Implementing Agencies**: COB DP&D, COB DPW
   - Funding Source: X

5. Partner with UCB to assess and address unmet housing demand of UCB employees and students
   - **Implementing Agencies**: UCB, COB DP&D, COB DPW
   - Funding Source: X, X

6. Partner with UCB and BUSD to identify opportunities to site affordable housing near transit for faculty and staff
   - **Implementing Agencies**: UCB, BUSD, COB DP&D
   - Funding Source: X

7. Provide enhanced assistance during the permit process for transit-oriented development projects
   - **Implementing Agencies**: COB DP&D
   - Funding Source: X

8. Encourage the adaptive reuse and intensification of historic buildings in proximity to transit, when feasible and appropriate
   - **Implementing Agencies**: COB DP&D
   - Funding Source: X

### TLU 2. Goal: Increase and enhance urban green and open space, including local food production, to improve the health and quality of life for residents, protect biodiversity, conserve natural resources, and foster walking and cycling

1. Establish and Open Space Fee or similar mechanism for the creation of new and enhancement of existing streetscapes and public open space
   - **Implementing Agencies**: COB DP&D
   - Funding Source: X

2. Allow multi-unit residential projects to provide street-level public open space in lieu of some required on-site private open space
   - **Implementing Agencies**: COB DP&D
   - Funding Source: X

3. Consider the feasibility of establishing policies that would discourage the removal of usable open space in private lots unless such open space would be provided elsewhere on site or the property owner agrees to pay an “Open Space Fee” or
   - **Implementing Agencies**: COB DP&D
   - Funding Source: X
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<td>similar mechanism which would be used to fund the maintenance of existing or the creation of new public open space</td>
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<td>B. Promote tree planting, landscaping, and the creation of green and open space that is safe, attractive and that helps to restore natural processes</td>
<td>Maintain and protect mature trees wherever possible and maximize tree planting as part of public open space and street improvements</td>
<td>COB Dept. of Parks, Rec &amp; Waterfront</td>
<td>COB</td>
<td>x</td>
<td>x</td>
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<tr>
<td>2.</td>
<td>Consider developing street tree master plans for sub-areas within the City</td>
<td>COB Dept. of Parks, Rec &amp; Waterfront, COB DP&amp;D</td>
<td></td>
<td>x</td>
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<td>3.</td>
<td>Consider developing a tree preservation ordinance that would articulate strong standards for the preservation and replacement of trees in the public right of way</td>
<td>COB Dept. of Parks, Rec &amp; Waterfront, COB DP&amp;D</td>
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<td>4.</td>
<td>Identify opportunities for tree planting and to maintain existing and create new public open spaces in order to increase community access to parks and plazas</td>
<td>COB Dept. of Parks, Rec &amp; Waterfront, COB DP&amp;D</td>
<td></td>
<td>x</td>
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<td>5.</td>
<td>Establish standards and guidelines to ensure that ecologically beneficial stormwater quality and retention features and water conservation features are integrated into the design of landscaping features on both public and private land</td>
<td>COB DPW, COB DP&amp;D, COB Dept. of Parks, Rec &amp; Waterfront</td>
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<tr>
<td>6.</td>
<td>Encourage the development of green roofs by providing outreach and guidelines consistent with the building code</td>
<td>COB DP&amp;D</td>
<td>COB</td>
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<td>C. Increase access to healthy and affordable foods for the community by supporting efforts to build more complete and sustainable local food production and distribution systems</td>
<td>Encourage and support existing community gardens as well as neighborhood initiatives to launch additional community gardens</td>
<td>COB Dept. of Parks, Rec &amp; Waterfront, COB DP&amp;D</td>
<td>COB</td>
<td>x</td>
<td>x</td>
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<tr>
<td>2.</td>
<td>Include community gardens and orchards in the planning for the Santa Fe Right-of-Way</td>
<td>COB DP&amp;D</td>
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<td>3.</td>
<td>Encourage local community gardens to donate excess produce to local food banks</td>
<td>COB Dept. of Parks, Rec &amp; Waterfront, COB DP&amp;D</td>
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<td>4.</td>
<td>Continue to provide compost to community and school gardens</td>
<td>COB Dept. of Parks, Rec &amp; Waterfront, COB DPW</td>
<td>COB</td>
<td>x</td>
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<tr>
<td>5.</td>
<td>In collaboration with local business associations and merchants, continue to expand and promote the Buy Local Berkeley Campaign</td>
<td>COB OED</td>
<td>COB</td>
<td>x</td>
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<tr>
<td>6.</td>
<td>Consider developing and adopting a Buy Local Ordinance that would give preference to local businesses</td>
<td>COB OED</td>
<td>COB</td>
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<td>7.</td>
<td>In partnership with business associations and others, create incentives for restaurants that feature local, organic foods</td>
<td>COB OED</td>
<td>COB</td>
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<td>8.</td>
<td>Support local educational institutions such as the Berkeley Unified School District, the Berkeley Adult School and UC Berkeley to continue educating students in growing and preparing their own food</td>
<td>BUSD, Berkeley Adult School, UCB, COB DP&amp;D</td>
<td>COB</td>
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<td>9.</td>
<td>Promote the purchase of food from local producers for schools, senior centers, after-school programs, the summer food program and others</td>
<td>COB DP&amp;D</td>
<td>COB</td>
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<tr>
<td>10.</td>
<td>Support state and federal legislation that prioritizes local food production</td>
<td>COB HHS</td>
<td>COB</td>
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<tr>
<td>11.</td>
<td>Continue to make street space available for farmers markets and explore opportunities for additional markets in Berkeley so as to increase access to local, healthy food</td>
<td>COB</td>
<td>COB</td>
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<td>12.</td>
<td>Encourage and provide guidelines consistent with the building code for buildings to incorporate rooftop gardens that can be used for food production</td>
<td>COB DP&amp;D</td>
<td></td>
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<td>13.</td>
<td>Through the City’s website and publications, encourage residents to grow food in home and community gardens using methods that reduce GHG emissions, such as using organic inputs and compost</td>
<td>COB DPW, COB DP&amp;D</td>
<td>COB</td>
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<tr>
<td>14.</td>
<td>Through the City’s website and publications, make information available to the public to facilitate consideration of a less carbon-intensive diet, such as eating less meat and choosing vegetarian or vegan options instead</td>
<td>COB DPW, COB DP&amp;D</td>
<td>COB</td>
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<td>15.</td>
<td>Support local efforts to provide training to residents in farming and gardening techniques</td>
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<td>16.</td>
<td>Work with East Bay Municipal Utility District to consider a program that would provide reduced water rates for community gardens as an incentive for residents to utilize community garden space to grow their own food</td>
<td>EBMUD, COB Dept. of Parks, Rec &amp; Waterfront</td>
<td></td>
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<tr>
<td>17.</td>
<td>Identify opportunities to open up City-owned vacant land to encourage local food production for local consumption</td>
<td>COB DP&amp;D, COB Dept. of Parks, Rec &amp; Waterfront</td>
<td></td>
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<td>18.</td>
<td>Support the development of local food distribution and processing facilities</td>
<td>COB OED</td>
<td>COB</td>
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<td>19.</td>
<td>In collaboration with AC Transit, identify opportunities to improve public transportation options to local food markets</td>
<td>AC Transit, COB DPW</td>
<td></td>
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<td>20.</td>
<td>Work with community partners to identify methodologies for better tracking and reporting on the rate of local food production and consumption and the associated cost and GHG impacts, and other indicators</td>
<td>COB DP&amp;D</td>
<td></td>
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Appendix A – City of Berkeley Climate Action Plan
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<tr>
<td>TLU 3. Goal: Manage parking more effectively to minimize driving demand and to encourage and support alternatives to driving</td>
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<tr>
<td>1.</td>
<td>Encourage UC Berkeley, the City’s largest employer, to reduce its plans to build new parking spaces and to also revise its parking policies and programs to better encourage, support, and invest in alternatives to driving.</td>
<td>COB DPW, UCB</td>
<td>COB, UCB</td>
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<td>2.</td>
<td>Identify neighborhoods in which increased parking rates would effectively discourage driving and generate new revenue while not having a significant negative effect on local businesses</td>
<td>COB DPW</td>
<td>COB</td>
<td>X</td>
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<td>3.</td>
<td>Identify neighborhoods in which extending parking meter hours of enforcement would effectively discourage driving and generate new revenue while not having a significant negative effect on local businesses</td>
<td>COB DPW</td>
<td>COB</td>
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<td>4.</td>
<td>Consider the establishment of Parking Benefit Districts, which would receive a portion of parking revenues generated in the area</td>
<td>COB DPW</td>
<td>COB</td>
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<tr>
<td>5.</td>
<td>Redesign the Residential Preferential Parking (RPP) program so as to apply it city-wide. Utilize the revenue to design programs and infrastructure that make alternative transportation options more accessible, convenient and attractive</td>
<td>COB DPW, COB City Attorney’s Office</td>
<td>COB City Attorney’s Office</td>
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<td>6.</td>
<td>Structure RPP permit costs so that each additional permit acquired by a given household escalates in cost</td>
<td>COB DPW</td>
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<td>7.</td>
<td>Consider setting RPP prices based on the fuel efficiency of the vehicle for which the permit is being acquired</td>
<td>COB DPW, COB City Attorney’s Office</td>
<td>COB City Attorney’s Office</td>
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<td>8.</td>
<td>Install RPP permit holder-exempt parking meters in some RPP zones</td>
<td>COB DPW, COB City Attorney’s Office</td>
<td>COB City Attorney’s Office</td>
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<td>9.</td>
<td>Mark on-street parking rates equivalent to or higher than off-street (parking lot) parking rates</td>
<td>COB DPW</td>
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<tr>
<td>10.</td>
<td>Raise on- and off-street parking rates as appropriate</td>
<td>COB DPW</td>
<td>COB</td>
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<td>11.</td>
<td>Consider putting an increase to the City’s 10 percent tax on off-street parking revenue on the ballot</td>
<td>COB DPW</td>
<td></td>
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<td>12.</td>
<td>&quot;Un-bundle&quot; prices for housing and parking so that parking spaces require separate payment and are not included in the rent or purchase price of a unit</td>
<td>COB DP&amp;D</td>
<td>COB</td>
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<td>13.</td>
<td>In certain popular destinations such as the Downtown, employ parking information signage to direct motorists to available off-street parking</td>
<td>COB DPW</td>
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## Implementation Timeline

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<td>14.</td>
<td>Ensure that local employers are abiding by state requirements to participate in the parking cash-out program</td>
<td>COB DPW</td>
<td>COB</td>
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<td>15.</td>
<td>Except in cases where certain City staff persons have no alternative to driving to and from work (e.g., emergency personnel who work overnight), phase out free parking assigned to City staff for privately owned vehicles</td>
<td>COB CMO</td>
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### TLU 4. Identify opportunities for generating sustained revenue for implementing community transportation demand management programs

1. **Institute a “Transportation Services Fee” for new development and utilize funds in part for alternative transportation programs that reduce vehicle trips and traffic congestion**
   - Implementing Agencies: COB DP&D, COB DPW
   - Funding Source: COB
   - Short Term (2009-10): X
   - Long Term (2015-2020): |

2. **Institute an “In-Lieu Parking Fee” on new development and utilize funds in part for alternative transportation programs that reduce parking demand**
   - Implementing Agencies: COB DP&D, COB DPW
   - Funding Source: COB
   - Short Term (2009-10): X
   - Long Term (2015-2020): |

3. **Encourage UC Berkeley to implement a “Transportation Services Fee” on new off-campus projects to mitigate the transportation impacts associated with new development. Fee revenue would go towards funding alternative transportation programs**
   - Implementing Agencies: UCB, COB DPW
   - Funding Source: |
   - Short Term (2009-10): |
   - Medium Term (2010-2015): |

4. **Conduct a feasibility analysis of a City of Berkeley “congestion pricing” program**
   - Implementing Agencies: COB DPW
   - Funding Source: |
   - Short Term (2009-10): |
   - Long Term (2015-2020): |

5. **Support development of a regional “climate mitigation fee” applied to either gasoline or vehicle registration**
   - Implementing Agencies: COB DPW
   - Funding Source: |
   - Short Term (2009-10): |
   - Long Term (2015-2020): |

### TLU 5. Goal: Accelerate implementation of the City’s Bicycle & Pedestrian Plans

A. **Continue to expand and improve Berkeley’s bicycle and pedestrian infrastructure**

1. **Integrate bicycle boulevards and pedestrian networks into broader alternative transportation system and identify mobility gaps that could be addressed through additional bicycle/pedestrian infrastructure**
   - Implementing Agencies: COB DPW
   - Funding Source: MTC, other grants
   - Short Term (2009-10): X

2. **Extend Bicycle Boulevard network**
   - Implementing Agencies: COB DPW
   - Funding Source: BAAQMD, other grants
   - Short Term (2009-10): X

3. **Improve cross-jurisdictional bicycle route connections through signage, bikeway route modification where warranted, and physical improvements**
   - Implementing Agencies: COB DPW
   - Funding Source: COB
   - Short Term (2009-10): |
   - Medium Term (2010-2015): |

4. **Identify opportunities to modify City streets to better serve the safety and needs of pedestrians and cyclists**
   - Implementing Agencies: COB DPW
   - Funding Source: |
   - Short Term (2009-10): |
   - Medium Term (2010-2015): |

5. **Identify and implement opportunities to improve the flow of cycling along bicycle boulevards, consistent with public safety, including consideration of replacing stop signs with yield signs at traffic circles on bicycle boulevards**
   - Implementing Agencies: COB DPW
   - Funding Source: |
   - Short Term (2009-10): |
   - Medium Term (2010-2015): |
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<tr>
<td>6.</td>
<td>Continue to create additional bicycle parking throughout the community, including near transit centers and other key destinations and as part of any new development projects</td>
<td>COB DPW</td>
<td>COB, BAAQMD</td>
<td>X</td>
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<td>7.</td>
<td>Provide adequate sidewalk width, pedestrian crossing time, “count down” signals, and universal access signal features at all signalized crosswalks</td>
<td>COB DPW</td>
<td>COB, Safe Routes to Schools</td>
<td>X</td>
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<td>8.</td>
<td>Evaluate the need for new mid-block pedestrian crosswalks where there are high volumes of pedestrians and a long distance between intersections</td>
<td>COB DPW</td>
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<td>9.</td>
<td>Regularly update the Bicycle and Pedestrian Plans, including updating indicators of pedestrian and cyclist safety</td>
<td>COB DPW</td>
<td>COB</td>
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<td>10.</td>
<td>Consider establishing a network of bicycle rental stations</td>
<td>COB DPW</td>
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B. Partner with local and regional organizations and agencies to promote and market cycling and walking as an attractive alternative to driving

1. Secure marketing firm to design a community-wide marketing campaign to increase the mode share of bicycles and walking (and other forms of alternative transportation) | COB DPW               | COB                    | X                       | X                       |                         |
2. Enhance bicycle and pedestrian safety outreach and education for cyclists, walkers and drivers | COB HH, various community agencies | Caltrans Office of Traffic Safety |                         |                         | X                       |
3. Promote participation in such bicycle promoting events as Bike To Work Day | 511.org, COB DPW | COB                    |                         |                         | X                       |
4. Promote the use of bicycle delivery services and bicycle cargo trailers to local businesses and residents | COB DPW, various community agencies |                        |                         |                         | X                       |

C. Partner with BART, AC Transit and other transit service providers to improve bicycle access on trains and buses and at stations and stops

1. Expand and improve bicycle parking at all Berkeley BART stations and bus stops | BART, AC Transit, COB DPW | BART and AC Transit | X                       |                         |                         |
2. Increase the capacity for bicycles on BART trains by removing some seats and making other changes to select cars | BART, COB DPW |                         |                          |                         | X                       |

D. Continue to incorporate bicycles into municipal operations

1. Maintain and expand the Bicycle Fleet Pool available for City employees and encourage more City staff persons to take advantage of it | COB DPW |                         |                          | X                       |                         |
2. Continue to supply secure bicycle parking near City Hall and other City employment sites | COB DPW | COB                    |                         | X                       |                         |
3. Consider other bicycle fleet programs such as electric bicycles, cargo bikes, and mileage reimbursement for employee’s personal bicycle use for work trips | COB DPW |                        |                         |                          | X                       |

TLU 6. Goal: Make public transit more frequent, reliable, integrated and accessible
### Implementation Timeline

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<tr>
<td>A. Partner with AC Transit to expand and enhance AC Transit bus service in Berkeley</td>
<td>Integrate bus routes into broader alternative transportation system, identify gaps in bus service routes and potential scenarios for addressing such gaps, and improve frequency and reliability of bus service where required</td>
<td>AC Transit, COB DPW</td>
<td>AC Transit, MTC, other grants</td>
<td>X</td>
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<tr>
<td>2. Improve access to public transportation in the Berkeley hills</td>
<td>AC Transit, COB DPW</td>
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<td>3. Encourage more efficient payment systems such as “proof of payment” and level boarding to speed bus transit service</td>
<td>AC Transit, COB DPW</td>
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<td>4. Ensure that transit buses are fuel-efficient, utilize alternative fuels, and are appropriately sized</td>
<td>AC Transit, COB DPW</td>
<td>AC Transit</td>
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<td>5. Install real-time transit signage at bus stations and stops</td>
<td>AC Transit, COB DPW</td>
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<td>6. Install and improve bus shelters and benches, and ensure that they are safe, well lit, and well-maintained</td>
<td>AC Transit, COB DPW</td>
<td>AC Transit</td>
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<td>7. Improve bus flow by removing certain stop signs and on-street parking spaces, by timing signals, and by creating “queue-jumper” lanes where delay occurs regularly</td>
<td>AC Transit, COB DPW</td>
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<td>8. Work with AC Transit and BART to implement the recommendations of the South and West Berkeley Community Based Transportation Plan, which calls for transit service to meet MTC “Lifeline” service standards in low-income areas.</td>
<td>AC Transit, BART, COB DPW</td>
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<td>9. Enhance sustainable mobility options for seniors and the disabled by providing “universal access” level boarding (e.g., roll-on/roll-off boarding for wheelchairs) on buses and shuttles that easily accommodates wheelchairs, walkers, and other individuals with mobility impairments</td>
<td>AC Transit, COB DPW</td>
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B. Partner with AC Transit, BART and other community stakeholders to consider opportunities for Bus Rapid Transit or light rail systems along certain major transportation corridors (e.g., San Pablo and University Avenues and the Telegraph Ave./Downtown route currently under consideration)

1. Continue timely assessment and development of proposed East Bay Bus Rapid Transit (BRT) system | COB DP&D, COB DPW, AC Transit | AC Transit | X | X |

C. Partner with BART to expand and enhance BART service in Berkeley

1. Improve the pedestrian, cyclist and transit connectivity at the Downtown Berkeley BART station by implementing the Downtown BART Plaza and Transit Area Design Plan | BART, COB DPW |                       | X |
2. Extend service hours and provide direct service from Berkeley to San Francisco in the evenings | BART |                       | X |
### Implementation Timeline

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<td>3.</td>
<td>Work with BART to install solar electric systems on Berkeley BART stations</td>
<td>BART</td>
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<td>1.</td>
<td>Conduct a Citywide Mobility Study that analyzes the feasibility, efficacy, design, and benefits of providing free bus and BART passes, fare-free zones, and/or shuttles for individuals who live, work, and/or study in Berkeley</td>
<td>COB DPW, COB DP&amp;D</td>
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<td>2.</td>
<td>Negotiate conditions of approval for all new residential multi-family developments to provide free or subsidized transit passes for tenants</td>
<td>COB DP&amp;D</td>
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<td>3.</td>
<td>Provide incentives for and eventually require all businesses to provide free or subsidized transit passes for employees</td>
<td>COB DPW</td>
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<td>4.</td>
<td>Encourage UC Berkeley to require that transportation alternatives be provided for employees for new on- and off-campus building projects</td>
<td>UCB, COB DPW</td>
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<td>5.</td>
<td>Consider establishing Easy Pass programs for employees of businesses in specific transportation corridors, such as the San Pablo Avenue corridor and the corridor from Downtown Berkeley to Telegraph Ave. to Downtown Oakland and San Leandro</td>
<td>AC Transit, COB DPW</td>
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<td>6.</td>
<td>Study feasibility of providing fare-free zones in specified travel corridors or citywide</td>
<td>AC Transit, COB DPW</td>
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<td>7.</td>
<td>Encourage and eventually require all eligible Berkeley employers to enroll in the Alameda County Congestion Management Agency (CMA) Guaranteed Ride Home Program</td>
<td>Alameda County CMA, COB DPW</td>
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### E. Expand and integrate community shuttle bus networks

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<tr>
<td>1.</td>
<td>Partner with BART, AC Transit, Bayer, Wareham Properties, UC Berkeley, LBNL, Alta Bates and others to design an integrated short-route shuttle bus system, including feeder or ‘last mile’ shuttles or bus service that would help customers access BART without driving</td>
<td>COB DPW, BART, AC Transit, various community partners</td>
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<td>2.</td>
<td>Continue to enhance mobility options for people with disabilities by expanding existing paratransit, car share, and taxi services</td>
<td>East Bay paratransit, COB DPW</td>
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### F. Encourage additional passenger rail service and ridership in Berkeley

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<tr>
<td>1.</td>
<td>Pursue joint marketing strategies with Capital Corridor/Amtrak to promote trains as a convenient form of transportation</td>
<td>Capital Corridor/Amtrak, COB DPW</td>
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<td>2.</td>
<td>Improve bicycle and pedestrian access to passenger rail line, including installing additional signage</td>
<td>COB DPW</td>
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<td>G. Continue to partner with other agencies to establish a ferry service to San Francisco and other locations</td>
<td>Expand bus and other transit service to any ferry terminal established at or near the Berkeley Marina so that there is consistent, coordinated, reliable transit service in conjunction with the ferry</td>
<td>AC Transit, COB DPW</td>
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<td>H. Support state and regional efforts to launch a high-speed rail system</td>
<td>Encourage state, regional, and local policy makers to support the development of a high-speed rail system that links all major California cities, including connecting service to Berkeley</td>
<td>CA High Speed Rail Authority, COB</td>
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<td></td>
<td>Ensure that high-speed rail is fully integrated into existing transit services such as BART and AC Transit</td>
<td>CA High Speed Rail Authority, COB, BART, AC Transit</td>
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TLU 7. Enhance and expand car sharing and ridesharing programs

A. Make car sharing convenient and available to all Berkeley residents by providing additional incentives and by removing disincentives to car sharing

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<tbody>
<tr>
<td>1.</td>
<td>Require that developers of new residential and commercial projects of a certain size (to be specified) make spaces available for car share vehicles (provide decreased parking requirements in return)</td>
<td>COB DP&amp;D, COB DPW</td>
<td>COB</td>
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<td>2.</td>
<td>Enhance outreach to promote increased car sharing</td>
<td>COB DPW</td>
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<td>3.</td>
<td>Integrate car share pods into broader mobility system by placing more car share pods adjacent to the existing transit network and in neighborhoods underserved by public transportation</td>
<td>COB DPW</td>
<td>COB</td>
<td>X</td>
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<td>4.</td>
<td>Designate on-street parking spaces for car share vehicles</td>
<td>COB DPW</td>
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<td>5.</td>
<td>Encourage car share companies to site vehicles in private driveways by modifying business license and zoning requirements</td>
<td>COB DP&amp;D, COB DPW</td>
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<td>6.</td>
<td>Provide car share subsidies for low-income residents</td>
<td>COB DPW</td>
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B. Provide incentives and remove disincentives to ride sharing

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<tr>
<td>1.</td>
<td>Market existing discounted parking for car and vanpools and site such parking spaces near transit when feasible</td>
<td>COB DPW</td>
<td>COB</td>
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<td>2.</td>
<td>In collaboration with community partners, include web and phone-enabled ridesharing programs in comprehensive marketing and outreach effort</td>
<td>COB DPW</td>
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<td>3.</td>
<td>In collaboration with community partners, market and enhance existing casual carpool program</td>
<td>COB DPW</td>
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<td>C. Expand capacity and service of local taxi fleets to provide an alternative to single-occupancy driving</td>
<td>1. Integrate information about the role of taxi services in marketing and outreach efforts</td>
<td>COB DPW</td>
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<td>2. In collaboration with regional agencies and local taxi companies, consider studying feasibility of establishing a discounted zone-based fare or flat fees, especially for travel to/from transit stations</td>
<td>COB DPW</td>
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<td>3. Support shared taxi use, including real-time dispatch and routing</td>
<td>COB DPW</td>
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**TLU 8. Goal: Encourage the use of low-carbon vehicles and fuels**

**A. Create incentives for high-efficiency vehicles, including electric vehicles and plug-in hybrids in the community**

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<tbody>
<tr>
<td>1. Evaluate opportunities to reduce parking rates in City-owned garages for vehicles that achieve a certain high threshold of fuel-efficiency</td>
<td>COB DPW</td>
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<tr>
<td>2. Evaluate opportunities to create additional free parking and charging stations for electric and plug-in hybrid vehicles</td>
<td>COB DPW, various community partners</td>
<td>COB</td>
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<td>X</td>
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<tr>
<td>3. Provide incentives in City parking and transportation demand management policies for developers and business owners that provide plug-in locations for electric vehicles and plug-in hybrids</td>
<td>COB DP&amp;D, COB DPW</td>
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<tr>
<td>4. Include information about electric vehicles in broader marketing campaign</td>
<td>COB DPW, various community partners</td>
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**B. Provide leadership in building a market for plug-in hybrids**

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<tbody>
<tr>
<td>1. Purchase (City government) plug-in hybrids when they become available and partner with car share organizations to provide plug-in hybrids to car share pods throughout the city</td>
<td>COB DPW</td>
<td>COB</td>
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**C. Encourage the responsible production of low-carbon bio-fuels**

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<tr>
<td>1. Initiate efforts to convert local restaurant grease into bio-fuel for City-owned and private vehicles</td>
<td>COB DPW, community partners</td>
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<tr>
<td>2. Partner with local organizations and bio-fuel providers to educate the community on the role responsibly produced bio-fuels can play to reduce local emissions</td>
<td>COB DP&amp;D, community partners</td>
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**TLU 9. Goal: Enhance and expand outreach, marketing, and education regarding land use and transportation**

**A. Work with regional and local community partners to provide sustained outreach and education to Berkeley citizens and visitors regarding alternative forms of transportation**

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<tbody>
<tr>
<td>1. Launch a marketing and branding campaign that informs local consumers of their alternative transportation options</td>
<td>COB DP&amp;D, COB DPW</td>
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<tr>
<td>2. Include transportation-related education materials in a welcome package for all new homebuyers/renters</td>
<td>COB DP&amp;D, COB DPW</td>
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Appendix A – City of Berkeley Climate Action Plan
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<tbody>
<tr>
<td>3.</td>
<td>Consider expanding existing TravelChoice-Berkeley program</td>
<td>TransForm, COB DPW</td>
<td></td>
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<tr>
<td>4.</td>
<td>Sustain and expand existing Safe Routes to School program</td>
<td>TransForm, COB DPW, COB HHS</td>
<td>Caltrans</td>
<td>X</td>
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<td>5.</td>
<td>Design and implement a monthly 'Berkeley Car-Free Day' campaign</td>
<td>COB DPW</td>
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<td>6.</td>
<td>Actively promote and participate in the annual Bike to Work Day</td>
<td>511.org, COB DPW</td>
<td>COB</td>
<td>X</td>
<td>X</td>
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<td>7.</td>
<td>In collaboration with local businesses and community partners, identify incentives for telecommuting</td>
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<tr>
<td>8.</td>
<td>Partner with hotels, motels, and other visitor destinations to provide visitors with information regarding public transit and bicycle facilities</td>
<td>COB DPW, various community organizations</td>
<td></td>
<td>X</td>
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<tr>
<td>9.</td>
<td>Partner with local business associations to market the &quot;Buy Local&quot; campaign</td>
<td>COB OED, COB</td>
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TLU 10. Goal: Green City government vehicle fleets and increase employee alternative transportation options

A. Increase fuel efficiency and use of alternative fuels in City government fleet

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<tbody>
<tr>
<td>1.</td>
<td>Retire underused and inefficient City fleet vehicles</td>
<td>COB DPW</td>
<td>COB</td>
<td>X</td>
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<tr>
<td>2.</td>
<td>Replace additional City fleet vehicles with City CarShare vehicles</td>
<td>COB DPW</td>
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<tr>
<td>3.</td>
<td>Partner with City CarShare to integrate plug-in hybrid vehicles into the City’s fleet</td>
<td>COB DPW, City CarShare</td>
<td></td>
<td>X</td>
<td>X</td>
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<td>4.</td>
<td>Purchase plug-in hybrids for City and fleet when available</td>
<td>COB DPW</td>
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<td>5.</td>
<td>Ensure that bio-fuel utilized by the City fleet is responsibly produced and creates a GHG emissions reduction benefit when analyzed from a lifecycle perspective. Investigate using recycled grease from local restaurants as a fuel alternative</td>
<td>COB DPW</td>
<td></td>
<td>X</td>
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<tr>
<td>6.</td>
<td>Consider increasing bio-fuel mix used by the City from B20 to B50 or higher</td>
<td>COB DPW</td>
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<td>7.</td>
<td>Increase the fuel and route efficiency of Office of Solid Waste trucks by converting trucks to low-emission engines; utilizing route-efficiency software; utilizing a higher percentage bio-fuel or other low-carbon fuel</td>
<td>COB Solid Waste Management Division</td>
<td>Waste disposal fees</td>
<td></td>
<td>X</td>
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<tr>
<td>8.</td>
<td>Institute a purchasing policy that requires the procurement of low-emissions vehicles whenever new vehicles need to be acquired</td>
<td>COB Finance Dept. (Purchasing), COB DPW</td>
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<tr>
<td>1. Continue to supply City employees with the Easy Pass (formerly Eco-Pass). Work to include BART ridership as part of the Easy Pass benefit</td>
<td>COB DPW</td>
<td>COB</td>
<td></td>
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<tr>
<td>2. Continue to supply City employees with pre-tax transit subsidies such as Commuter Check</td>
<td>COB DPW</td>
<td>COB</td>
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<tr>
<td>3. Continue to offer deeply discounted carpool and vanpool monthly parking permits at City parking facilities</td>
<td>COB DPW</td>
<td>COB</td>
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<tr>
<td>4. Except in cases where certain City staff persons have no alternative to driving to and from work (e.g., emergency personnel who work overnight), phase out free parking assigned to City staff for privately owned vehicles</td>
<td>COB CMO</td>
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<tr>
<td>5. Consider phasing out free parking assigned to City Councilmembers</td>
<td>COB CMO</td>
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</table>

B. Encourage the use of alternative transportation for City employees and elected officials
Building Energy Use: Implementation Table

Key to Acronyms:

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAAQMD</td>
<td>Bay Area Air Quality Management District</td>
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<tr>
<td>BIG</td>
<td>Build It Green</td>
</tr>
<tr>
<td>BUSD</td>
<td>Berkeley Unified School District</td>
</tr>
<tr>
<td>CEC</td>
<td>California Energy Commission</td>
</tr>
<tr>
<td>CESC</td>
<td>Community Energy Services Corporation</td>
</tr>
<tr>
<td>COB</td>
<td>City of Berkeley</td>
</tr>
<tr>
<td>DoIT</td>
<td>Department of Information Technology</td>
</tr>
<tr>
<td>DP&amp;D</td>
<td>Department of Planning &amp; Development</td>
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<tr>
<td>EBMUD</td>
<td>East Bay Municipal Utility District</td>
</tr>
<tr>
<td>LBNL</td>
<td>Lawrence Berkeley National Laboratory</td>
</tr>
<tr>
<td>PG&amp;E</td>
<td>Pacific Gas &amp; Electric Company</td>
</tr>
<tr>
<td>RSEC</td>
<td>Rising Sun Energy Center</td>
</tr>
<tr>
<td>SD Fee</td>
<td>City of Berkeley Sustainable Development Fee</td>
</tr>
<tr>
<td>UCB RAEL</td>
<td>University of California, Berkeley Renewable &amp; Appropriate Energy Laboratory</td>
</tr>
<tr>
<td>U.S. EPA</td>
<td>United States Environmental Protection Agency</td>
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<tr>
<td>U.S. DOE</td>
<td>United States Department of Energy</td>
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</table>

Lead implementing agency is in **BOLD**. Where possible, City staff identified a funding source for all short-term implementing actions.
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<tbody>
<tr>
<td>1.</td>
<td>Establish and continually ratchet up minimum energy standards for residential and nonresidential buildings that exceed the current Title 24 energy code for various building types specific to Berkeley’s climate zone</td>
<td>COB DP&amp;D</td>
<td>SD Fee, other COB funds</td>
<td>X</td>
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<tr>
<td>2.</td>
<td>Require that new projects achieve a minimum level on an appropriate green building checklist (e.g., GreenPoint Rated Checklist for residential buildings or LEED checklist for nonresidential) and report projected GHG emissions</td>
<td>COB DP&amp;D</td>
<td></td>
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<tr>
<td>3.</td>
<td>Expand and eventually require the monitoring, testing and commissioning of residential and non-residential building systems to ensure that buildings in Berkeley are performing as intended</td>
<td>COB DP&amp;D</td>
<td></td>
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<tr>
<td>4.</td>
<td>Require that all new multi-unit buildings be “sub-metered” to enable monitoring of energy and water consumption on a unit-by-unit basis</td>
<td>COB DP&amp;D</td>
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**B. Simplify project review and permit approval process to encourage innovative green building measures**

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<tbody>
<tr>
<td>1.</td>
<td>Dedicate a Senior Green Building Inspector to make it easier to use green building technologies under the building code and provide upfront coordination and assistance for builders committed to achieving a high level of green building</td>
<td>COB DP&amp;D</td>
<td>SD Fee</td>
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<tr>
<td>2.</td>
<td>Identify funding sources and other incentives that can subsidize City permit fees for innovative or pilot green building projects</td>
<td>COB DP&amp;D</td>
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<tr>
<td>3.</td>
<td>Adopt a green building curriculum and provide ongoing training for zoning and building permit plan-checkers in the City’s Planning Department to enable them to be knowledgeable about the latest green building techniques</td>
<td>COB DP&amp;D, BIG, StopWaste.org</td>
<td>SD Fee, StopWaste.Org</td>
<td>X</td>
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<tr>
<td>4.</td>
<td>Increase green building throughout the region by sharing best practices with other area cities through such entities as the Green Building Public Agency Council (PAC)</td>
<td>COB DP&amp;D</td>
<td>COB</td>
<td>x</td>
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**C. Identify and develop financial incentives and low-cost financing tools to enable increased green building in the private sector**

|--------|----------------------|-----------------------|----------------|----------------------|------------------------|------------------------|

**D. Enhance outreach to encourage developers to adopt national green building and energy performance standards, such as ENERGY STAR, GreenPoint Rated and LEED**

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<tbody>
<tr>
<td>1.</td>
<td>Highlight existing green buildings and cutting edge green technologies through green building tours</td>
<td>BIG, COB DP&amp;D</td>
<td>BIG, Grants</td>
<td>X</td>
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<tr>
<td>2.</td>
<td>Highlight existing green buildings in Berkeley through case studies made available at the City’s Permit Service Center and on City and partnering agency websites</td>
<td>BIG, COB DP&amp;D</td>
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<tr>
<td>3.</td>
<td>Working with partner organizations and nearby jurisdictions, identify a sponsor and launch a green building awards competition</td>
<td>COB DP&amp;D, BIG, StopWaste.Org</td>
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<tr>
<td>4.</td>
<td>Expand the green building display in the City’s Permit Service Center and utilize it to showcase innovative green build materials and practices</td>
<td>COB DP&amp;D</td>
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**BEU 2. Goal: Enhance energy services and standards and reduce costs of energy upgrades for existing residential properties**

**A. Establish a standard for home energy audits and energy improvements that provides thorough guidance on achieving deep, sustained energy savings in existing residential buildings**

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<tbody>
<tr>
<td>1.</td>
<td>In collaboration with energy service providers, community stakeholders and local governments in the region, develop and phase in a local energy standard for existing residential buildings that is designed to facilitate deep, cost-effective reductions in energy use</td>
<td>COB DP&amp;D, several community partners</td>
<td>SD Fee</td>
<td>X</td>
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<tr>
<td>2.</td>
<td>Phase in energy standards for existing residential buildings by requiring compliance in order to take advantage of certain incentives and financing and by triggering a compliance requirement at certain events such as major renovations, point of sale, and condo conversions.</td>
<td>COB DP&amp;D, several community partners</td>
<td></td>
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<tr>
<td>3.</td>
<td>Engage and train energy service providers (e.g., organizations that can conduct comprehensive energy audits and upgrades) to become well versed in Berkeley’s energy standard so that they can serve the market</td>
<td>COB DP&amp;D, CESC, PG&amp;E, RSEC</td>
<td>PG&amp;E ratepayer funds, grants</td>
<td>X</td>
<td>X</td>
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<tr>
<td>4.</td>
<td>Provide a suite of energy-saving programs, resources, education, incentives, rebates and financing options to assist property owners and tenants to comply with the local energy standard</td>
<td>COB DP&amp;D, regional partners and cities</td>
<td>PG&amp;E ratepayer funds, grants</td>
<td>X</td>
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<tr>
<td>5.</td>
<td>Partner with the Berkeley Association of Realtors and other real estate professional groups in an effort to conduct targeted outreach and education to new Berkeley homeowners</td>
<td>COB DP&amp;D, Berkeley Association of Realtors, others</td>
<td>PG&amp;E ratepayer funds, grants</td>
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**B. Develop and provide comprehensive energy services for local residents**

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<tbody>
<tr>
<td>1.</td>
<td>In collaboration with PG&amp;E and state and federal government, provide financial incentives for compliance with local energy standards</td>
<td>COB DP&amp;D, PG&amp;E, other government agencies and cities</td>
<td></td>
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<tr>
<td>3.</td>
<td>Provide Berkeley FIRST (Financing Initiative for Renewable and Solar Technology) financing for solar photovoltaic energy systems and if feasible, expand the program to include financing for other renewable energy systems and energy</td>
<td>COB DP&amp;D, UCB RAEL</td>
<td>U.S. EPA, BAAQMD, fees</td>
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<tr>
<td></td>
<td>Efficiency improvements</td>
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<td>4.</td>
<td>Explore the feasibility of amending the existing program allowing a rebate of a portion of the City of Berkeley’s transfer tax for seismic safety upgrades to also include major energy efficiency and solar improvements</td>
<td>RSEC, COB DP&amp;D</td>
<td>PG&amp;E ratepayer funds</td>
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<tr>
<td>5.</td>
<td>Partner with Rising Sun Energy Center and other community partners to implement a 3-tier energy efficiency and job-training program</td>
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<td>6.</td>
<td>Develop targeted energy services for home-based care facilities</td>
<td>COB DP&amp;D, PG&amp;E</td>
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<tr>
<td>7.</td>
<td>Partner with East Bay Municipal Utility District (EBMUD) to identify additional opportunities for distribution of free water saving devices and education</td>
<td>EBMUD</td>
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<tr>
<td>8.</td>
<td>Rather than having ratepayer funds for energy efficiency and other energy saving programs (Public Goods Charge) be distributed through utilities, consider the feasibility and effectiveness of having those funds given directly to the City or some other agency or organization</td>
<td>California Public Utilities Commission, COB, PG&amp;E</td>
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C. Expand and better integrate programs for low-income households

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<tbody>
<tr>
<td>1.</td>
<td>Conduct a “gap analysis” or baseline study to determine how to effectively expand and enhance energy services for low-income clients</td>
<td>COB DP&amp;D, COB Housing Dept, PG&amp;E, various Community partners</td>
<td>PG&amp;E ratepayer funds</td>
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<tr>
<td>2.</td>
<td>Combine the delivery of City and agency programs with other income-qualified assistance programs</td>
<td>COB DP&amp;D, COB Housing Dept, PG&amp;E, various Community partners</td>
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<tr>
<td>3.</td>
<td>Develop and implement Green LEEP (Low-income Energy Efficiency Program)</td>
<td>COB DP&amp;D, COB Housing Dept, PG&amp;E, various Community partners</td>
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<tr>
<td>4.</td>
<td>Develop and implement the Rental Housing Energy Efficiency Loan (RHEEL) program</td>
<td>COB DP&amp;D, COB Housing Dept, PG&amp;E, various Community partners</td>
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<tr>
<td>5.</td>
<td>Partner with agencies such as GRID Alternatives to provide low-cost solar installations to low-income households</td>
<td>COB DP&amp;D, COB Housing Dept, Grid Alternatives</td>
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D. Identify and capture opportunities for energy and water savings in renter-occupied units

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<tbody>
<tr>
<td>1.</td>
<td>Work with the Rent Board to explore ways in which the cost of high quality energy and water efficiency measures can be paid for by both property owners and tenants</td>
<td>COB Rent Board, COB DP&amp;D, building owners</td>
<td>PG&amp;E ratepayer funds</td>
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<tr>
<td>2.</td>
<td>Work with community partners to design a program that would require that upon vacancy, an energy rating system is applied to rental units so as to inform future occupants of the costs and relative energy</td>
<td>COB Rent Board, COB DP&amp;D, building owners, COB Housing Dept</td>
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<tr>
<td>and water efficiency associated with the unit</td>
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<tr>
<td>3.</td>
<td>Develop and market a green landlord database</td>
<td>COB DP&amp;D, COB Rent Board</td>
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</table>

**BEU 3. Goal: Enhance energy services and standards for existing commercial properties**

_A. Establish a standard for energy audits and energy improvements in nonresidential buildings that provides thorough guidance on achieving deep, sustained energy savings_

1. In collaboration with energy service providers, community stakeholders and local governments in the region, develop and phase in a local energy standard for existing nonresidential buildings that is designed to facilitate deep, cost-effective reductions in energy use
   - COB DP&D, several community partners
   - SD Fee
   - X

2. Phase in energy standards for existing nonresidential buildings by requiring compliance in order to take advantage of certain incentives and financing; and by triggering a compliance requirement at certain events such as major renovations and point of sale or lease.
   - COB DP&D, several community partners
   - X
   - X

3. Consider requiring that a “cool roof” be installed anytime the roof of a commercial building is being built or re-roofed
   - COB DP&D
   - X

4. Require all fluorescent lamps, magnetic ballasts, and incandescent lamps be retrofitted for higher efficiency technology for commercial building permits to be issued
   - COB DP&D
   - X

5. Engage and train energy service providers (e.g., organizations that can conduct comprehensive energy audits and upgrades) to become well versed in Berkeley’s energy standard so that they can serve the market
   - COB DP&D, CESC, PG&E, RSEC
   - PG&E ratepayer funds, grants
   - X
   - X
   - X

6. Provide a suite of energy-saving programs, resources, education, incentives, rebates and financing options to assist property owners and tenants to comply with the local energy standard
   - COB DP&D, regional agencies and cities
   - PG&E ratepayer funds, grants
   - X
   - X
   - X

7. Partner with property management firms and real estate professional groups in an effort to conduct targeted outreach and education to building owners
   - COB DP&D, property managers, real estate professionals
   - SD Fee
   - X
   - X

**B. Develop and provide comprehensive energy services for local businesses**

1. In collaboration with PG&E and state and federal government, provide financial incentives for compliance with local energy standards
   - COB DP&D, PG&E, other government agencies
   - X
   - X

2. Launch the Smart Solar Program
   - COB DP&D, U.S. DOE, UCB RAEL, BIG, CESC, PG&E
   - U.S. DOE, COB, PG&E ratepayer funds
   - X

3. Provide Berkeley FIRST (Financing Initiative for Renewable and Solar Technology) financing for solar photovoltaic energy systems and if feasible, expand the
   - COB DP&D, UCB RAEL
   - U.S. EPA, BAAQMD, fees
   - X
   - X
   - X
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<tbody>
<tr>
<td>4.</td>
<td>Enhance the Smart Lights program energy audit process to make it more comprehensive</td>
<td>COB and partnering East Bay jurisdictions and agencies</td>
<td>PG&amp;E ratepayer funds</td>
<td>X</td>
<td>X</td>
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<tr>
<td>5.</td>
<td>Develop and implement the Berkeley Cleaner Solar program</td>
<td>COB DP&amp;D</td>
<td></td>
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<tr>
<td>6.</td>
<td>Improve marketing of energy-related rebates for small businesses</td>
<td>COB and partnering East Bay jurisdictions and agencies</td>
<td>PG&amp;E ratepayer funds</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7.</td>
<td>Market Demand Response Programs where appropriate</td>
<td>COB and partnering East Bay jurisdictions and agencies</td>
<td>PG&amp;E ratepayer funds</td>
<td>X</td>
<td>X</td>
<td>X</td>
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</tbody>
</table>

C. Identify opportunities for energy savings in renter-occupied/leased commercial buildings

| 1.     | Develop model lease provisions that would encourage commercial landlords and tenants to share the liability and benefit of energy saving measures | COB DP&D, COB Rent Board | | X |
| 2.     | Develop and market a green landlord database | COB DP&D, COB Rent Board | | X |
| 3.     | Encourage commercial building owners to use Portfolio Manager for energy tracking | COB and partnering East Bay jurisdictions and agencies | PG&E ratepayer funds | X |

D. Expand energy saving opportunities for large commercial properties

| 1.     | Partner with local community agencies to encourage large commercial businesses to retire old HVAC systems | COB and partnering East Bay jurisdictions and agencies | PG&E ratepayer funds | X | X | X |
| 2.     | Partner with local community agencies to implement commissioning and re-commissioning for new development, major renovations, and existing buildings | COB and partnering East Bay jurisdictions and agencies | PG&E ratepayer funds | X | X |
| 3.     | Improve marketing of rebates | COB and partnering East Bay jurisdictions and agencies | PG&E ratepayer funds | X | X |
| 4.     | Market Demand Response programs to large businesses in order to reduce high-carbon peak load | COB and partnering East Bay jurisdictions and agencies | PG&E ratepayer funds | X | X | X |
| 5.     | Encourage local large businesses to track the energy consumption in their facilities through ENERGY STAR Portfolio Manager | COB and partnering East Bay jurisdictions and agencies | PG&E ratepayer funds | X | X |

BEU 4. Goal: Increase residential and commercial renewable energy use

A. Implement targeted assistance and outreach to increase decentralized solar installations in homes and businesses

| 1.     | Launch the Smart Solar Program | COB DP&D, U.S. DOE, UCB RAEI, BIG, CESC, PG&E | U.S. DOE, COB, PG&E ratepayer funds | X |
|--------|----------------------|----------------------|----------------|----------------------|------------------------|----------------------|
| 2.     | Provide Berkeley FIRST (Financing Initiative for Renewable and Solar Technology) financing for solar photovoltaic energy systems and if feasible, expand the program to include financing for other renewable energy systems and energy efficiency improvements | COB DP&D, UCB RAEL | U.S. EPA, BAAQMD, fees | X | X | X |
| 3.     | Launch an on-line Solar Map | COB DP&D, COB DoT, CH2M Hill (Contractor) | U.S. DOE | X | | |
| 4.     | Identify funding sources to subsidize and eliminate solar permit fees (including solar thermal) for residential dwellings and lower fees for solar permits for commercial buildings | COB DP&D | | | X | |

B. Partner with the State government and utilities to green the energy mix that supplies the region’s grid electricity

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<tbody>
<tr>
<td>1.</td>
<td>Support the California Air Resources Board recommendation to increase the Renewable Portfolio Standard to 33 percent by 2020. Urge PG&amp;E to achieve that standard</td>
<td>COB and partnering cities and agencies</td>
<td>COB</td>
<td>X</td>
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<tr>
<td>2.</td>
<td>Urge Congress to maintain tax credits for renewable power developers</td>
<td>COB and partnering cities and agencies</td>
<td>COB</td>
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<tr>
<td>3.</td>
<td>Urge the State to revise net metering rules to enable residential and commercial customers to earn refunds for excess energy generated</td>
<td>COB and partnering cities and agencies</td>
<td>COB</td>
<td>X</td>
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<td>4.</td>
<td>Urge the State to allow utilities to count decentralized energy sources toward the RPS requirement and to raise the RPS a commensurate amount</td>
<td>COB and partnering cities and agencies</td>
<td>COB</td>
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C. Consider Community Choice Energy

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<tbody>
<tr>
<td>1.</td>
<td>Continue to consider CCE and to monitor the efforts of other jurisdictions and PG&amp;E’s ability to comply with their renewable energy requirements</td>
<td>COB DP&amp;D, COB City Manager’s Office</td>
<td></td>
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D. Identify and implement opportunities for increased wind generation and the use of other renewable energy technologies

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<tbody>
<tr>
<td>1.</td>
<td>Conduct a study to identify the wind energy generation potential in various parts of Berkeley (taking into consideration potential impact on wildlife) and identify opportunity sites where wind energy can best be implemented</td>
<td>COB DP&amp;D</td>
<td></td>
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<td>2.</td>
<td>Based on the study above and working with stakeholders, evaluate modifications to the building code that would be necessary to facilitate the installation of wind turbines within City limits. Work with the State to modify the building code, if necessary</td>
<td>COB DP&amp;D</td>
<td></td>
<td>X</td>
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<tr>
<td>3.</td>
<td>Investigate the potential and possible sites for combined heat and power (CHP) systems in Berkeley</td>
<td>COB DP&amp;D</td>
<td></td>
<td>X</td>
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<tr>
<td>4.</td>
<td>Research the potential for a grid-connected wave energy system in the San Francisco Bay</td>
<td>COB DP&amp;D</td>
<td></td>
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</table>
### BEU 5. Goal: Increase energy efficiency and renewable energy use in public buildings

**A. Continue to identify and implement opportunities for increased energy and water efficiency in public buildings**

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<tbody>
<tr>
<td>5.</td>
<td>Evaluate the effectiveness of a green waste anaerobic digester for collected waste</td>
<td>COB DPW</td>
<td></td>
<td>X</td>
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**B. Continue to actively identify and implement cost-effective opportunities to utilize renewable energy systems in public buildings**

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<tbody>
<tr>
<td>1.</td>
<td>Maintain and continually update the City Capital Improvements Plan</td>
<td>COB DP&amp;D</td>
<td>COB</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>2.</td>
<td>Ensure that the City and BUSD purchase high efficiency computer equipment and other office appliances and operate the equipment as energy efficiently as possible</td>
<td>COB DoIT, BUSD</td>
<td>COB, BUSD</td>
<td></td>
<td>X</td>
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<tr>
<td>3.</td>
<td>Replace the few remaining incandescent traffic signals with high-efficiency Light Emitting Diode (LED) lamps</td>
<td>COB DPW</td>
<td></td>
<td>X</td>
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<td>4.</td>
<td>Consider replacing existing streetlights with high-efficiency LED lamps</td>
<td>COB DPW</td>
<td></td>
<td>X</td>
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<td>5.</td>
<td>Benchmark and track public building energy performance through ENERGY STAR’s Portfolio Manager</td>
<td>COB DP&amp;D</td>
<td>COB</td>
<td>X</td>
<td>X</td>
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<tr>
<td>6.</td>
<td>Launch an on-bill financing pilot program with PG&amp;E</td>
<td>COB DP&amp;D</td>
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<td>7.</td>
<td>Establish an annual energy reduction target for each City department</td>
<td>COB DP&amp;D</td>
<td></td>
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<td>8.</td>
<td>Draft and implement an Administrative Regulation for energy and water efficiency in all City buildings</td>
<td>COB DP&amp;D</td>
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### BEU 6. Goal: Enhance and expand marketing, outreach, and education regarding building energy use

**A. Work with regional and local community partners to provide sustained outreach and education regarding energy efficiency and renewable energy use**

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<tbody>
<tr>
<td>1.</td>
<td>Include building energy use-related education materials in a welcome package for all new homebuyers/renters</td>
<td>COB DP&amp;D, Berkeley Board of Realtors (BBOR)</td>
<td></td>
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<td>2.</td>
<td>Partner with the Berkeley Board of Realtors on an outreach and education effort that targets new Berkeley homeowners</td>
<td>COB DP&amp;D, BBOR</td>
<td></td>
<td></td>
<td>X</td>
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<tr>
<td>3.</td>
<td>Coordinate outreach between City divisions that provide related services to the community, including energy services, child and low- income health programs, housing programs, and safety programs</td>
<td>Various City Departments</td>
<td>COB</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4.</td>
<td>The City’s Office of Energy &amp; Sustainable Development should continue to distribute information at community festivals and other events</td>
<td>COB DP&amp;D</td>
<td>COB</td>
<td>X</td>
<td>X</td>
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<tr>
<td>5.</td>
<td>Identify and catalogue existing energy efficiency showcases within the community</td>
<td>COB DP&amp;D</td>
<td></td>
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<tr>
<td>6.</td>
<td>Design and implement a “Lights Out at Night” campaign to reduce the amount of energy being wasted by local institutions (including the City government) and businesses</td>
<td>COB DP&amp;D</td>
<td></td>
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<td>7.</td>
<td>Launch an annual “Get Off Your Gas” contest to encourage Berkeley residents to reduce natural gas consumption during the winter months</td>
<td>COB DP&amp;D</td>
<td>PG&amp;E ratepayer funds</td>
<td>X</td>
<td>X</td>
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<tr>
<td>8.</td>
<td>Initiate a voluntary home energy-monitoring program</td>
<td>COB DP&amp;D, PG&amp;E</td>
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**BEU 7. Goal: Prepare local residents for green collar job opportunities**

_A. Prepare and promote our local workforce for local and regional green jobs that offer stable employment, career growth and living wages_

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<tbody>
<tr>
<td>1.</td>
<td>Identify projected demand for skilled labor associated with implementation of the Climate Action Plan and other sustainability strategies through partnerships with economic development agencies, local universities, community colleges, certified apprenticeship programs, workforce development and training programs, businesses, and community agencies</td>
<td>COB, UCB, local schools, community colleges, community agency partners, local business and industry partners</td>
<td>Federal grants, investment from private companies</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>2.</td>
<td>Integrate energy and climate-related education into the public school curriculum and after school learning programs and explore development of a high school Green Career Technical Academy by partnering with the Berkeley Unified School District, Berkeley High School and the Berkeley Technical Academy (B-Tech)</td>
<td>COB, UCB, LBNL, BUSD, Berkeley Technical Academy, industry partners</td>
<td>Grants</td>
<td>X</td>
<td>X</td>
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<tr>
<td>3.</td>
<td>Strengthen and expand job training partnerships and opportunities that prepare young adults, many with barriers to employment (e.g., lack of education, language/cultural barriers, etc.), to seize existing and future green collar job opportunities</td>
<td>East Bay Green Corridor Partnership, RSEC, other community partners</td>
<td>COB, federal grants, federal funding through the Workforce Investment Act</td>
<td>X</td>
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<tr>
<td>4.</td>
<td>Assist Berkeley residents to enroll in pre-apprenticeship trades training programs, such as those that prepare students for jobs in green construction, energy retrofits, and solar photovoltaic installation</td>
<td>COB, local schools, community agency partners, local business and industry partners</td>
<td>X</td>
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<tr>
<td>5.</td>
<td>Provide ongoing support for local green businesses and industries that provide green collar jobs</td>
<td>COB, business associations</td>
<td>COB</td>
<td>X</td>
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<td>X</td>
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<tr>
<td>6.</td>
<td>Stimulate demand for energy services and an energy service workforce by strengthening and improving the administration and performance of the City’s First Source Employment Ordinance and by developing additional provisions and incentives to encourage green businesses and contractors to hire local and provide high-quality employment</td>
<td>COB, energy service providers</td>
<td>COB, federal and state grants</td>
<td>X</td>
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<tr>
<td>7.</td>
<td>Consider developing and adopting a Local Hire Ordinance that would serve to create additional opportunities for local residents to get jobs</td>
<td>COB and several community partners</td>
<td></td>
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Waste Reduction & Recycling: Implementation Table

Key to Acronyms:

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>BUSD</td>
<td>Berkeley Unified School District</td>
</tr>
<tr>
<td>COB</td>
<td>City of Berkeley</td>
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<tr>
<td>DP&amp;D</td>
<td>Department of Planning &amp; Development</td>
</tr>
<tr>
<td>DPW</td>
<td>Department of Public Works</td>
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<tr>
<td>OED</td>
<td>Office of Economic Development</td>
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<tr>
<td>RSEC</td>
<td>Rising Sun Energy Center</td>
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<tr>
<td>SWMD</td>
<td>Solid Waste Management Division</td>
</tr>
</tbody>
</table>

Lead implementing agency is in **BOLD**. Where possible, City staff identified a funding source for all short-term implementing actions.
## WRR 1. Goal: Increase residential composting, recycling, and source reduction

### A. Enhance recycling and composting outreach and assistance to single-family homes

1. Initiate a ‘split-cart’ program to increase convenience and recycling capacity for residents of single-family homes  
   - **Implementing Agencies:** COB SWMD, Ecology Center  
   - **Funding Source:** Waste collection fees, grants  
   - **Timeline:**  
     - Short Term (2009-10): X  
     - Long Term (2015-2020):  

2. Increase participation in the residential green-cart program by enhancing education and outreach to residents on the topic of composting household organic waste and yard trimmings  
   - **Implementing Agencies:** COB SWMD, StopWaste.Org  
   - **Funding Source:** Waste collection fees, grants, regional program funds  
   - **Timeline:**  
     - Short Term (2009-10): X  
     - Long Term (2015-2020):  

3. Integrate a “waste audit” into local efforts to conduct residential energy audits, such as the Rising Sun Energy Center’s California Youth Energy Services program  
   - **Implementing Agencies:** COB SWMD, Rising Sun Energy Center  
   - **Funding Source:** Waste collection fees, grants  
   - **Timeline:**  
     - Short Term (2009-10): X  
     - Medium Term (2010-2015):  
     - Long Term (2015-2020):  

### B. Target expanded recycling outreach and services to multi-family residential buildings, including apartment buildings, fraternities and sororities, and cooperative housing

1. Provide on-site assistance and containers for building managers to set up recycling and composting systems  
   - **Implementing Agencies:** COB SWMD, StopWaste.Org  
   - **Funding Source:** Waste collection fees, grants  
   - **Timeline:**  
     - Short Term (2009-10): X  
     - Long Term (2015-2020):  

2. Design model lease language that outlines the responsibility of building managers to provide recycling systems and of tenants to recycle waste  
   - **Implementing Agencies:** COB SWMD, building managers, StopWaste.Org  
   - **Funding Source:** Waste collection fees, grants  
   - **Timeline:**  
     - Short Term (2009-10):  
     - Long Term (2015-2020):  

3. Organize tenant meetings for the purpose of providing recycling resources and training  
   - **Implementing Agencies:** COB SWMD  
   - **Funding Source:** Waste collection fees, grants  
   - **Timeline:**  
     - Short Term (2009-10): X  
     - Long Term (2015-2020):  

4. Develop standards to ensure new and remodeled buildings are designed to include appropriate space and facilities for recycling and green waste receptacles/systems  
   - **Implementing Agencies:** COB SWMD  
   - **Funding Source:** Waste collection fees, grants  
   - **Timeline:**  
     - Short Term (2009-10): X  
     - Medium Term (2010-2015):  
     - Long Term (2015-2020):  

5. Enact a local ordinance requiring managers of multi-family buildings to provide tenants with the opportunity to recycle, including the provision of the appropriate receptacles and tenant education  
   - **Implementing Agencies:** COB SWMD, building managers, COB SWMD, building managers, potential requirement at state-level  
   - **Funding Source:** Waste collection fees, grants  
   - **Timeline:**  
     - Short Term (2009-10):  
     - Long Term (2015-2020):  

6. Integrate a “waste audit” into local efforts to conduct residential energy audits, such as the Rising Sun Energy Center’s California Youth Energy Services program  
   - **Implementing Agencies:** COB SWMD, RSEC  
   - **Funding Source:** Waste collection fees, grants  
   - **Timeline:**  
     - Short Term (2009-10):  
     - Medium Term (2010-2015):  

## WRR 2. Goal: Increase recycling, composting & waste reduction in the commercial sector

### A. Enhance recycling and composting outreach and assistance to local businesses

1. Provide on-site assistance and containers for building managers and owners to set up recycling and composting systems  
   - **Implementing Agencies:** COB SWMD  
   - **Funding Source:** Waste collection fees, grants  
   - **Timeline:**  
     - Short Term (2009-10): X  
     - Long Term (2015-2020):  

2. Design model lease language that outlines the responsibility of building managers to provide recycling systems and of commercial tenants to recycle waste  
   - **Implementing Agencies:** COB SWMD, building managers, StopWaste.Org, local business associations  
   - **Funding Source:** Waste collection fees, grants  
   - **Timeline:**  
     - Short Term (2009-10):  
     - Long Term (2015-2020):  

3. Partner with the Chamber of Commerce, the Sustainable Business Association and other business associations to conduct expanded marketing and outreach to local business owners  
   - **Implementing Agencies:** COB SWMD, business associations  
   - **Funding Source:** Grants, in-kind contributions  
   - **Timeline:**  
     - Short Term (2009-10):  
     - Medium Term (2010-2015):  

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Appendix A – City of Berkeley Climate Action Plan
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<tr>
<td>4.</td>
<td>Design and administer recycling and composting training sessions for local building maintenance companies</td>
<td>COB SWMD</td>
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<tr>
<td>5.</td>
<td>Refer large businesses to StopWaste.Org’s recycling partnership program, which provides free waste analysis and consulting services for waste reduction</td>
<td>COB SWMD, StopWaste.Org</td>
<td>StopWaste.Org</td>
<td></td>
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<tr>
<td>6.</td>
<td>Enact a local ordinance requiring managers of commercial buildings to provide commercial tenants with the opportunity to recycle, including the provision of shared storage containers and tenant education</td>
<td>COB SWMD, building managers, potential requirement at state-level</td>
<td></td>
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<tr>
<td>7.</td>
<td>Utilize the interaction between the City government and local businesses at the time a business license is issued to distribute resources and information regarding setting up recycling and composting systems</td>
<td>COB SWMD, COB Finance Dept.</td>
<td>COB</td>
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<td>X</td>
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<tr>
<td>8.</td>
<td>Design and implement more effective space allocation ordinance to ensure that new and remodeled buildings provide adequate space for storage of recycled materials</td>
<td>COB SWMD, COB DP&amp;D</td>
<td>COB Refuse Fund, grants</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>9.</td>
<td>Continue to promote participation in the Alameda County Green Business Program</td>
<td>COB SWMD, COB OED, Alameda County Green Business Program</td>
<td>Grants, other COB funding</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>10.</td>
<td>Identify and implement opportunities to assist local businesses to aggregate purchasing power for the purchase of sustainable product alternatives such as compostable take out fare and reusable bags</td>
<td>COB SWMD, COB OED</td>
<td></td>
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</tr>
<tr>
<td>11.</td>
<td>Work with franchised haulers, private recycling companies, and their customers to identify opportunities to recycle and reduce waste in the commercial sector</td>
<td>COB SWMD</td>
<td>COB Refuse Fund</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

B. Make recycling and composting mandatory at public events and provide more public recycling containers

| 1. | Continue to require recycling plans and to provide recycling containers and assistance to public event organizers upon request | COB SWMD, COB Health and Human Services Dept. | COB Refuse Fund, grants | X | X | X |
| 2. | Prepare a recycling guide for local event organizers/planners | COB SWMD, StopWaste.Org | COB Refuse Fund | | | X |
| 3. | Provide more public recycling containers on commercial corridors and in parks and public places and create a system for collecting these recyclables | COB SWMD, COB Parks, Rec. & Waterfront Dept. | COB Refuse Fund, grants | | X | X |
| 4. | Explore the feasibility of providing composting receptacles in the public right of way | COB SWMD, COB Parks, Rec. & Waterfront Dept. | | | | X |

WRR 3. Goal: Increase recycling of construction & demolition (C&D) debris

A. Enhance C&D recycling outreach and assistance to improve enforcement of existing ordinance and convenience of compliance for local builders

| 1. | Promote deconstruction and reuse of building materials through written outreach materials such as a brochure on residential remodeling and through direct consultations with builders | COB DP&D, COB SWMD | COB Refuse Fund, grants | X | X |
|--------|------------------------------------------------------------------------------------|-----------------------|----------------|----------------------|------------------------|-----------------------|
| 2.     | Pending site design and feasibility analysis, create capacity to process C&D materials at new Berkeley Transfer Station | COB SWMD              |                |                      |                        | X                     |

**WRR 4. Goal: Expand local capacity to process recycled materials**

* A. Rebuild the Berkeley Transfer Station and material recovery facility into a state-of-the-art Zero Waste facility in order to increase local capacity to recover a high percentage of recyclable materials

1. Conduct a feasibility study that results in recommendations regarding the design of a rebuilt Transfer Station and material recovery facility as well as recommendations regarding what types of waste-processing equipment and material recovery systems to incorporate
   - COB DPW
   - X

2. As part of the Transfer Station rebuild, examine the costs and benefits of installing a “single-stream” sorting system, or a sorting system that can accept both single and dual-stream recyclables
   - COB SWMD
   - X

* B. Expand the types of materials that can be recycled locally and identify local markets for recycled products

1. Evaluate the feasibility of partnering with EBMUD to divert commercial food waste to its anaerobic digester
   - COB SWMD, East Bay Municipal Utility District, StopWaste.Org
   - X

2. Expand the types of materials that are collected for recycling as soon as a local, environmentally sound market for the materials is found
   - COB SWMD
   - COB Refuse Fund
   - X

3. Investigate additional options to sell recycled materials for domestic use, rather than for export
   - COB SWMD
   - COB Refuse Fund
   - X

**WRR 5. Goal: Expand efforts to eliminate waste at its source**

* A. Encourage the use of reusable bags at local retail locations

1. Institute a ban on plastic bags and establish a fee on paper shopping bags at Berkeley retail locations
   - COB SWMD
   - COB Refuse Fund
   - X

2. Explore bulk purchase of reusable bags with the City’s Office of Economic Development (OED), coordinating with the Buy Local Berkeley program
   - COB OED, COB SWMD, local business associations
   - Grants
   - X

* B. Increase producer responsibility for product waste and packaging

1. Evaluate options and opportunities for extending producer responsibility for product waste at the local level
   - COB SWMD, COB Finance Dept. (Purchasing)
   - COB
   - X

2. Support policies at the state level that provide incentives for efficient product design, reduced product and packaging waste, and elimination of toxics in the discard stream through mandatory compliance programs
   - COB SWMD
   - COB
   - X

3. In collaboration with the Chamber of Commerce and other business associations, enhance outreach and education to local businesses about the waste embodied in products and packaging and support local manufacturers’ efforts to reduce packaging
   - COB SWMD, StopWaste.Org, business associations
   - Regional agency funding
   - X
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<tbody>
<tr>
<td>C. Continue to promote reuse and repair businesses and organizations</td>
<td>Promote the utilization of reuse and repair businesses in outreach to businesses and residents</td>
<td>COB SWMD, various reuse/repair organizations</td>
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<td></td>
<td>Explore the feasibility of initiating a local “excess harvest program” in which residents are encouraged to donate excess produce from gardens and fruit trees to local food banks and homeless assistance programs</td>
<td>COB SWMD, Community Gardening Collaborative, community partners</td>
<td></td>
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<tr>
<td>WRR 6. Revise the City solid waste disposal rate structure in order to maintain and enhance incentives, outreach programs and other activities designed to increase waste diversion</td>
<td>Update solid waste disposal billing rates to cover costs of providing basic refuse, recycling and composting service to the community</td>
<td>COB SWMD</td>
<td>COB Refuse Fund</td>
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<td></td>
<td>Review the service impacts and operational and financial aspects of offering every-other-week residential refuse service</td>
<td>COB SWMD</td>
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<tr>
<td>WRR 7. Goal: Increase recycling, composting, and waste reduction in public institutions</td>
<td>Ensure that every City department is equipped with the appropriate recycling containers and undergoes basic training on how and where to recycle</td>
<td>COB SWMD, all City departments</td>
<td>COB Refuse Fund</td>
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<td></td>
<td>Initiate a recognition program to encourage City departments to recycle 100 percent of recyclable materials</td>
<td>COB SWMD, all City departments</td>
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<td></td>
<td>Ensure that all City departments coordinate event planning with the City’s Solid Waste Management Division</td>
<td>COB SWMD, all City departments</td>
<td>COB Refuse Fund, grants</td>
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<tr>
<td></td>
<td>Limit the use of single-use plastic beverage bottles in City buildings and at City events</td>
<td>COB City Manager's Office</td>
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<tr>
<td></td>
<td>Track City government paper use and limit its consumption by making duplex the default setting for printers and by encouraging the electronic distribution of documents whenever possible</td>
<td>COB Finance Dept., COB Dept of Information Technology, COB SWMD</td>
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<tr>
<td>B. Sustain and enhance waste diversion efforts at the Berkeley Unified School District</td>
<td>Support BUSD efforts to identify a funding source for ongoing staffing in support of waste diversion systems in schools</td>
<td>BUSD, COB SWMD</td>
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<tr>
<td>WRR 8. Goal: Enhance and expand marketing, outreach, and education regarding waste reduction and recycling</td>
<td>Incorporate information about waste reduction services into expanded marketing and outreach print and web-based materials, including City and partner agency</td>
<td>COB SWMD, StopWaste.Org, various community partners</td>
<td>COB Refuse Fund, grants</td>
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<tr>
<td>2.</td>
<td>newsletters, the City website, and door-to-door marketing</td>
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<tr>
<td>3.</td>
<td>Include waste diversion resources and information in a “welcome basket” for new Berkeley homeowners and renters</td>
<td><strong>COB SWMD</strong></td>
<td></td>
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<tr>
<td>3.</td>
<td>Enhance the City Solid Waste Division website to serve as a one-stop web portal for waste diversion resources</td>
<td><strong>COB SWMD, StopWaste.Org</strong></td>
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</tbody>
</table>
Adapting to a Changing Climate: Implementation Table

Key to Acronyms:

**COB**  City of Berkeley  
**DP&D**  Department of Planning & Development  
**DPW**  Department of Public Works  
**EBMUD**  East Bay Municipal Utility District

Lead implementing agency is in **BOLD**. Where possible, City staff identified a funding source for all short-term implementing actions.
### ADP I. Goal: Make Berkeley resilient to the impacts of climate change

#### A. Launch and sustain a collaborative process for increasing Berkeley’s and the region’s preparedness for climate change impacts

1. In collaboration with neighboring cities and relevant regional and state agencies, conduct an assessment of Berkeley’s (and the region’s) vulnerability to climate change impacts

   - **Implementing Actions**: COB DP&D, State Climate Action Team, various regional and community partners
   - **Implementing Agencies**: COB DP&D, various state, regional and community partners
   - **Funding Source**: N/A
   - **Short Term (2009-10)**: X
   - **Medium Term (2010-2015)**: X
   - **Long Term (2015-2020)**: X

2. Develop and implement a strategic plan for climate change adaptation

   - **Implementing Actions**: COB DP&D, various state, regional and community partners
   - **Implementing Agencies**: COB DP&D, various state, regional and community partners
   - **Funding Source**: N/A
   - **Short Term (2009-10)**: X
   - **Medium Term (2010-2015)**: X
   - **Long Term (2015-2020)**: X

#### B. In preparation for the impacts of climate change on the region’s water resources, partner with local, regional, and state agencies to encourage water conservation and efficiency and expand and diversify the water supply

1. Examine the potential of developing new, local groundwater sources for various purposes, including irrigation, showers, and toilets

   - **Implementing Actions**: EBMUD, COB DP&D
   - **Implementing Agencies**: EBMUD, COB DP&D
   - **Funding Source**: N/A
   - **Short Term (2009-10)**: X

2. Encourage water recycling and gray water use through the development of outreach materials and local guidelines that are consistent with the Building Code

   - **Implementing Actions**: EBMUD, COB DP&D
   - **Implementing Agencies**: EBMUD, COB DP&D
   - **Funding Source**: N/A
   - **Short Term (2009-10)**: X

3. Partner EBMUD to provide and market incentives for residents, businesses and institutions to conserve water

   - **Implementing Actions**: EBMUD, COB DP&D, various community partners
   - **Implementing Agencies**: EBMUD, COB DP&D, various community partners
   - **Funding Source**: N/A
   - **Short Term (2009-10)**: X

4. Encourage the use of water conservation technologies, such as waterless urinals and cisterns, through the development of local guidelines that are consistent with the Building Code

   - **Implementing Actions**: COB DP&D, EBMUD
   - **Implementing Agencies**: COB DP&D, EBMUD
   - **Funding Source**: N/A
   - **Short Term (2009-10)**: X

5. Partner with agencies such as EBMUD and StopWaste.org to encourage private property owners and public agencies (including the City government) to use sustainable landscaping techniques that require less water and energy to maintain

   - **Implementing Actions**: EBMUD, StopWaste.org, COB DP&D, various community partners
   - **Implementing Agencies**: EBMUD, StopWaste.org, COB DP&D, various community partners
   - **Funding Source**: N/A
   - **Short Term (2009-10)**: X

6. In collaboration with community partners, increase public awareness by including information on climate change impacts to water supplies and riparian and coastal habitats and on how residents and businesses can use water more efficiently in various newsletters and newspapers and on City and partner websites, among other places

   - **Implementing Actions**: EBMUD, COB DP&D, StopWaste.org, various community partners
   - **Implementing Agencies**: EBMUD, COB DP&D, StopWaste.org, various community partners
   - **Funding Source**: N/A
   - **Short Term (2009-10)**: X

#### C. In preparation for rising sea-levels and more severe storms, partner with local, regional and state agencies to reduce the property damage associated with flooding and coastal erosion

1. Use development review to ensure that new development does not contribute to an increase in flood potential

   - **Implementing Actions**: COB DP&D
   - **Implementing Agencies**: COB DP&D
   - **Funding Source**: N/A
   - **Short Term (2009-10)**: X

2. Design public improvements such as streets, parks and plazas, for retention and infiltration of stormwater by diverting urban runoff to bio-filtration systems such as greenscapes

   - **Implementing Actions**: COB DP&D, COB DPW, COB Dept. of Parks, Rec & Waterfront
   - **Implementing Agencies**: COB DP&D, COB DPW, COB Dept. of Parks, Rec & Waterfront
   - **Funding Source**: N/A
   - **Short Term (2009-10)**: X
   - **Medium Term (2010-2015)**: X
   - **Long Term (2015-2020)**: X

---

Appendix A – City of Berkeley Climate Action Plan
<table>
<thead>
<tr>
<th>Policy</th>
<th>Implementing Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
<td>Expand local tree planning efforts and continue to maintain the health of existing trees by providing local outreach and guidelines for residents, businesses and public institutions</td>
</tr>
<tr>
<td></td>
<td>COB Dept. of Parks, Rec &amp; Waterfront, COB DP&amp;D</td>
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<td>COB COB</td>
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<td>4.</td>
<td>Maximize permeable surfaces in both greenscape and hardscape areas for retention and infiltration of stormwater</td>
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<tr>
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<td>COB DP&amp;D, COB DPW, COB Dept. of Parks, Rec &amp; Waterfront</td>
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<td>COB COB</td>
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<tr>
<td>5.</td>
<td>Encourage the development of green roofs by providing local outreach and guidelines consistent with the Building Code</td>
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<tr>
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<td>COB DP&amp;D</td>
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<td>COB COB</td>
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</table>

D. In preparation for more extreme heat events, partner with local, regional and state agencies to protect and increase urban tree cover

<table>
<thead>
<tr>
<th>Policy</th>
<th>Implementing Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Expand local tree planning efforts and continue to maintain the health of existing trees by providing local outreach and guidelines for residents, businesses and public institutions (same as above)</td>
</tr>
<tr>
<td></td>
<td>COB Dept. of Parks, Rec &amp; Waterfront, COB DP&amp;D</td>
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<td>COB COB</td>
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<tr>
<td>2.</td>
<td>Consider developing street tree master plans for sub-areas within the City</td>
</tr>
<tr>
<td></td>
<td>COB Dept. of Parks, Rec &amp; Waterfront</td>
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<tr>
<td></td>
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<tr>
<td>3.</td>
<td>Consider developing a vegetation and fuel management plan in parts of the City designated as high fire hazard areas</td>
</tr>
<tr>
<td></td>
<td>COB Dept. of Parks, Rec &amp; Waterfront</td>
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</table>
Community Outreach & Empowerment: Implementation Table

Key to Acronyms:

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>BAAQMD</td>
<td>Bay Area Air Quality Management District</td>
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<tr>
<td>BUSD</td>
<td>Berkeley Unified School District</td>
</tr>
<tr>
<td>COB</td>
<td>City of Berkeley</td>
</tr>
<tr>
<td>DP&amp;D</td>
<td>Department of Planning &amp; Development</td>
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<tr>
<td>EBMUD</td>
<td>East Bay Municipal Utility District</td>
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<tr>
<td>LBNL</td>
<td>Lawrence Berkeley National Laboratory</td>
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<tr>
<td>OED</td>
<td>Office of Economic Development</td>
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<tr>
<td>PTA</td>
<td>Parent Teacher Association</td>
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<tr>
<td>UCB</td>
<td>University of California, Berkeley</td>
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</table>

Lead implementing agency is in **BOLD**. Where possible, City staff identified a funding source for all short-term implementing actions.
### Implementation Timeline

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<tbody>
<tr>
<td>COE 1. Goal: Mobilize the community at large to turn the climate plan into climate action</td>
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<tr>
<td>A. Establish an implementation framework that enables the City to more efficiently and effectively distribute information and resources to a wide range of community partners and to report progress on achieving the goals outlined in this plan</td>
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<tr>
<td>1. Design a climate action “stakeholder database” that identifies the many stakeholders that are playing or will play a role in implementing local climate protection strategies</td>
<td>COB DP&amp;D</td>
<td>BAAQMD, grants</td>
<td>X</td>
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<tr>
<td>2. Establish community working groups that take ownership for mobilizing a given group of individuals or sector of the community or for promoting a given climate protection program</td>
<td>COB DP&amp;D, various community partners</td>
<td>BAAQMD, grants</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>3. Launch and maintain a web-based portal that enables reporting and tracking of GHG reduction efforts on both an individual and community-wide basis</td>
<td>COB DP&amp;D</td>
<td>BAAQMD, grants</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>4. Provide an annual report to City Council that highlights community climate protection actions and progress toward the Measure G goals</td>
<td>COB DP&amp;D</td>
<td>COB</td>
<td>X</td>
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<tr>
<td>B. Launch a coordinated outreach and education campaign, utilizing a range of tools, programs and partnerships, to mobilize residents</td>
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<tr>
<td>1. Promote the Berkeley Climate Action Pledge as a means by which individuals can commit to reducing their own emissions</td>
<td>COB DP&amp;D</td>
<td>COB</td>
<td>X</td>
<td></td>
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<tr>
<td>2. Support local efforts to launch a &quot;local carbon offset&quot; project</td>
<td>Ecology Center, KyotoUSA, COB DP&amp;D</td>
<td>Grants</td>
<td>X</td>
<td>X</td>
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<tr>
<td>3. In collaboration with community partners, develop and implement a public information strategy that serves to highlight climate-related information and resources in multiple mailings, newsletters and local media outlets, including radio, television and news publications</td>
<td>COB DP&amp;D, COB City Manager’s Office, local media outlets, various community partners</td>
<td></td>
<td>X</td>
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<tr>
<td>4. Partner with Berkeley’s network of neighborhood associations to hold various community workshops and events focused on reducing GHG emissions at the neighborhood level</td>
<td>COB DP&amp;D, COB City Manager’s Office, various community partners</td>
<td>COB</td>
<td>X</td>
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<tr>
<td>5. Partner with the Ecology Center and others to promote the Low Carbon Diet program as means for helping households reduce their GHG emissions</td>
<td>Ecology Center, COB DP&amp;D</td>
<td>Grants, COB</td>
<td>X</td>
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<tr>
<td>6. In collaboration with community partners, launch a “Green Neighborhood Challenge” and “Green Star Household” program</td>
<td>COB DP&amp;D, various community partners</td>
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<tr>
<td>7. Partner with PG&amp;E to provide residents with monthly personalized energy consumption reports</td>
<td>COB DP&amp;D, PG&amp;E</td>
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<tr>
<td>8. Educate Berkeley residents and employees about the significant environmental impact of air travel and about potential travel-mode alternatives</td>
<td>COB DP&amp;D</td>
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<td>9.</td>
<td>In partnership with the Berkeley Board of Realtors, design a &quot;welcome package&quot; for new homeowners and business owners that includes resources related to energy use, transportation choices, and waste diversion and reduction</td>
<td>COB DP&amp;D, Berkeley Board of Realtors</td>
<td></td>
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<tr>
<td>10.</td>
<td>Hold speaker series' and other educational events at the Berkeley Public Library</td>
<td>Berkeley Public Library, COB DP&amp;D</td>
<td>COB</td>
<td>X</td>
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</tr>
<tr>
<td>11.</td>
<td>Partner with the Civic Arts Commission to encourage and fund art projects that serve to heighten awareness of the climate issue</td>
<td>Civic Arts Commission, COB DP&amp;D</td>
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<tr>
<td>12.</td>
<td>Partner with biologists, botanists, and other scientists to raise awareness regarding the impact of climate change on local ecosystems</td>
<td>COB DP&amp;D, UCB, LBNL, other community partners</td>
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**COE 2. Goal: Enhance outreach and incentives to the business community**

*Continue to showcase effective climate protection efforts in the business community and to engage additional businesses in the local climate protection effort*

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<tbody>
<tr>
<td>1.</td>
<td>Continue to promote participation in the Alameda County Green Business Program and enhance the program's ability to efficiently administer the green business certification process and track GHG-related metrics</td>
<td>Green Business Program, COB OED</td>
<td>COB, various other funding sources</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>2.</td>
<td>Expand the local green economy through the East Bay Green Corridor Partnership</td>
<td>Office of the Mayor, COB OED, neighboring cities, UC Berkeley, LBNL</td>
<td>COB, various other funding sources</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>3.</td>
<td>In collaboration with local business associations and merchants, continue to expand and promote the Buy Local Berkeley Campaign</td>
<td>Local business associations, COB OED</td>
<td>COB, various other funding sources</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4.</td>
<td>Recognize and celebrate the environmental leadership of local businesses, business associations, and community groups</td>
<td>COB OED, local business associations, other community partners</td>
<td>COB, various other funding sources</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**COE 3. Goal: Enhance climate change-related education at local schools**

*Continue to showcase existing climate protection efforts in our schools and to expand the opportunities students have to learn about and take action on climate change*

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Integrate climate-related activities and education into existing after school programs such as Berkeley LEARNS (Links Enrichment, Academics, and Recreational Needs to Students)</td>
<td>COB Dept. of Parks, Rec &amp; Waterfront, BUSD</td>
<td>COB, BUSD</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Partner with Parent Teacher Associations (PTAs) to promote programs such as the Low Carbon Diet and to integrate climate-related information into school gatherings and fairs</td>
<td>BUSD, PTAs, COB DP&amp;D</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>3.</td>
<td>In collaboration with community partners, support Berkeley High School's School of Social Justice and Ecology by providing internship opportunities and climate-related resources to integrate into its curriculum</td>
<td>COB DP&amp;D, other City departments</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>----------------------</td>
<td>-----------------------</td>
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</tr>
<tr>
<td>4.</td>
<td>In collaboration with UC Berkeley, provide internships and educational programs to K – 12 students on topics related to climate science and on impacts of climate change on the community and local ecosystems</td>
<td>UCB, COB DP&amp;D, BUSD</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

**COE 4. Goal: Increase awareness in the City government**

A. Launch a sustained effort to increase awareness in the City government regarding the climate issue and to provide training on how to achieve increased sustainability at home and in the workplace

1. Hold regular "brown bag" events for each City department on various topics related to the climate change issue and on actions employees can take to reduce their own GHG emissions
   - Implementing Agencies: COB DP&D, other City departments
   - Funding Source: COB
   - Implementation Timeline: X X X

2. Establish “Sustainability at Work and at Home” class as part of the required City of Berkeley Core Courses for City employees
   - Implementing Agencies: COB and various local higher education institutions
   - Funding Source: COB
   - Implementation Timeline: X

3. Establish energy consumption reduction targets for each City department and provide assistance in achieving those targets
   - Implementing Agencies: COB DP&D, all City departments
   - Funding Source: COB
   - Implementation Timeline: X

4. Establish recycling and composting systems in each City building and recycling training for employees and maintenance staff
   - Implementing Agencies: COB Solid Waste Management Division
   - Funding Source: COB
   - Implementation Timeline: X
Appendix B:

The Berkeley Climate Action Pledge

I, _______________________, will address the climate crisis by taking responsibility for my greenhouse gas emissions. I pledge to reduce my greenhouse gas emissions by at least 10% within one year and 2% every year after that.

Name:

Signature:

Address:

Email Address:

Take the pledge today!

Email your pledge to MeasureG@ci.berkeley.ca.us or take the pledge on-line at www.BerkeleyClimateAction.org
Appendix C

My Very Own Climate Action Plan

The City of Berkeley will reach its greenhouse gas (GHG) emissions reduction target only when every individual does his/her part to save energy, reduce waste and drive less. Put together your own climate action plan using some of the steps listed below. For additional ideas and resources, visit the City’s climate action website at: [www.BerkeleyClimateAction.org](http://www.BerkeleyClimateAction.org)

<table>
<thead>
<tr>
<th>Easy Actions</th>
<th>Estimated Percent of Average Household’s GHG emissions reduced</th>
<th>Pounds of GHGs eliminated each year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace one out of every five (non-commute) auto trips with bike, bus, walking or BART every week</td>
<td>6%</td>
<td>530</td>
</tr>
<tr>
<td>Replace your drive to work with a bike, bus, walking, or BART commute one day per week</td>
<td>5%</td>
<td>445</td>
</tr>
<tr>
<td>Replace all incandescent and halogen light bulbs with Compact Fluorescents (CFLs) and turn off unused lights</td>
<td>3%</td>
<td>265</td>
</tr>
<tr>
<td>Upgrade to a water-saver (2.5 gallons per minute) showerhead</td>
<td>3%</td>
<td>265</td>
</tr>
<tr>
<td>Dry your clothes on the line during the warmest half of the year</td>
<td>2%</td>
<td>180</td>
</tr>
<tr>
<td>Dry your clothes on an indoor drying rack during the other half of the year</td>
<td>2%</td>
<td>180</td>
</tr>
<tr>
<td>Turn your water heater down to 120 degrees</td>
<td>2%</td>
<td>180</td>
</tr>
<tr>
<td>Wash clothes in cold water rather than hot</td>
<td>2%</td>
<td>180</td>
</tr>
<tr>
<td>Replace your 20 year old refrigerator with a new ENERGY STAR model</td>
<td>2%</td>
<td>180</td>
</tr>
<tr>
<td>Plug all electronics into power strips and switch off when not in use (including cell phone and other chargers, TV, VCR/DVD, stereos, etc.)</td>
<td>1%</td>
<td>90</td>
</tr>
<tr>
<td>Watch half as much TV each day</td>
<td>1%</td>
<td>90</td>
</tr>
<tr>
<td>Keep car tires inflated (significantly improves your gas mileage)</td>
<td>1%</td>
<td>90</td>
</tr>
<tr>
<td>Get a FREE Home Energy Audit from CYES, for more info visit: <a href="http://www.risingsunenergy.org">www.risingsunenergy.org</a></td>
<td>2%-10%</td>
<td>180-900</td>
</tr>
</tbody>
</table>
### Intermediate Actions

<table>
<thead>
<tr>
<th>Action</th>
<th>Estimated Percent of Avg. Household’s GHG emissions reduced</th>
<th>Pounds of GHGs eliminated each year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Join a car sharing organization rather than purchasing (or keeping) a second car for your household</td>
<td>10-20%</td>
<td>890-1800</td>
</tr>
<tr>
<td>Apply weather stripping to doors and windows</td>
<td>5%</td>
<td>445</td>
</tr>
<tr>
<td>Upgrade your attic insulation to 12 inches</td>
<td>5%</td>
<td>445</td>
</tr>
<tr>
<td>Reduce amount of weekly waste by at least one garbage bag (buy products with less packaging, bring your own bag to the grocery store, compost your food scraps and yard clippings etc.)</td>
<td>2-5%</td>
<td>180-445</td>
</tr>
<tr>
<td>Join a Low Carbon Diet group to teach friends, neighbors, family and/or community members about some of the tips on this handout as well as those featured in “The Low Carbon Diet” by David Gershon. For more info: <a href="http://www.ecologycenter.org">www.ecologycenter.org</a></td>
<td>10-50% or more</td>
<td>890-4430 and up</td>
</tr>
</tbody>
</table>

### Advanced Actions

<table>
<thead>
<tr>
<th>Action</th>
<th>Estimated Percent of Avg. Household’s GHG emissions reduced</th>
<th>Pounds of GHGs eliminated each year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sell your car (it is the single biggest source of most Berkeley residents’ greenhouse gas emissions) and, if desired, join a car share organization.</td>
<td>30-45%</td>
<td>2660-4000</td>
</tr>
<tr>
<td>Install a solar photovoltaic system</td>
<td>15-40%</td>
<td>1330-3550</td>
</tr>
<tr>
<td>Install a solar hot water system</td>
<td>10-15%</td>
<td>900-1330</td>
</tr>
<tr>
<td>Replace old single-pane windows with dual-pane windows</td>
<td>10%</td>
<td>900</td>
</tr>
<tr>
<td>Start a Low Carbon Diet group and get 5-10 others involved (see intermediate section for more info)</td>
<td>10-50%</td>
<td>890-4430 and up</td>
</tr>
</tbody>
</table>

Percentages and other numerical values are approximations based off of national and local averages. They are here to give you a rough estimate of the impacts of your actions.
The Cal Climate Action Partnership (CalCAP) is a collaboration of faculty, administration, staff and students working to reduce greenhouse gas (GHG) emissions at UC Berkeley. Facilitation of CalCAP activities is part of the responsibilities of the campus Office of Sustainability. CalCAP’s focus is to develop a strategy and methods for significantly reducing UC Berkeley’s GHG footprint without compromising the operations and mission of the University.

Greenhouse Gas Emissions Reduction Target
The UC Berkeley campus has committed to reducing its greenhouse gas (GHG) emissions to reach 1990 levels by the year 2014 – a goal that is six years earlier than State of California and the UC requires. The eventual target of CalCAP is to achieve climate neutrality – defined in the UC Policy on Sustainable Practices as reducing GHG emissions through mitigation strategies so as to have a net zero impact on the Earth’s climate.

Greenhouse Gas Emissions Inventory
UC Berkeley reports on ten emissions sources that include: electricity consumption, steam use, natural gas consumption, the university fleet, student commuting, faculty and staff commuting, business air travel, fugitive emissions from coolants, solid waste, and water use. Greenhouse gas inventories reveal that electricity and steam usage account for over 70% of campus emissions and close to 80% of our emissions are associated with campus buildings. The majority of the remaining emissions come from campus related travel. The campus reports its GHG inventory annually to both the California Climate Action Registry (CCAR) and the American College and University Presidents Climate Commitment (ACUPCC) and makes it available to the public. Third party verification of the inventory is completed as part of the CCAR reporting process.

Climate Planning & Emissions Mitigation Strategies
The 2009 Climate Action Plan documents how the campus plans to reduce its GHG emissions by one-third and eventually achieve climate neutrality. The Plan examines how far the campus has come in the last two years to meet its ambitious emissions reduction goal and begins to explore areas that still need deeper
analysis, decision-making, and implementation. Over the last year, the campus has begun implementation of some reduction projects and committed to additional energy efficiency GHG reduction projects through a Strategic Energy Plan. These new projects, along with other infrastructure and behavioral projects identified in the 2007 CalCAP Feasibility Study, are predicted to accomplish about half of what is needed to meet the 2014 target. The 2009 Climate Action Plan identifies new potential strategies to accomplish the 2014 target and expands the discussion on climate neutrality. The Plan calls for the campus to make its next interim GHG reduction target for the year 2020 or 2025 by 2011.

For More Information contact UC Berkeley’s Office of Sustainability
sustainability@berkeley.edu; 510-642-0074
http://sustainability.berkeley.edu/calcap/sustain

CONTACT:
Kira Stoll
Office of Sustainability
stoll@berkeley.edu
510-642-0074
## EMISSION SCENARIO PROJECTIONS (metric tons)

### SECTOR & SCENARIO

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electricity</td>
<td>10.9%</td>
<td>80.0%</td>
<td>45,806</td>
<td>40,822</td>
<td>37,304</td>
<td>33,795</td>
<td>30,268</td>
<td>26,751</td>
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<tr>
<td>% reduction below 2000 levels</td>
<td>10.9%</td>
<td>80.0%</td>
<td>129,971</td>
<td>111,777</td>
<td>102,245</td>
<td>92,714</td>
<td>83,163</td>
<td>73,651</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>14.0%</td>
<td>80.0%</td>
<td>14.0%</td>
<td>21.3%</td>
<td>28.7%</td>
<td>36.0%</td>
<td>43.3%</td>
<td>50.7%</td>
</tr>
<tr>
<td>% reduction below 2000 levels</td>
<td>14.0%</td>
<td>80.0%</td>
<td>176,778</td>
<td>152,589</td>
<td>138,550</td>
<td>126,501</td>
<td>113,451</td>
<td>100,402</td>
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<tr>
<td>SUBTOTAL EMISSIONS (metric tons)</td>
<td>13.2%</td>
<td>80.0%</td>
<td>183,063</td>
<td>157,746</td>
<td>144,286</td>
<td>130,827</td>
<td>117,367</td>
<td>103,908</td>
</tr>
<tr>
<td>% reduction below 2000 levels</td>
<td>13.8%</td>
<td>80.0%</td>
<td>273,033</td>
<td>265,544</td>
<td>242,106</td>
<td>218,669</td>
<td>195,231</td>
<td>171,794</td>
</tr>
<tr>
<td>Transportation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gasoline</td>
<td>3.9%</td>
<td>80.0%</td>
<td>175,888</td>
<td>169,031</td>
<td>154,159</td>
<td>139,285</td>
<td>124,413</td>
<td>109,541</td>
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<tr>
<td>% reduction below 2000 levels</td>
<td>3.9%</td>
<td>80.0%</td>
<td>97,145</td>
<td>90,012</td>
<td>87,948</td>
<td>79,383</td>
<td>70,818</td>
<td>62,253</td>
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<tr>
<td>Diesel</td>
<td>0.7%</td>
<td>80.0%</td>
<td>14.2%</td>
<td>21.5%</td>
<td>28.8%</td>
<td>35.9%</td>
<td>43.2%</td>
<td>50.6%</td>
</tr>
<tr>
<td>% reduction below 2000 levels</td>
<td>0.7%</td>
<td>80.0%</td>
<td>183,063</td>
<td>157,746</td>
<td>144,286</td>
<td>130,827</td>
<td>117,367</td>
<td>103,908</td>
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<tr>
<td>SUBTOTAL EMISSIONS (metric tons)</td>
<td>13.8%</td>
<td>80.0%</td>
<td>273,033</td>
<td>265,544</td>
<td>242,106</td>
<td>218,669</td>
<td>195,231</td>
<td>171,794</td>
</tr>
<tr>
<td>% reduction below 2000 levels</td>
<td>2.7%</td>
<td>11.3%</td>
<td>19.9%</td>
<td>28.5%</td>
<td>37.1%</td>
<td>45.7%</td>
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### TOTAL EMISSIONS

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<tr>
<th>% reduction increase</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
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<tr>
<td>Residential</td>
<td></td>
<td>91.1%</td>
<td>83.2%</td>
<td>75.3%</td>
<td>67.4%</td>
<td>59.5%</td>
<td>51.6%</td>
</tr>
<tr>
<td>Commercial</td>
<td></td>
<td>20.63%</td>
<td>13.2%</td>
<td>2.53%</td>
<td>5.00%</td>
<td>7.41%</td>
<td>9.76%</td>
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<tr>
<td>Transportation</td>
<td>3.9%</td>
<td>16.3%</td>
<td>3.9%</td>
<td>2.0%</td>
<td>3.9%</td>
<td>5.8%</td>
<td>7.6%</td>
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</table>

### Business As Usual Forecast

<table>
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<tr>
<th>% reduction increase</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>10.9%</td>
<td>10.9%</td>
<td>2%</td>
<td>4%</td>
<td>6%</td>
<td>8%</td>
<td>9%</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>14.0%</td>
<td>11.77%</td>
<td>2%</td>
<td>4%</td>
<td>6%</td>
<td>8%</td>
<td>9%</td>
</tr>
<tr>
<td>% increase above 2005 levels</td>
<td>16%</td>
<td>15%</td>
<td>12%</td>
<td>9%</td>
<td>6%</td>
<td>8%</td>
<td>9%</td>
</tr>
<tr>
<td>% increase above 2005 levels</td>
<td>16%</td>
<td>16%</td>
<td>16%</td>
<td>16%</td>
<td>16%</td>
<td>16%</td>
<td>16%</td>
</tr>
<tr>
<td>SUBTOTAL EMISSIONS (metric tons)</td>
<td>10.9%</td>
<td>10.9%</td>
<td>2%</td>
<td>4%</td>
<td>6%</td>
<td>8%</td>
<td>9%</td>
</tr>
<tr>
<td>% increase above 2005 levels</td>
<td>16%</td>
<td>15%</td>
<td>12%</td>
<td>9%</td>
<td>6%</td>
<td>8%</td>
<td>9%</td>
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### TOTAL EMISSIONS

<table>
<thead>
<tr>
<th>621,863</th>
<th>675,869</th>
<th>588,353</th>
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<th>614,109</th>
<th>627,474</th>
<th>641,011</th>
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<tbody>
<tr>
<td>Percent of 2000 Emissions</td>
<td>91.1%</td>
<td>97.2%</td>
<td>97.2%</td>
<td>97.2%</td>
<td>97.2%</td>
<td>97.2%</td>
</tr>
<tr>
<td>Percent increase above 05 GHGs</td>
<td>2.1%</td>
<td>4.2%</td>
<td>6.2%</td>
<td>8.2%</td>
<td>10.2%</td>
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## Summary of Targets, Projected Savings, Total Costs and Direct Savings

<table>
<thead>
<tr>
<th></th>
<th>Target Reduction</th>
<th>Projected Performance</th>
<th>Colateral Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Therms (1,000)</td>
<td>mWh</td>
<td>Motor fuels (1,000 gals.)</td>
</tr>
<tr>
<td><strong>Residential 2020</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction</td>
<td>6,338</td>
<td>58,724</td>
<td>-</td>
</tr>
<tr>
<td>Energy Efficiency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local renewables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Commercial 2020</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction</td>
<td>5,791</td>
<td>92,826</td>
<td>-</td>
</tr>
<tr>
<td>Energy Efficiency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local renewables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Transportation 2020</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>12,129</td>
<td>151,550</td>
<td>9,242</td>
</tr>
</tbody>
</table>

* Net present value

Climate protection, jobs, productivity, housing affordability and preservation, comfort, energy security, quality of life, air quality and public health
## Appendix F

### Summary of Targets, Projected Savings, Total Costs and Direct Savings

#### Assumptions

<table>
<thead>
<tr>
<th>Targets and Coefficients</th>
<th>Baseline</th>
<th>Sources/notes</th>
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<tbody>
<tr>
<td></td>
<td>Thems</td>
<td>kWh</td>
</tr>
<tr>
<td>Residential 2005 Actual</td>
<td>19,942.72</td>
<td>183,694.927</td>
</tr>
<tr>
<td>Residential 2020 Reduction</td>
<td>6,338.459</td>
<td>58,724.048</td>
</tr>
<tr>
<td>Commercial 2005 Actual</td>
<td>17,207.886</td>
<td>275,808.003</td>
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<tr>
<td>Commercial 2020 Reduction</td>
<td>5,790.840</td>
<td>92,626.396</td>
</tr>
<tr>
<td>Transportation 2005 Actual</td>
<td>28,258.745</td>
<td>296,000</td>
</tr>
<tr>
<td>Transportation 2020 Reduction</td>
<td>9,242.358</td>
<td>87,000</td>
</tr>
</tbody>
</table>

#### General Assumptions

<table>
<thead>
<tr>
<th>Metric tons/unit</th>
<th>Sources/notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thems</td>
<td>0.00559602 12.325 lbs/therm ICLEI</td>
</tr>
<tr>
<td>kWh</td>
<td>0.00022226 49 lbs/kWh ICLEI</td>
</tr>
<tr>
<td>kWh PV</td>
<td>0.00046686 CEC Clean Power Estimator</td>
</tr>
<tr>
<td>Gasoline</td>
<td>0.0031410 ICLEI</td>
</tr>
<tr>
<td>Annual kWh per AC CEC kW of PV</td>
<td>1,607 PV Watts @ NREL gov less 10% for discounted 1% annual performance degradation</td>
</tr>
<tr>
<td>PV Measure Life</td>
<td>25</td>
</tr>
<tr>
<td>Cost per therm solar thermal</td>
<td>$53 $8,000 for 64 sf system @ 2.5 therm/sf + 5% for maintenance</td>
</tr>
<tr>
<td>Solar Thermal measure life</td>
<td>35</td>
</tr>
<tr>
<td>Cost inflation</td>
<td>2%</td>
</tr>
<tr>
<td>Discount Rate</td>
<td>5%</td>
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</table>

#### RESIDENTIAL ASSUMPTIONS

<table>
<thead>
<tr>
<th>Gas efficiency measure life</th>
<th>Sources/notes</th>
</tr>
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<tbody>
<tr>
<td>Electric efficiency measure life</td>
<td>30 Change formula manually</td>
</tr>
<tr>
<td>Avoided cost per therm</td>
<td>$1.39 PG&amp;E 1/10/09</td>
</tr>
<tr>
<td>Avoided cost per kWh</td>
<td>$0.13 PG&amp;E 1/10/09 1.19 small, 1.95 large, Assumed more small in Berkeley</td>
</tr>
<tr>
<td>Avoided cost per PV kWh</td>
<td>$0.18</td>
</tr>
<tr>
<td>Cost per PV CEC AC kW plus maintenance</td>
<td>$12,000 Clean Power Estimator ($11) plus discounted inverter</td>
</tr>
<tr>
<td>Annual PV performance degradation</td>
<td>0.68% Deduct of 5% (discounted lifetime) from PV Watts production values</td>
</tr>
<tr>
<td>Therm inflation</td>
<td>4%</td>
</tr>
<tr>
<td>kWh inflation</td>
<td>3%</td>
</tr>
<tr>
<td>Single Family Units</td>
<td>21,854 2000 census</td>
</tr>
<tr>
<td>Multi Family Units</td>
<td>24,920 2000 census</td>
</tr>
<tr>
<td></td>
<td>Energy per dwelling unit</td>
</tr>
</tbody>
</table>
|                   | Reduction | 40% | 30% (8K)
| Cost/Single family | 10,000 Retrofit costs per CA Building Performance Contractors Assoc. |
| Cost/Multi Family | 2,000 Retrofit costs per CA Building Performance Contractors Assoc. |
| PV installed capacity (CEC AC kW) | 1.33 CH2M Hill Solar Map: 2.383 MM of structurally unshaded less 30% tree shaded x 85% residential, 1/2 PV, 1/2 thermal. For PV x 10/watts $ 81% for CEC AC, For thermal, 2.6 therm/sf. |
| Total PV potential (CEC AC kW) | 5,300 CH2M Hill |
| Solar thermal potential (thermas) | 1,600,000 CH2M Hill |
| Energy efficiency market penetration | 80% |
| Solar PV market penetration | 7% |
| Solar thermal market penetration | 7% |

#### COMMERCIAL ASSUMPTIONS

<table>
<thead>
<tr>
<th>Gas efficiency measure Life</th>
<th>Sources/notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric efficiency measure Life</td>
<td>15 Change formula manually</td>
</tr>
<tr>
<td>Avoided cost per therm</td>
<td>$1.15 PG&amp;E 1/1/09 1.19 small, 1.97 large, Assumes more small in Berkeley</td>
</tr>
<tr>
<td>Avoided cost per kWh</td>
<td>$0.15 2011 Estimated from CECS and Quest</td>
</tr>
<tr>
<td>Avoided cost per PV kWh</td>
<td>$0.18</td>
</tr>
<tr>
<td>Cost per PV AC kW with maintenance</td>
<td>$12,000 Clean Power Estimator plus discounted inverter</td>
</tr>
<tr>
<td>Annual PV performance degradation</td>
<td>0.80% Deduct of 5% (discounted lifetime) from PV Watts production values</td>
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<tr>
<td>Therm inflation</td>
<td>4%</td>
</tr>
<tr>
<td>kWh inflation</td>
<td>3%</td>
</tr>
<tr>
<td>Cost first year therm saved</td>
<td>$7.00 QuEST</td>
</tr>
<tr>
<td>Cost first year kW saved</td>
<td>$0.80 QuEST</td>
</tr>
<tr>
<td>PV installed capacity (CEC AC kW)</td>
<td>276 PG&amp;E and CEC thru 2008</td>
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</table>
RESOLUTION NO. 64,480–N.S.

ADOPTING THE PROPOSED NEGATIVE DECLARATION FOR THE BERKELEY
CLIMATE ACTION PLAN AND ADOPTING THE BERKELEY CLIMATE ACTION PLAN

WHEREAS, pursuant to the California Environmental Quality Act (CEQA) staff
conducted an Initial Study (Exhibit A) to determine whether the Climate Action Plan
would have any significant effects on the environment and found that no significant
effects would occur; and

WHEREAS, staff prepared a Negative Declaration (Exhibit A) for the Climate Action
Plan, which was posted on the City’s website and distributed to the public library and
the Permit Service Center as well as noticed in newspapers and through email
distribution lists; and for which the public comment period was open from April 24 to
May 26, 2009; and

WHEREAS, the amendments to the Climate Action Plan approved by City Council on
May 5, 2009, did not affect the analysis or the conclusions of the Initial Study of the
Climate Action Plan; and

WHEREAS, the City Council has considered the initial study and proposed Negative
Declaration together with comments received during the public review process, and finds
on the basis of the whole record that there is no substantial evidence the Climate Action
Plan may have a significant adverse effect on the environment, and that the Negative
Declaration reflects the lead agency’s independent judgment and analysis; and

WHEREAS, the weight of scientific authority has concluded that greenhouse gas
emissions caused by human activity are altering the Earth’s climate; and

WHEREAS, we recognize that the impacts associated with climate change, including
shrinking water resources, rising seas, and extreme heat events, put our residents at
serious risk and require immediate action at all levels; and

WHEREAS, the impacts of global warming often affect poor and minority communities
disproportionately; and

WHEREAS, local governments and the communities they represent are uniquely
capable of reducing the main sources of greenhouse gas emissions through policies
that increase access to sustainable mobility modes, increase energy efficiency and
reduce waste; and

WHEREAS, action taken to reduce greenhouse gas emissions have several important
co-benefits, including improved public health through reduced local air pollution, cost
savings associated with increased energy efficiency, improved access to more active
mobility options, increased preparedness for peak oil due to less reliance on fossil fuels,
and the creation of local green jobs; and
WHEREAS, the problem of global warming will not be resolved without leadership from local governments and the communities they represent and without collaboration across all levels of government; and

WHEREAS, in September of 2006 the Governor signed Assembly Bill 32 (Nunez), the Global Warming Solutions Act that requires California to reduce its greenhouse gas emissions to 1990 levels by 2020 and directs the California Air Resources Board to develop a Scoping Plan for achieving that target; and

WHEREAS, in December 2008 the California Air Resources Board approved the AB 32 Scoping Plan that contains the main strategies that California will use to reduce the emissions that cause climate change and that also recognizes the important role local governments must play in achieving the state’s targets; and

WHEREAS, in November 2006, 81 percent of Berkeley voters endorsed local ballot Measure G that established a target of reducing Berkeley’s community-wide emissions by 80 percent by 2050 and directed the Mayor to develop a plan for achieving that target; and

WHEREAS, City staff developed the Berkeley Climate Action Plan through an extensive community process that enabled widespread community input and engagement; and

WHEREAS, the Berkeley Climate Action Plan contains specific and prioritized strategies for aggressively reducing local greenhouse gas emissions; and

WHEREAS, development and implementation of the Berkeley Climate Action Plan has the potential to positively affect climate policy at all levels of government.

NOW THEREFORE, BE IT RESOLVED that the Berkeley City Council hereby adopts the proposed Negative Declaration for the Climate Action Plan and adopts the Berkeley Climate Action Plan.

The foregoing Resolution was adopted by the Berkeley City Council on June 2, 2009 by the following vote:


Noes: None.

Absent: None.

Attest: Deanna Despain, CMC, City Clerk

Resolution No. 64,480-N.S
## Sustainable Sites

<table>
<thead>
<tr>
<th>17</th>
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<td>Y</td>
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<td><strong>Items highlighted in yellow are items that require additional coordination</strong></td>
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<tr>
<td>1</td>
<td>Prereq 1</td>
<td>Construction Activity Pollution Prevention</td>
</tr>
<tr>
<td>1</td>
<td>Credit 1</td>
<td>Site Selection</td>
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<tr>
<td>5</td>
<td>Credit 2</td>
<td>Development Density &amp; Community Connectivity</td>
</tr>
<tr>
<td>1</td>
<td>Credit 3</td>
<td>Brownfield Redevelopment</td>
</tr>
<tr>
<td>6</td>
<td>Credit 4.1</td>
<td>Alternative Transportation, Public Transportation Access</td>
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<tr>
<td>1</td>
<td>Credit 4.2</td>
<td>Alternative Transportation, Bicycle Storage &amp; Changing Rooms</td>
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<tr>
<td>3</td>
<td>Credit 4.3</td>
<td>Alternative Transportation, Low-Emitting and Fuel-Efficient Vehicles</td>
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<td>Credit 4.4</td>
<td>Alternative Transportation, Parking Capacity</td>
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<tr>
<td>1</td>
<td><strong>Credit 5.1</strong></td>
<td>Site Development, Protect of Restore Habitat</td>
</tr>
<tr>
<td>1</td>
<td>Credit 5.2</td>
<td>Site Development, Maximize Open Space</td>
</tr>
<tr>
<td>1</td>
<td>Credit 6.1</td>
<td>Stormwater Design, Quantity Control</td>
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<tr>
<td>1</td>
<td>Credit 6.2</td>
<td>Stormwater Design, Quality Control</td>
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<tr>
<td>1</td>
<td>Credit 7.1</td>
<td>Heat Island Effect, Non-Roof</td>
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<tr>
<td>1</td>
<td>Credit 7.2</td>
<td>Heat Island Effect, Roof</td>
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<tr>
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<td>Credit 8</td>
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## Water Efficiency

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<tbody>
<tr>
<td>Y</td>
<td>Prereq 1</td>
<td>Water Use Reduction, 20% Reduction</td>
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<tr>
<td>4</td>
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<td>Water Efficient Landscaping</td>
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<tr>
<td>2</td>
<td>Credit 2</td>
<td>Innovative Wastewater Technologies</td>
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<tr>
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## Energy & Atmosphere

<table>
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<td>Prereq 1</td>
<td>Fundamental Commissioning of the Building Energy Systems</td>
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<tr>
<td>Y</td>
<td>Prereq 2</td>
<td>Minimum Energy Performance</td>
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<tr>
<td>Y</td>
<td>Prereq 3</td>
<td>Fundamental Refrigerant Management</td>
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<tr>
<td>10</td>
<td>Credit 1</td>
<td>Optimize Energy Performance</td>
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<td>5</td>
<td>Credit 2</td>
<td>On-Site Renewable Energy</td>
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<tr>
<td>2</td>
<td>Credit 3</td>
<td>Enhanced Commissioning</td>
</tr>
<tr>
<td>2</td>
<td>Credit 4</td>
<td>Enhanced Refrigerant Management</td>
</tr>
<tr>
<td>3</td>
<td>Credit 5</td>
<td>Measurement &amp; Verification</td>
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<tr>
<td>2</td>
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**Claremont Branch Library LEED Scorecard of October 21, 2010**

### Sustainable Sites

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<thead>
<tr>
<th>Prereq</th>
<th>Credit</th>
<th>Possible Points</th>
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<tbody>
<tr>
<td>1</td>
<td>Site Selection</td>
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</tr>
<tr>
<td>5</td>
<td>Development Density</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>Brownfield Redevelopment</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Alt. Transportation, Public Transportation Access</td>
<td>6</td>
</tr>
<tr>
<td>1</td>
<td>Alt. Transportation, Bicycle Storage &amp; Changing Rooms</td>
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<tr>
<td>1</td>
<td>Alt. Transportation, Low-Emit/Fuel Efficient Vehicles</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Alt. Transportation, Parking Capacity</td>
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<tr>
<td>1</td>
<td>Site Development, Protect or Restore Habitat</td>
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<tr>
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<td>Site Development, Maximize Open Space</td>
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<tr>
<td>1</td>
<td>Stormwater Management, Quantity Control</td>
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</tr>
<tr>
<td>1</td>
<td>Stormwater Management, Quality Control</td>
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<tr>
<td>1</td>
<td>Heat Island Effect, No-Roof</td>
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<td>Heat Island Effect, Roof</td>
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<tr>
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<td>Light Pollution Reduction</td>
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### Materials & Resources

<table>
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<tr>
<th>Prereq</th>
<th>Credit</th>
<th>Possible Points</th>
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<tbody>
<tr>
<td>1</td>
<td>Storage &amp; Collection of Recyclables</td>
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<tr>
<td>1</td>
<td>Building Reuse, Maintain 55% of Existing Shell</td>
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<tr>
<td>1</td>
<td>Building Reuse, Maintain 75% of Existing Shell</td>
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<tr>
<td>1</td>
<td>Building Reuse, Maintain 50% Interior Non-Structural</td>
<td>1</td>
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<tr>
<td>1</td>
<td>Construction Waste Management, Divert 50%</td>
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</tr>
<tr>
<td>1</td>
<td>Construction Waste Management, Divert 75%</td>
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<td>1</td>
<td>Materials Reuse, Specify 5%</td>
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<td>1</td>
<td>Materials Reuse, Specify 10%</td>
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<td>Recycled Content, 20%</td>
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<td>Local/Regional Materials, 10%</td>
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<tr>
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<td>Certified Wood</td>
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### Water Efficiency

<table>
<thead>
<tr>
<th>Prereq</th>
<th>Credit</th>
<th>Possible Points</th>
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<tbody>
<tr>
<td>1</td>
<td>Water Use Reduction, 20% Reduction</td>
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<tr>
<td>1</td>
<td>Water Efficient Landscaping, Reduce by 50%</td>
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<tr>
<td>1</td>
<td>Water Efficient Landscaping, No Potable Use or No Irrigation</td>
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<tr>
<td>1</td>
<td>Innovative Wastewater Technologies</td>
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<tr>
<td>1</td>
<td>Water Use Reduction, 30% Reduction</td>
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<td>1</td>
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<td>Water Use Reduction, 40% Reduction</td>
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### Indoor Environmental Quality

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<th>Prereq</th>
<th>Credit</th>
<th>Possible Points</th>
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<tbody>
<tr>
<td>1</td>
<td>Minimum IAQ Performance</td>
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</tr>
<tr>
<td>1</td>
<td>Environmental Tobacco Smoke (ETS) Control</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>Outdoor Air Delivery Monitoring</td>
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<tr>
<td>1</td>
<td>Increased Ventilation</td>
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<tr>
<td>1</td>
<td>Construction IAQ Management Plan, During Construction</td>
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<tr>
<td>1</td>
<td>Construction IAQ Management Plan, Before Occupancy</td>
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<tr>
<td>1</td>
<td>Low-Emitting Materials, Adhesives &amp; Sealants</td>
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<tr>
<td>1</td>
<td>Low-Emitting Materials, Paints &amp; Coatings</td>
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<td>1</td>
<td>Low-Emitting Materials, Carpet Systems</td>
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<td>Low-Emitting Materials, Composite Wood</td>
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<td>1</td>
<td>Indoor Chemical &amp; Pollutant Source Control</td>
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<td>Controllability of Systems, Lighting</td>
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<td>Controllability of Systems, Thermal Comfort</td>
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<td>Thermal Comfort, Design</td>
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<td>1</td>
<td>Thermal Comfort, Verification</td>
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<tr>
<td>1</td>
<td>Daylight &amp; Views, Daylight 75% of Spaces</td>
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<tr>
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<td>Daylight &amp; Views, Views for 90% of Spaces</td>
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### Energy & Atmosphere

<table>
<thead>
<tr>
<th>Prereq</th>
<th>Credit</th>
<th>Possible Points</th>
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</thead>
<tbody>
<tr>
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### Innovation & Design Process

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<th>Credit</th>
<th>Possible Points</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Innovation in Design: Low Mercury Lighting</td>
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</tr>
<tr>
<td>1</td>
<td>Innovation in Design: Exemplary Performance 95% MRc2</td>
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<tr>
<td>1</td>
<td>Innovation in Design: Green Housekeeping</td>
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<tr>
<td>1</td>
<td>Innovation in Design: Exemplary Performance 100% EAc6</td>
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<tr>
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<td>LEED™ Accredited Professional</td>
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**Total Project Score:** 110

**Certified: 40 to 49 points  Silver: 50 to 59 points  Gold: 60 to 79 points  Platinum: 80 or more points**

Prepared by KEMA Services, Inc.
### Materials & Resources

<table>
<thead>
<tr>
<th>Credit</th>
<th>Credit Description</th>
<th>Required</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Building Reuse, Maintain Existing Walls, Floors &amp; Roof</td>
<td>1 to 3</td>
<td>should attain 75% reuse of building structure</td>
</tr>
<tr>
<td>1.2</td>
<td>Building Reuse, Maintain 50% of Interior Non-Structural Elements</td>
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<td>difficult to achieve - requires further calculations but this may be possible</td>
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<td>2</td>
<td>Construction Waste Management</td>
<td>1 to 2</td>
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<tr>
<td>3</td>
<td>Materials Reuse</td>
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<td>4</td>
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<td>5</td>
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### Indoor Environmental Quality

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<thead>
<tr>
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<th>Credit Description</th>
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<th>Notes</th>
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<tr>
<td>1.1</td>
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<td>1.17</td>
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<td>1</td>
<td>Because the existing window sills are too high, we cannot qualify for this credit</td>
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### Innovation & Design Process

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<td>Innovation in Design: Green Housekeeping</td>
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<td>Innovation in Design: Provide Specific Title</td>
<td>1</td>
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<td>1.4</td>
<td>Innovation in Design: Provide Specific Title</td>
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<td>1.5</td>
<td>Innovation in Design: Provide Specific Title</td>
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### Regional Priority

<table>
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<tr>
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<td>Regional Priority: WEc3 40% reduction</td>
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</tr>
<tr>
<td>1.2</td>
<td>Regional Priority: MRc1.1 55% Building Reuse</td>
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<tr>
<td>1.3</td>
<td>Regional Priority: EQc8.1 Daylight</td>
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<td>1.4</td>
<td>Regional Priority: Provide Specific Title</td>
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### Project Totals (pre-certification estimates)

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</table>
## West Branch Library

**Schematic Design Phase Report**

**LEED-BDC (NC) Version 3 - 2009 Registered Project Scorecard**

**West Berkeley Branch Library**

**Berkeley, CA**

### APPENDIX A

<table>
<thead>
<tr>
<th>Sustainable Sites</th>
<th>Credits</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>1</td>
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<td>1</td>
</tr>
<tr>
<td>5</td>
<td>D</td>
<td>2</td>
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<tr>
<td>1</td>
<td>D</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>D</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>D</td>
<td>5</td>
</tr>
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<td>1</td>
<td>C</td>
<td>6</td>
</tr>
<tr>
<td>1</td>
<td>C</td>
<td>7</td>
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<td>1</td>
<td>D</td>
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<td>1</td>
<td>D</td>
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<td>1</td>
<td>D</td>
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### Water Efficiency

<table>
<thead>
<tr>
<th>Credits</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Water Use Reduction, 20% Reduction</td>
</tr>
<tr>
<td>2</td>
<td>Water Efficient Landscaping, Reduce by 50%</td>
</tr>
<tr>
<td>2</td>
<td>Water Efficient Landscaping, No Potable Use or No Irrigation</td>
</tr>
<tr>
<td>2</td>
<td>Innovative Wastewater Technologies</td>
</tr>
<tr>
<td>2</td>
<td>Water Use Reduction, 30% Reduction</td>
</tr>
<tr>
<td>1</td>
<td>Water Use Reduction, 35% Reduction</td>
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<td>1</td>
<td>Water Use Reduction, 40% Reduction</td>
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### Energy & Atmosphere

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<tr>
<th>Credits</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Fundamental Commissioning of the Building Energy Systems</td>
</tr>
<tr>
<td>2</td>
<td>Minimum Energy Performance, 10% New Bldgs 5% Existing Renov.</td>
</tr>
<tr>
<td>2</td>
<td>Fundamental Refrigerant Management</td>
</tr>
<tr>
<td>2</td>
<td>Optimize Energy Performance</td>
</tr>
<tr>
<td>2</td>
<td>On-Site Renewable Energy, 1% Power Match per Credit</td>
</tr>
<tr>
<td>2</td>
<td>Enhanced Commissioning</td>
</tr>
<tr>
<td>2</td>
<td>Enhanced Refrigerant Management</td>
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<tr>
<td>2</td>
<td>Green Power, Purchase 35% of Power for 2 Year GreenE Contract</td>
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### Materials & Resources

<table>
<thead>
<tr>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Storage &amp; Collection of Recyclables</td>
</tr>
<tr>
<td>1</td>
<td>Building Reuse, Maintain 55% of Existing Walls, Floors &amp; Roof</td>
</tr>
<tr>
<td>1</td>
<td>Building Reuse, Maintain 75% of Existing Walls, Floors &amp; Roof</td>
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<td>1</td>
<td>Building Reuse, Maintain 95% of Existing Walls, Floors &amp; Roof</td>
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<td>1</td>
<td>Construction Waste Management, Divert 50% from Disposal</td>
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<td>1</td>
<td>Construction Waste Management, Divert 75% from Disposal</td>
</tr>
<tr>
<td>1</td>
<td>Materials Reuse, 5%</td>
</tr>
<tr>
<td>1</td>
<td>Materials Reuse, 10%</td>
</tr>
<tr>
<td>1</td>
<td>Recycled Content, 10% (post-consumer + ½ pre-consumer)</td>
</tr>
<tr>
<td>1</td>
<td>Recycled Content, 20% (post-consumer + ½ pre-consumer)</td>
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</table>

Targeted Materials include Fly Ash / Slag, Rebar, ACT, Gypsum Board, Recycled Rubber, Terrazzo, Countertops, Insulation, Ceramic Tile.
### LEED-BDC (NC) Version 3 - 2009 Registered Project Scorecard

#### West Berkeley Branch Library

Berkeley, CA

<table>
<thead>
<tr>
<th>Credit</th>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C MR</td>
<td>Credit 5.1</td>
<td>Regional Materials, 10% Extracted, Processed &amp; Manuf. Regionally</td>
</tr>
<tr>
<td>C MR</td>
<td>Credit 5.2</td>
<td>Regional Materials, 20% Extracted, Processed &amp; Manuf. Regionally</td>
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<td>C MR</td>
<td>Credit 6</td>
<td>Rapidly Renewable Materials, Min 2.5% of Total Bldg Mat'l Cost</td>
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<td>C MR</td>
<td>Credit 7</td>
<td>Certified Wood, 50% Total Wood Purchased as FSC Certified</td>
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#### Indoor Environmental Quality

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<td>D EQ</td>
<td>Credit 1</td>
<td>Outdoor Air Delivery Monitoring</td>
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<td>Credit 2</td>
<td>Increased Ventilation</td>
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<td>C EQ</td>
<td>Credit 3.1</td>
<td>Construction IAQ Management Plan, During Construction</td>
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<td>C EQ</td>
<td>Credit 3.2</td>
<td>Construction IAQ Management Plan, Before Occupancy</td>
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<td>D EQ</td>
<td>Credit 5</td>
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<td>D EQ</td>
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<td>Controllability of Systems, Lighting</td>
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<td>Credit 6.2</td>
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<td>Daylight &amp; Views, Views for 90% of Spaces</td>
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#### Innovation & Design Process

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<td>C ID</td>
<td>Credit 1.2</td>
<td>Innovation in Design: Green Cleaning / Purchasing: City of Berkeley policy</td>
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<td>C ID</td>
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<td>C ID</td>
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#### Regional Priority Credits

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<td>Credit 1.2</td>
<td>Regional Priority Credit: EAc8.1 Daylight &amp; Views</td>
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<td>D RP</td>
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<td>D RP</td>
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<td>Regional Priority Credit (none left that project qualifies for)</td>
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#### Project Totals (pre-certification estimates)

<table>
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<th>Points</th>
<th>Silver</th>
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<tr>
<td>76</td>
<td>14</td>
<td>18</td>
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Updated LEED Score Sheet

During the schematic design phase, we held a LEED charrette at the Field Paoli offices, attended by the full consultant team, a representative from the City of Berkeley department of sustainability, and Steve Dewan from Kitchell. Based upon the discussions of that meeting, our LEED sheet was updated. We now estimate that the project can achieve a score of approximately 57 LEED points. The objective is to achieve a minimum of LEED Silver (50 – 59 points). A second LEED charrette took place on February 24, 2010, marking the beginning of the Design Development phase of work and our collaboration with Elaine Hsieh from KEMA, supported by Alameda County Stop Waste.
FINAL

BERKELEY WEST BRANCH LIBRARY RENOVATION AND EXPANSION PROJECT

INITIAL STUDY AND MITIGATED NEGATIVE DECLARATION

LSA

October 2003
FINAL

BERKELEY WEST BRANCH LIBRARY
RENOVATION AND EXPANSION PROJECT

INITIAL STUDY AND MITIGATED NEGATIVE DECLARATION

Submitted to the:

City of Berkeley
2118 Milvia Street
Berkeley, CA 94704

Prepared by:

LSA Associates, Inc.
2215 Fifth Street
Berkeley, CA 94710
(510) 540-7331

LSA

October 2003
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- Appendix C: West Branch Library Shadow Study
- Appendix D: Mitigated Negative Declaration Comments and Responses
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A. SUMMARY INFORMATION

1. Project Title:
   Berkeley Public Library West Branch Renovation and Expansion Project

2. Lead Agency Name and Address
   Berkeley Public Library
   2090 Kittredge Street
   Berkeley, CA 94704

3. Contact Person:
   Elena Engel, Building Project Manager
   Berkeley Public Library
   2090 Kittredge Street
   Berkeley, CA 94704
   Phone: (510) 981-6109
   E-mail: ele3@ci.berkeley.ca.us

4. Project Location:
   Address: 1125 University Avenue
   Berkeley, CA 94702
   General: The project site is immediately bounded by University Avenue to the south, a driveway and parking lot to the west, multi-family residential units to the north (fronting on Hearst Avenue), and a three-story Holiday Inn motel to the east.
   APN#: 057-2085-01100

5. Project Sponsor's Name and Address:
   Berkeley Public Library
   2090 Kittredge Street
   Berkeley, CA 94704

6. General Plan Designation: Avenue Commercial

7. Zoning: General Commercial (C-1)
8. Description of Project:

Existing Conditions and Setting:

The Berkeley Public Library (BPL) system is proposing to renovate and expand the existing single-story West Branch Library located at 1125 University Avenue (see Figure 1). The Library is located on the northern side of University Avenue, west of the intersection of University and San Pablo Avenues. The parcel is approximately 11,970 square feet in size.

The West Branch Library of the BPL system is the second largest of the four branch libraries. The facility was originally constructed in 1923 under a "lease plan" authorized by the City Council, wherein payments for the building were made from a Library Building Fund. The original 1923 building was a 2,100 square-foot, one-story building constructed in the Classical Revival style. In 1974, the building was significantly enlarged (by 3,870 square feet to a total of 5,970 square feet) and remodeled. The 1974 modifications to the building included: relocating the Library's main entrance to the east side of the building, and adding several box-shaped additions and two ramps from the University Avenue sidewalk to the new side entrance. The 1974 modifications demolished the entire north wall and the western portion of the south wall of the original Library. The original ceiling with vaulted perimeter was concealed by a dropped acoustical ceiling hiding mechanical ducts and wiring. The central skylight was removed because of leakage problems although the light frame is still intact in the original ceiling. Although the 1974 additions to the Library expanded the internal space of the West Branch, these modifications resulted in "an awkward ensemble of architectural languages and building elements," and detracted from the aesthetic and historic integrity of the 1923 structure.

The University Avenue context has changed significantly over 80 years since the original Library was built. New developments are higher in density and built right up to the sidewalk, reinforcing the urban streetscape character of the present day University Avenue. Being set back 20 feet, elevated four feet from the sidewalk level, and substantially hidden behind the 1974 addition, the Library as a whole has poor street presence and no interaction with the sidewalk or pedestrian level.

On May 5, 2003, the Landmarks Preservation Commission (LPC) designated the West Branch as a Structure of Merit due to its educational, cultural, historical, and architectural significance. The full text of the Commission’s notice of decision is contained in Appendix A to this document. The decision specifically noted features from the 1923 structure to be preserved, as follows:

- Roman triumphal arched entry, with semi-circular window and surrounding engaged columns;
- round ornamental medallion right of the arch;
- window proportions of three banks of windows on either side of the arched entry on south façade;
- wood framed windows on the west and east façades;
- cornice of the west, south and east façade; and
- remaining incised lettering “WEST BERKELEY BRANCH LIBRARY.”

---


FIGURE 1

Berkeley West Branch Library
Renovation and Expansion Project
Project Vicinity and
Regional Location
As shown in Figure 2, the west side of the site contains an asphalt concrete service drive and parking area for four cars (accessible only to Library staff) and a small side patio and two redwood trees on the northwest corner of the site, as well as three redwood trees in the northeast corner of the lot. The building is setback approximately 5 feet from the rear fence, 20 feet from the western site boundary, 5 feet from the eastern site boundary, and 8 feet from the southern boundary. A front patio, a ramp and a small service area lie between the building and the University Avenue sidewalk.

Due to expansion in the size of the Library’s collection, the West Branch has inadequate storage and display capacity, and cramped seating. In addition, the internal circulation area is too small, the building requires handicap accessibility improvements, and has insufficient space for a staff lounge and special programs. Library staff considers the workroom small and inefficient. Figure 2 shows the existing boundary and topographic survey for the Library site.

Proposed Project:

The proposed West Branch Library renovation would add a second floor and increase the existing space of the building (currently 5,970 square feet) to a maximum of 15,000 gross square feet (GSF) by demolishing approximately 3,870 square feet and adding an approximately 12,900 square foot two-story addition to the rear of the relocated 1923 building. A preliminary building program is shown in Table 1. Elements of the building program are listed below:

- construction of a new area showcasing new books and audiovisual materials (a community “Market Place”);
- expanded children’s services, including reference collection, books, international language collection, picture books;
- space for the children’s storytelling and class visits;
- expanded adult services, including reference collection, books, international language collection;
- a dedicated teen area;
- a quiet reading and study area;
- an expanded magazine and newspaper reading area (a “Community Living Room”);
- space for the Family Learning and Literacy Center;
- space for the Berkeley Reads Literacy Program;
- increased and universal access to computers;
- tutoring rooms;
- a multi-purpose community meeting room;
- wider aisle widths;
- additional circulation area space; and
- larger staff work areas.
Table 1: Preliminary West Branch Library Program

<table>
<thead>
<tr>
<th>Proposed Use - Public Space</th>
<th>Gross Square Feet (GSF)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Space: entrance, lobby, multi-purpose community room, Berkeley Reads Literacy Program space, tutoring rooms, Family Learning and Literacy Center, copy center.</td>
<td>4,000</td>
</tr>
<tr>
<td>Children’s Services: service desk, reference, new books and magazine area, public access computers, audiovisual media collection, picture books, storytelling and class visit space.</td>
<td>2,800</td>
</tr>
<tr>
<td>Market Place: area showcasing new books and audiovisual materials</td>
<td>500</td>
</tr>
<tr>
<td>Adult Services: reference collection, public access computers, circulating books, quiet reading study area, newspapers and magazine area, international language collection, teen area.</td>
<td>4,000</td>
</tr>
<tr>
<td>Proposed Use - Non-Public Space</td>
<td>1,000</td>
</tr>
<tr>
<td>Circulation Services: circulation and reference service desk, express checkout.</td>
<td>2,700</td>
</tr>
<tr>
<td>Staff and Support: staff work area, staff lounge, manager’s office, supplies and equipment storage.</td>
<td>7,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>15,000</td>
</tr>
</tbody>
</table>

* Group 4 Architecture, Research + Planning, Inc., is currently designing the West Branch renovation and expansion project and provided a preliminary breakdown of square footage that totals 15,000 GSF. The maximum size of the project would be 15,000 GSF, and for the purposes of CBOA, a 15,000 GSF project is analyzed.

Preliminary floor plans are shown in Figure 3, and a north to south section diagram of the proposed renovation is presented in Figure 4. The first floor of the Library will house most of the collection and reading areas, and the second floor will house flexible Library program rooms, such as the Community Meeting room, Berkeley Reads Literacy Program, and a Family Learning and Literacy Center. Key components of the renovation and expansion project could include the following:

- demolition of the 1974 building additions;
- strengthen and enhance the presence and visibility of the Library on University Avenue (an important City thoroughfare) and reinforce the University Avenue streetscape by moving the building closer to the street and restoring the façade of the 1923 original Library to the historic Classical Revival style;
- lowering the current floor level to the entry door level to allow universal access;
- construction of a two-story addition to the original 1923 structure in the northern portion of the Library site to house an expanded Library collection and services;
- relocation of the original Library entrance back to its original centralized arched doorway to preserve the character of the 1923 Classical Revival style building;
- rebuilding the foundation; and
- restoring components of the original 1923 structure including: the skylight, exterior and interior finishes, windows and doors.

Current zoning allows for a two-story building and a maximum 40-foot building height, and requires a setback only for the rear yard (due to the adjacent residential district). Consistent with zoning requirements, the proposed project would be two stories and would not exceed 40 feet in height. The Zoning Ordinance requires a 12-foot rear yard setback (i.e., 10 percent of the lot depth of 120 feet per the City’s Zoning Ordinance Section 23E 040.050). However, to maximize the Library expansion and use the small lot efficiently, the proposed project requires the approval of a use permit to reduce the required rear yard setback for the first floor to zero. No other setbacks are required.

The existing redwood trees in the northwestern and northeastern corners of the lot are an important feature of the Library site and will be preserved and sensitively incorporated into the building design (as shown in Figure 3).
Berkeley West Branch Library
Renovation and Expansion Project
Preliminary Floor Plans
The proposed project does not include on-site parking due to site restrictions including: the small lot size, difficulties in egress and ingress on University Avenue, the need to renovate and retain the Structure of Merit, preservation of the redwood trees, and the need to maximize the use of the existing lot for Library expansion. Therefore, under Section 23E.36.080 of the City’s Zoning Ordinance, the proposed Library expansion would require a variance. It should be noted that the West Branch Library currently does not have dedicated off-street parking spaces for public use (the four on-site spaces are for staff use), nor do any of the other libraries in the BPL system, including the Central Library in downtown Berkeley. Most of the visitors who drive to the West Branch (approximately 45 percent according to a User Survey, see Appendix B for a summary)\(^3\) park on the street, as there are 358 street spaces within 500 feet of the Library. Additionally, once the renovation and construction were completed, the existing curb cut on University Avenue would be available for use as a public parking space.

To promote alternative transportation modes, the proposed project includes the provision of 16 bicycle parking spaces (eight more spaces than are required under the Zoning Ordinance) adjacent to the new Library entrance. It should be noted that the City of Berkeley General Plan includes policies that discourage the use of the private automobile and encourages public transit use, especially on primary transit routes (i.e., University Avenue and San Pablo Avenue), as well as bicycle and pedestrian modes of transportation. Transit options in the immediate area include six AC Transit lines and the San Pablo Rapid bus service (line 72R).

BPL staff estimates current West Branch visitation to be approximately 238 persons per day. For the purposes of this Initial Study, a conservative increase in visitation of 25 percent (or 71 visitors, for a total of 354 visitors) after the expansion and renovation has been assumed.\(^4\)

The following actions are being applied for under the Berkeley Municipal Code:

- Use Permit to demolish 3,870 square feet of non-residential buildings, per Section 23C.08.050 (ZAB);
- Use Permit to create more than 5,000 square feet of new floor area, per Section 23E.36.050.A (ZAB);
- Use Permit to reduce the required rear yard setback to zero, per Section 23E.04.050 (ZAB);
- Variance to provide no parking, per Section 23E.36.080 (ZAB);
- Alteration Permit to alter a City of Berkeley Structure of Merit, per BMC Section 3.24.200, and Sections 3.24.220 through 3.24.250 (LPC);

9. Surrounding Land Uses:

The parcel is approximately 11,970 square feet in size and bounded on the south by University Avenue and on the north by a multi-family residential use. To the east is the three-story Holiday Inn motel, and to the west is a parking lot for adjacent commercial uses fronting on University Avenue and San Pablo Avenue.

10. Other Public Agencies Whose Approval Is Required:

None

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\(^4\) When the Central Library opened after restoration and expansion, the Library experienced an approximately 10 percent increase in visitation, although a 25 percent increase was projected. For the purposes of this analysis of the West Branch Library restoration project, a conservative approach has been adopted and a 25 percent increase in visitation has been assumed.
INITIAL STUDY CHECKLIST

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:
The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics  ☐ Agriculture Resources  ☐ Air Quality
☐ Biological Resources  ☐ Cultural Resources  ☐ Geology /Soils
☒ Hazards & Hazardous Materials  ☐ Hydrology / Water Quality  ☐ Land Use / Planning
☐ Mineral Resources  ☐ Noise  ☐ Population / Housing
☐ Public Services  ☐ Recreation  ☐ Transportation /Traffic
☐ Utilities / Service Systems  ☐ Mandatory Findings of Significance

DETERMINATION

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect: 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.
Mitigation Measures that shall be incorporated by the project sponsor:

Mitigation Measure AIR-1: During construction, the project sponsor shall require the construction contractor to implement the following Bay Area Air Quality Management District (BAAQMD) basic dust control measures:

- Water all active construction areas at least twice daily. Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever possible.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).
- Apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
- Sweep streets (with water sweepers using reclaimed water if possible) at the end of each day if visible soil material is carried onto adjacent paved roads.

Mitigation Measure AIR-2: The project sponsor shall provide the results of an asbestos survey prior to issuance of demolition permits. Demolition and disposal of any asbestos containing building material would be in accordance with the procedures specified by BAAQMD Regulation 11, Rule 2 (Asbestos Demolition, Renovation and Manufacturing).

Mitigation Measure GEO-1: The buildings proposed as part of the project shall be constructed and renovated in accordance with design requirements and construction standards of the Uniform Building Code, the 1997 Historic Building Code, and the site-specific recommendations in the project site geotechnical report.

Mitigation Measure HAZ-1: The project applicant shall notify the construction contractor that asbestos and lead have been found to be present within the West Branch Library, and provide the contractor with a copy of the Asbestos and Lead Survey Report. The construction contractor shall adhere to all existing regulations requiring abatement of lead and asbestos hazards and worker health and safety procedures during construction activities.

Mitigation Measure HAZ-2: All building permit plans shall be subject to the review and approval by the City of Berkeley Toxics Management Division prior to issuance of a building permit. The applicant shall submit a site management plan that addresses worker and community protection during construction.

Mitigation Measure HAZ-3: Building footing and subterranean portions of the project may encounter contaminated ground water. If ground water is found, the project shall include a de-watering system that will drain the subterranean areas of the project, and filter the water for release into the City’s sanitary sewer system.

Mitigation Measure HYDRO-1: Because groundwater may be encountered during excavation and construction of the building foundation, Best Management Practices (BMPs) for erosion and sediment controls shall be printed on the construction plans.

Mitigation Measure LU-1: The project applicant shall secure a Use Permit to allow for the reduction of the required rear yard setback to zero and a variance from the parking requirement.

Mitigation Measure NOI-1: To reduce daytime noise impacts due to construction, the construction contractors shall implement the following measures:
1. Equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically-attenuating shields or shrouds, wherever feasible and necessary);

2. Impact tools (e.g., jack hammers, pavement breakers, and noise drills) used for project construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to 10 decibels (dB). External jackets on the tools themselves shall be used where feasible, and this could achieve a reduction of 5 dB. Quieter procedures shall be used such as drilling rather than impact equipment whenever feasible; and

Stationary noise sources shall be located as far from sensitive receptors as possible. If they must be located near existing receptors, they shall be muffled to the extent feasible and enclosed with temporary sheds.

Mitigation Measure NOI-2: Construction activity shall be limited to between the hours of 8:00 a.m. and 6:00 p.m. Monday through Friday, and between 9:00 a.m. and noon on Saturday. No construction-related activity shall occur on Sunday.

Mitigation Measure NOI-3: Prior to the start of construction, the applicant shall provide the project planner with the name and telephone number of the individual empowered to manage construction noise from the project. The individual’s name, telephone number, and responsibility for noise management shall be posted at the project site for the duration of construction in a location easily visible to the public. The individual shall record all noise complaints received and actions taken in response, and submit written reports of such complaints and actions to the project planner on a weekly basis.

Mitigation Measure NOI-4: To ensure compliance with the City’s noise control regulations and these mitigations, the City of Berkeley Zoning Officer is authorized to place additional limitations on the hours of operation and/or halt construction until corrective measures are taken.
CHECK LIST

I. AESTHETICS -- Would the project:

a) Have a substantial adverse effect on a scenic vista? 1 □ ○ □ □

The Berkeley General Plan does not identify any scenic vistas. While no vistas were identified, University Avenue, like many east/west streets in Berkeley, contains views of San Francisco Bay and the Marin Headlands to the west, and the East Bay Hills to the east. The existing structure is setback approximately 20 feet from University Avenue. The proposed ground floor expansion would have a setback of approximately 10 feet from University Avenue; the proposed second story addition would have a setback of approximately 45 feet from University Avenue. The proposed project would not visually intrude on the University Avenue east/west viewshed, and would not block views to the north or south.

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway? 2, 3 □ ○ □ ○

The proposed project is not located on a State scenic highway.

c) Substantially degrade the existing visual character or quality of the site and its surroundings? □ ○ ○ ○

The proposed project would be of a similar size, scale, and mass as other buildings in the vicinity of the project site. Many of the buildings on the San Pablo Avenue and University Avenue commercial corridors have been modified over time in ways that have detracted from their original historic and aesthetic integrity. Implementation of the proposed project, which would remove the 1974 Library additions and reinstate the original 1923 Library entrance, would enhance the aesthetic integrity of the building and benefit the historical character of the surrounding commercial areas. The proposed project would enhance the aesthetic integrity of an important public building on University Avenue, thereby benefiting the visual quality of the project site and its surroundings.

d) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area? □ ○ ○ ○

The proposed project would not result in a substantial increase in lighting within or immediately adjacent to the project site. Although new lighting may be installed to provide for visitor safety and to highlight the restored architectural features of the Library building, this lighting would not be substantial in relation to surrounding urban development and would not be directed towards residential uses to the north. Newly restored windows and skylights would enhance the aesthetic character of the existing building and would not substantially contribute to daytime glare. All proposed lighting will be required to minimize glare to adjacent properties, and would be subject to review and approval at the time building permits are requested.

5 The headers of column check boxes are defined as follows: PSI = Potentially Significant Impact; <SwM = Less than Significant with Mitigation; LS = Less than Significant Impact; ○ = No Impact.
II. AGRICULTURE RESOURCES -- In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

The project site is in the urbanized portion of Berkeley, and is classified as Urban and Built-Up Land by the State Department of Conservation. Therefore, implementation of the proposed project would not result in the conversion of farmland of any classification to non-agricultural use, and would not impact agricultural resources of statewide importance.

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

The project site is not zoned for agricultural uses and is not subject to a Williamson Act contract. Therefore, implementation of the proposed project would not conflict with existing zoning for agricultural use or a Williamson Act contract.

c) Involves other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?

As discussed in II.a, the project site is in an urbanized portion of Berkeley. Therefore, implementation of the proposed project would not cause the conversion of farmland to non-agricultural uses.

III. AIR QUALITY -- Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:

a) Conflict with or obstruct implementation of the applicable air quality plan?

The project will neither conflict with nor obstruct implementation of any applicable air quality plan, in this case the Bay Area 1997 Clean Air Plan implemented by the Bay Area Air Quality Management District (BAAQMD). The following mitigation measure will further reduce any potential impact associated with dust during the construction period.

Mitigation Measure AIR-1: During construction, the project sponsor shall require the construction contractor to implement the following Bay Area Air Quality Management District (BAAQMD) basic dust control measures:

* Water all active construction areas at least twice daily. Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever possible.

* Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).
Apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.

Sweep streets (with water sweepers using reclaimed water if possible) at the end of each day if visible soil material is carried onto adjacent paved roads.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

The proposed project would not have a detrimental impact on any air quality standard. The results of an Asbestos and Lead Survey Report conducted by RGA Environmental Inc. for the project, showed that there may be asbestos and lead present in the existing building. In addition to implementation of Mitigation Measure AIR-1, Mitigation Measure AIR-2 would further reduce any potential impact to a less than significant level during renovation of the existing building.

Mitigation Measure AIR-2: The project sponsor shall provide the results of an asbestos survey prior to issuance of demolition permits. Demolition and disposal of any asbestos containing building material would be in accordance with the procedures specified by BAAQMD Regulation 11, Rule 2 (Asbestos Demolition, Renovation and Manufacturing).

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Due to the relatively low number of net vehicle trips generated by the project (conservatively estimated to be 64 new vehicle trips over the course of a day as described below in section XV, Transportation/Traffic), implementation of the proposed project would not result in a cumulatively considerable net increase of any criteria pollutant.

d) Expose sensitive receptors to substantial pollutant concentrations?

The proposed project would not create substantial pollutant concentrations.

e) Create objectionable odors affecting a substantial number of people?

The proposed project would not involve any operations or activities that would create objectionable odors.

IV. BIOLOGICAL RESOURCES -- Would the project:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

The project site, which is urbanized and developed, has low habitat value for wildlife. No sensitive biological habitat is located within the project site, and it is highly unlikely that the site contains protected species. The existing redwood trees (Sequoia sempervirens) in the northwest and northeast corners of the project site would be
retained as part of the proposed project. No other protected plant or animal species are known to occur within the project site. Therefore, the proposed project would not directly or indirectly impact protected species.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?

No riparian areas or sensitive natural communities are located within the project site. Therefore, the proposed project would not effect riparian areas or sensitive natural communities.

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

No wetlands are located within the project site. Therefore, implementation of the proposed project would not impact federally protected wetlands.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

The project site is developed and has been subject to human disturbance for over 75 years. Wildlife visiting the project site would be species associated with disturbed, urbanized areas. No migratory wildlife corridors are located on the project site. Implementation of the proposed project would not substantially interfere with the movement of native wildlife species or impede the use of native wildlife nursery sites.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

The existing redwood trees in the northwest and northeast portions of the project site would be retained as part of the proposed project. No other protected biological resources are located within the project site. Therefore, implementation of the proposed project would not conflict with any local policies or ordinances protecting biological resources. No locally significant trees are located on the project site. Implementation of the project would not conflict with local policies or ordinances protecting biological resources.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan?

No adopted Habitat Conservation Plans, Natural Community Conservation Plans, or any other approved local, regional, or State habitat conservation plans apply to the project or project site.
V. CULTURAL RESOURCES -- Would the project:

a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5? 2, 3, 7

The proposed project would not cause a substantial adverse change in the significance of the portion of the West Branch Library constructed in 1923. A portion of the existing Library was constructed in 1923 under a “lease-plan” authorized by the City Council, wherein payments for the building were made from a Library Building Fund. The 1923 building was a 2,100 square-foot, one-story building constructed in the Classical Revival style. In 1974, the building was significantly enlarged (by 3,870 square feet to a total of 5,970 square feet) and remodeled. The 1974 modifications to the building were described previously in the project description section of this document. The new addition blocked the public’s view of the 1923 Structure of Merit and hides its original appearance from the public. The alterations previously described make it difficult to determine where the original building fabric ends and newer material begins. At this time the building does not communicate a sense of the 1920s. Additionally, the historic setting of the building has been dramatically altered, and the open lots along University Avenue, that lent the Library building some prominence in the 1920s and 30s, have been built up giving the Library a crowded look. Although the 1974 additions expanded the internal space of the West Branch, these modifications resulted in an awkward ensemble of architectural languages and building elements, and detracted from the integrity of the 1923 structure. Based on an examination in April 2002 by Page and Turnbull (see Appendix A), an historical architectural firm, it has been demonstrated that the existing structure is probably not eligible for the National Register of Historic Places or the California Register of Historic Places under any of the eligibility criteria. However, the 1923 structure may be nominated for listing.

On May 5, 2003, the City of Berkeley Landmarks Preservation Commission (LPC) designated the West Branch as a Structure of Merit “due to its Architectural, Cultural, Educational, and Historic significance.” The full text of the Commission’s motion is contained in Appendix A to this document. The following features from the 1923 structure that were specifically noted to be preserved are described on page 2 of this document.

As noted in the project description, the project design, which is currently ongoing, will include the preservation of the features noted by the LPC. The proposed addition and renovation includes relocating the original Library closer to the sidewalk and maintaining a public forecourt that transitions onto the original central entrance to the Library. The existing Library will be lowered down to two feet above sidewalk level to minimize ramping distance while still allowing an adequate base to retain the Classical Revival character. The floor level of the existing Library will also be lowered to door level to allow flexibility in the use of space and universal access. A two-story addition, although much larger in scale, will sensitively wrap around the east and south portion of the original Library. The character and massing of the addition will be carefully designed so that it does not overwhelm and change the character of the small original Library building.

The Library staff and project architect have been coordinating with the LPC on a monthly basis starting in May 2003 while designing the renovation and expansion of the building. The Library staff will continue to work with the LPC through the design and review phases of the project. Additionally, the project will comply with the standards in the City’s Landmarks Preservation Ordinance, and the Secretary of Interior’s Standards for the Treatment of Historic Properties, and the LPC will conduct the design review process on the proposed addition, per Section 23E.12.020.A. Prior to the approval of necessary demolition permits, proposed project building elevations would be reviewed by the LPC as part of the design review process. This project is not a historic rehabilitation project and is not subject to the controls set forth in the Secretary of Interior’s Standards for the Treatment of Historic Properties because it is not eligible for listing on the National or California Registers. The

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project would remove the elements that blocked the public view of the 1923 building; it will restore the appearance of the façade, and will include sensitive additions (such as a setback second story) that will not detract from the 1923 building elements (see the elevations in Figure 4). By moving the Library entrance closer to University Avenue, lowering the floor elevation, and uncovering and renovating significant elements of the 1923 building, the proposed project would provide a beneficial effect and would enhance historic elements of the building. The proposed project would not cause a substantial adverse change to the significance of a historical resource (i.e., the Structure of Merit as defined by LPC).

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

The subject property has been previously disturbed and developed and is not located in an area known to have archaeological resources pursuant to §15064.5.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

The subject property has been previously disturbed and urbanized and is not located in an area that is known to have paleontological resource or unique geological features.

d) Disturb any human remains, including those interred outside of formal cemeteries?

The subject property is not located in an area known to have any human remains.

VI. GEOLOGY AND SOILS — Would the project:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

The project site is not located within an Alquist-Priolo Zone. Therefore, implementation of the proposed project would not adversely impact persons or structures due to the rupture of a known earthquake fault.

ii) Strong seismic ground shaking?

The San Francisco Bay region is a seismically active region that is subject to large earthquakes. Five faults (Hayward, Calaveras, Rodgers Creek, Concord-Green Valley, and San Andreas) are located within 17 miles of the project site. Earthquakes on any of these faults could cause strong ground shaking at the project site. Earthquake intensities vary throughout the Bay Area depending upon the magnitude of the earthquake, the distance of the site from the causative fault, the type of underlying materials, and other factors. Groundshaking on the project site could pose a substantial threat to buildings and people. Pugro West prepared a geotechnical report for the project which determined that the proposed project would respond well during strong seismic shaking if built to standards in the Uniform Building Code. Implementation of Mitigation Measure GEO-1 would reduce potential impacts to a less-than-significant level.
Mitigation Measure GEO-1: The buildings proposed as part of the project shall be constructed and renovated in accordance with design requirements and construction standards of the Uniform Building Code, the 1997 Historic Building Code and the site-specific recommendations in the project site geotechnical report.

iii) Seismic-related ground failure, including liquefaction?

The site is not within any California Geological survey area (as revised and updated in February 2003) for seismic landslides or liquefaction. The soils found within the project site consist predominantly of lean clay, medium dense to dense clayey sand. These soils have sufficient cohesion and/or density to not be prone to liquefaction or other seismic-related ground-failure.

iv) Landslides?

The project site consists of relatively flat terrain and is not susceptible to landslides.

b) Result in substantial soil erosion or the loss of topsoil?

The project site is relatively flat, and is completely paved or vegetated, and so would not be susceptible to soil erosion during the project construction period. Build-out of the proposed project would result in coverage of the project site by structures, pavement, or landscaping, minimizing any soil erosion or loss of topsoil.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

The project site is relatively flat, contains soils that have sufficient cohesion and/or density, and is 1.7 miles from the closest known active fault. Therefore, the soils and the project site are sufficiently stable and would not be susceptible to an on or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.

d) Be located on expansive soil, as defined in Table 18- 1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

The geotechnical report conducted for the proposed project concluded that the near-surface soils on the project site are moderately expansive. Expansive soils have the potential to shrink and swell in response to changes in moisture content and can damage structures, slabs-on-grade, and other surface improvements. Potential impacts resulting from the presence of expansive soils would be reduced to a less-than-significant level by implementation of mitigation measure GEO-1.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

No septic tanks or alternative waste systems would be utilized on the project site. The project site would be connected to City sanitary sewer lines.
VII. HAZARDS AND HAZARDOUS MATERIALS -- Would the project:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Implementation of the proposed project would result in the renovation and expansion of a library. Potentially hazardous materials such as adhesives and paint could be used during construction of the proposed project. However, the construction contractor would adhere to all local, State, and federal regulations regarding the use and handling of these materials. This temporary use of hazardous materials would not create a significant hazard to the public or environment. Commercially available hazardous materials could be used for maintenance of the project site. Normal operational use of the project site would not pose a significant hazard to the public or environment through the routine transport, use, or disposal of hazardous materials.

b) 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?

See VII.a. An Asbestos and Lead Survey Report prepared for the project site, completed in May 2003, concluded that homogeneous suspect asbestos-containing materials may be impacted by the planned demolition of the 1974 additions. Additionally, several painted surfaces within the West Branch Library were found to contain detectable levels of lead. Therefore, the renovation and expansion of the Library could release asbestos fibers and lead dust, potentially affecting construction workers. Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure HAZ-1: The project applicant shall notify the construction contractor that asbestos and lead have been found to be present within the West Branch Library, and shall provide the contractor with a copy of the Asbestos and Lead Survey Report. The construction contractor shall adhere to all existing regulations requiring abatement of lead and asbestos hazards and worker health and safety procedures during construction activities.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

See VII.b regarding asbestos and lead. A geotechnical investigation of the project site was conducted and no hazardous soils were found. An asbestos and lead survey of the site was conducted and concluded that homogenous suspect asbestos-containing materials may be impacted by the planned demolition, and several painted surfaces within the Library were found to contain detectable levels of lead. Although these levels of lead are not considered to be toxic by the State, the presence of elevated levels of the metal on the project site could pose a health risk to Library employees and patrons as well as construction workers. All lead and asbestos would be removed prior to the opening of the renovated Library. As this site has been in use as a library for the past 80 years, it is not anticipated that any other hazardous materials occur within the site, and that no hazardous materials were ever used within the project site. In addition, no contaminated sites in the vicinity of the project site have been documented. No emission of hazardous materials or the handling of acutely hazardous waste would occur within 1/4 mile of the project site. Implementation of the following mitigation measures would reduce this impact to a less-than-significant level.

Mitigation Measure HAZ-2: All building permit plans shall be subject to the review and approval by the City of Berkeley Toxics Management Division prior to issuance of a building permit. The applicant shall submit a site management plan that addresses worker and community protection during construction.
Mitigation Measure HAZ-3: Building footing and subterranean portions of the project may encounter contaminated ground water. If ground water is found, the project shall include a de-watering system that will drain the subterranean areas of the project, and filter the water for release into the City’s sanitary sewer system.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

The project site is not included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

The project site is not located within an airport land use plan or within two miles of a public airport or public use airport.

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

The project site is not located within the vicinity of a private airstrip.

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Implementation of the proposed project would not substantially impact traffic on University Avenue or interfere with emergency response or evacuation plans.

h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

The project site is located in an urbanized area and is not susceptible to wildland fires.

VIII. HYDROLOGY AND WATER QUALITY -- Would the project:

a) Violate any water quality standards or waste discharge requirements?

Renovation and expansion of the Library would not violate any water quality standards or waste discharge requirements. The majority of the site is currently covered by the Library, a driveway, walkways and other impervious surfaces. The expanded Library will cover most of the site and all pervious surfaces would be landscaped. A storm drainage system consistent with current standards and regulations will be incorporated into the site design.
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing [and uses or planned uses for which permits have been granted]?)

The entire project site, with the exception of small landscaped areas in the northwest and northeast corners of the site, is currently paved. Implementation of the proposed project would not result in a substantial increase in impervious surfaces compared to the area of impervious surfaces that currently exist on the project site. Furthermore, neither the project site nor properties in its vicinity rely on wells for their water. Therefore, implementation of the proposed project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

Implementation of the proposed project would not substantially alter the existing site topography or substantially increase the area of impervious surfaces within the project site. The proposed project would not alter the course of a stream or river. Strawberry Creek is contained within a covered culvert under University Avenue to the south of the project site and would not be impacted. Therefore, implementation of the proposed project would not substantially alter the existing drainage of the site nor would it substantially increase the rate or amount of surface runoff.

d) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

See VIII.c. The existing stormwater infrastructure that currently serves the project site would be sufficient to serve the proposed project.

e) Otherwise substantially degrade water quality?

A drilled pier foundation may be required for the proposed project. The project is in the conceptual design phase and as design progresses, more will be known about the required foundation. During soil test borings, groundwater was encountered at approximately 20 feet below ground surface. If groundwater is encountered during excavation, there is the potential for soils or construction-related materials to degrade water quality. Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure HYDRO-1: Because groundwater may be encountered during excavation and construction of the building foundation, Best Management Practices (BMPs) for erosion and sediment controls shall be printed on the construction plans.
f) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

The project does not propose any housing. The project site is not located within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map, or other flood hazard delineation map.

g) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

See VIII.f.

h) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

The project site is not susceptible to these types of flooding.

i) Inundation by seiche, tsunami, or mudflow?

The project site is located approximately ½ mile east of San Francisco Bay at an elevation of approximately 56 feet above mean sea level (msl). The potential for the project site to be inundated by seiche, tsunami, or mudflow is non-existent.

IX. LAND USE AND PLANNING - Would the project:

a) Physically divide an established community?

Implementation of the proposed project would result in the renovation and expansion of an existing Library within an established neighborhood in Berkeley. Implementation of the proposed project would not restrict or otherwise impede circulation around the site. The existing Library is a public meeting place; proposed Library improvements would enhance the visibility and visual quality of the Library building, resulting in a net benefit to community cohesiveness. Therefore, implementation of the proposed project would not physically divide an existing community.

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

The proposed project does not involve a change in land use and does not conflict with the policies in the Berkeley General Plan. The proposed project is within the plan area of the University Avenue Strategic Plan. Consistent with Strategy 9G, the proposed project would restore the façade of the Library to its original architectural character.

The project is consistent with the Zoning Ordinance in regards to shade and shadows cast on adjacent properties. The University Avenue Strategic Plan also contains general design guidelines on solar orientation that state that "a new building shall not cast a shadow more than twenty feet (20) onto the adjacent property rear yard when the southern sun is at a 29 degree angle on the winter solstice." As shown in the Shadow Study (contained in
Appendix C) a portion of the second floor addition would cast a shadow greater than twenty feet during the winter solstice (the day of the year when shadows are at their maximum) as a result of the new second story addition. It should be noted that the proposed building is 20 percent below the maximum allowable height of 40 feet, and the second floor addition would be located behind the 12 foot setback from the northern property line. The proposed first floor extension will never cast a shadow on the neighboring residential building to the north. The City finds the potential shading impact during the winter solstice to be less than significant for the following reasons. To satisfy Library program goals while maintaining the 1923 Structure of Merit, the project needs to maximize building square feet while taking into account site constraints. These constraints include: the small size of the lot; the need to preserve the redwood trees; and the restoration and retention of the original 1923 building elements. Additionally, expanding and restoring the West Branch Library will provide Library services and resources for the benefit of the community.

Land uses proposed as part of the proposed project are consistent with the Zoning Ordinance designations for the project site (Avenue Commercial and General Commercial (C-1), respectively). Libraries are allowed in C-1-zoned areas with a use permit and after a public hearing is held. The C-1 zone does not require front or side yard setbacks, but does require a 10-foot (i.e., 10 percent of the depth of the lot) rear yard setback. The proposed project does not include a rear yard setback and would require a Use Permit.

It should also be noted that Berkeley Zoning Code requires that the proposed project provide one auto parking space per 500 square feet of publicly accessible floor area of approximately 12,000 square feet, for a total of 24 required parking spaces. The existing Library does not provide any off-street parking, and the proposed project would not provide any off-street parking. This issue and the exceptional circumstances that apply to the project site are discussed in section XV.f.

Implementation of the following mitigation measure would reduce any potential impacts related to conflicts with City policies to a less-than-significant level.

**Mitigation Measure LU-1:** The project applicant shall secure a Use Permit to allow for the reduction of the required rear yard setback to zero and a variance from the parking requirement.

c) Conflict with any applicable habitat conservation plan or natural community conservation plan?

There are no habitat conservation plans or natural community conservation plans for the project site.

**X. MINERAL RESOURCES -- Would the project:**

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State?

There are no known mineral resources on the project site.

b) Result in the loss of availability of a locally-important mineral resource, recovery site delineated on a local, general plan, specific plan or other land use plan?

There are no known mineral resources on the project site.
XI. NOISE -- Would the project result in:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Vehicle trips associated with the proposed project would not lead to measurable increases in traffic noise. A 25 percent increase in visitation is estimated after the renovation and expansion of the Library is completed, for a total of 354 visits per day, many of which would involve alternative modes of transportation. Implementation of the proposed project would not result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. Any measurable noise effects would be considered less than significant.

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Vehicles using University Avenue consist of trucks, buses, and automobiles. These vehicles have the potential to produce some groundborne vibration. However, current visitor and staff exposure to groundborne vibrations is neither excessive nor substantial and no future significant impact is expected to result with implementation of the expansion and renovation. Heavy equipment use during renovation and expansion of the Library may cause some groundborne vibration and noise, but these exposures would be temporary, and typical of a construction project of this type and scale.

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Operation of the expanded Library would not create a permanent substantial increase in ambient noise levels over the existing Library use. Activities associated with the renovated Library would take place within the building and would not create additional noise for adjacent or nearby uses.

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Expansion and renovation of the Library would generate temporary construction noise in the immediate project vicinity that would be higher than current ambient noise levels. However, construction of the proposed project would be required to comply with the City’s Noise Ordinance, which restricts the hours of operation for certain noise producing equipment. The construction contractor would be encouraged to place equipment staging areas as far away from existing noise sensitive uses, such as residential units, as possible. Therefore, implementation of the proposed project would result in a less-than-significant temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. The following measures will further mitigate the potential noise levels to a less than significant level:
Mitigation Measure NOI-1: To reduce daytime noise impacts due to construction, the construction contractors shall implement the following measures:

1. Equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically-attenuating shields or shrouds, wherever feasible and necessary);

2. Impact tools (e.g., jack hammers, pavement breakers, and noise drills) used for project construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to 10 decibels (dB). External jackets on the tools themselves shall be used where feasible, and this could achieve a reduction of 5 dB. Quieter procedures shall be used such as drilling rather than impact equipment whenever feasible; and

Stationary noise sources shall be located as far from sensitive receptors as possible. If they must be located near existing receptors, they shall be muffled to the extent feasible and enclosed with temporary sheds.

Mitigation Measure NOI-2: Construction activity shall be limited to between the hours of 8:00 a.m. and 6:00 p.m. Monday through Friday, and between 9:00 a.m. and noon on Saturday. No construction-related activity shall occur on Sunday.

Mitigation Measure NOI-3: Prior to the start of construction, the applicant shall provide the project planner with the name and telephone number of the individual empowered to manage construction noise from the project. The individual’s name, telephone number, and responsibility for noise management shall be posted at the project site for the duration of construction in a location easily visible to the public. The individual shall record all noise complaints received and actions taken in response, and submit written reports of such complaints and actions to the project planner on a weekly basis.

Mitigation Measure NOI-4: To ensure compliance with the City’s noise control regulations and these mitigations the City of Berkeley Zoning Officer is authorized to place additional limitations on the hours of operation and/or halt construction until corrective measures are taken.

c) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

The project site is not located within an airport land use plan or within two miles of any public airport or public use airport.

d) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

The project site is not within the vicinity of any private airstrip.
XII. POPULATION AND HOUSING -- Would the project:

a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

There are no growth-inducing elements to the project. The Library expansions and renovation would not generate any additional population, and the site is currently developed, so no extension of facilities or services would be needed to implement the project.

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

The proposed project would be confined to its existing site and would not displace any existing houses or apartments.

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

See XII.b.

XIII. PUBLIC SERVICES

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

Fire protection?

6, 12

The nearest fire stations to the project site are Station #6 (on Cedar Street) and Station #1 (on 8th Street). Upon approval of the project, the applicant would adhere to all Uniform Building Code standards and City policies regarding fire hazards. The proposed Library building would include sprinklers for Type V buildings. The project would not increase the need for additional fire services, and would not adversely affect response times.

Police protection?

6, 12

The expansion and renovation of the Library would not increase the demand for police protection or other public safety services in the area. It is anticipated that current patrols could serve the needs of the proposed project and not adversely affect response times.

Schools?

The Berkeley Adult School is approximately one block from the proposed project. During construction, the Library would vacate the site, and the students and faculty that use the West Branch Library for educational purposes could be impacted by the temporary relocation of the facility. However, all other branches will remain open and so any effect would be considered less than significant.
The proposed project would not contribute to population or employment growth and would therefore not increase demand for parks or other recreation facilities.

Other public facilities?

The proposed project is the expansion and renovation of the West Branch of the Berkeley Public Library; there would be a beneficial effect on this branch of the public library and the public facilities provided within, including public meeting space.

**XIV. RECREATION**

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

See XIII.a. Parks above.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

The proposed project does not include recreational facilities, nor would it contribute to population or employment growth; as such, it would not require the construction of recreational facilities.

**XV. TRANSPORTATION/TRAFFIC** -- Would the project:

a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections)?

The Library fronts on University Avenue, a four-lane arterial roadway with on-street parking on both sides of the street. In 2000, University Avenue had a 24-hour volume of 32,400 vehicles (on the segment east of the project area, Sacramento to California Avenues). It is estimated that the expansion and renovation of the West Branch Library would increase visitation to the site by 71 visitors per day (a 25 percent increase over the current number of visits). Based on the results of a Users Survey conducted by the Library (the results of which are summarized in Appendix B), approximately 45 percent of the 71 net new visitors (i.e., 32 visitors) would be expected to drive to the site. These 32 visitors would generate two trips each, one trip to the site and one trip from the site, for a total of 64 additional vehicle trips per day, assuming that people would visit the Library only once per day. Of the 64 new vehicle trips, approximately 10 percent (six vehicle trips) would occur during the peak traffic hours. This analysis found that the generation of six additional vehicle trips during peak hour traffic would not cause a

\[\text{ Citation: } 5, 6, 14\]

7 The number of potential new Library-associated trips at the University Avenue and San Pablo Avenue intersection during the peak AM and PM commute hours are those of greatest concern to the City of Berkeley according to Chuck De Leuw, Traffic Engineer, City of Berkeley personal communication with LSA Associates Inc.
substantial increase in traffic relative to the existing traffic load and capacity of the street system or the University Avenue and San Pablo Avenue intersection (see Appendix B for additional information).

b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

See XV.a. The proposed project would not generate more than 100 trips during the p.m. peak hour and so is not required to undertake a traffic analysis subject to the protocols of the Congestion Management Agency (CMA).

The proposed project is not anticipated to result in significant impacts to Congestion Management Program (CMP) roadways or local intersections in the vicinity of the project site.

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

The project site is not located near an airport and would not result in any change to air traffic patterns.

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

A driveway currently exists on the west side of the Library which provides access to four parking spaces. The proposed project would remove this driveway and curb-cut on University Avenue, increasing the safety of drivers, bicyclists and pedestrians on University Avenue. The project would not result in a substantial increase in hazards relative to the circulation system.

c) Result in inadequate emergency access?

Local emergency access would not be affected by implementation of the proposed project. During the most active periods of construction on the project site, University Avenue would remain clear of obstructions to allow adequate emergency vehicle access. In addition, the small relative increase in traffic on University Avenue that would result from the proposed project would not create a barrier to the movement of emergency vehicles.

f) Result in inadequate parking capacity?

The City of Berkeley Zoning Ordinance requires that the proposed project provide 1 auto parking space per 500 square feet of publicly accessible floor area of approximately 12,000 square feet, for a total of 24 required parking spaces. The existing Library currently has four on-site parking spaces that are used by staff. The proposed project would not provide any off-street parking. The proposed project includes the application for a variance to provide no parking, per Section 23E.36.080 (ZAB).

There is sufficient on-street public parking in the vicinity of the Library; specifically, within a 500-foot radius of the project, there are 262 non-metered and 76 metered parking spaces. One additional on-street parking space would be made available after completion of the renovation project due to the closure of the access drive on the western side of the project site. A parking problem has not been identified in the neighborhood to the north of the Library site. Of the respondents to the Library User Survey (conducted in winter and spring of 2003, see Appendix B), of those who drive to the West Branch Library, only 1 percent responded that they had to park “far away.” In addition to access to parking, there is access to public transit and alternative transportation routes. There are 13 bus stops, which serve three east-west bus routes on University Avenue and four north-south bus
routes on San Pablo Avenue in the project vicinity, including the San Pablo Rapid bus service (line 72R). The site is four blocks from the east-west Bicycle Boulevard of Virginia Street, and three blocks from the north-south Bicycle Boulevard of 9th Street. University Avenue is a major corridor, with sidewalks, streetscaping, and storefronts of interest to pedestrians. In addition, the City General Plan includes Transit Policies that encourage public transit, bicycle use, pedestrian activities, and the related reduction in automobile use. In general, the renovation and expansion of the Library would promote the municipal health, welfare and safety and would benefit the City as a whole and provide for the enjoyment of Berkeley citizens.

In evaluating the adequacy of parking for users of the West Branch, it should be emphasized that there are exceptional circumstances that apply to the project site and that do not apply to other uses along the University Avenue corridor. The size of the parcel is 11,970 square feet, and the existing Library is approximately 5,970 square feet. The required 24 parking spaces, assuming 18 8-foot stalls and a 22 foot-wide driveway (100 feet in length to access 12 spaces on the right and left), would require 5,660 square feet. This is approximately 50 percent of the site. Providing underground parking would be cost prohibitive. The Library expansion project is required to retain the Structure of Merit and proposes to use the majority of the site for Library-related uses to benefit the public. The existing facility is overcrowded, and the expanded and renovated Library would provide for the enjoyment of Berkeley's citizens. In general, the public value of an expanded and enhanced community library is greater than providing dedicated public parking.

The lack of parking in association with the renovation and expansion of the Library would not adversely affect the health or safety of persons residing or working in the area, or be detrimental to the public welfare, for the reasons stated above and because there is adequate on-street parking and transit opportunities in the project vicinity for the levels of use expected at the renovated Library. Additionally, with implementation of Mitigation Measure LU-1, the project would not result in significant impacts related to a lack of parking.

g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

The City of Berkeley Zoning Ordinance requires that the proposed project provide one bicycle parking space per 2,000 gross square feet of publicly accessible floor area, for a total of eight required parking spaces. The proposed project includes 16 bicycle parking spaces (providing eight additional spaces). The proposed project supports adopted policies, plans and programs supporting alternative transportation. The project also furthers the General Plan goal of furthering the use of transportation alternatives by limiting available public parking.

XVI. UTILITIES AND SERVICE SYSTEMS -- Would the project:

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

The project would be served by the existing sewer lines, and development of the project would not exceed wastewater treatment requirements of the Regional Water Quality Control Board.

b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Implementation of the project would neither require nor result in the construction of new water or wastewater treatment facilities on the expansion of existing facilities.
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Development of the project would neither require nor result in the construction of new stormwater drainage facilities or expansion of existing facilities as the project would not significantly increase the amount of impervious surfaces on the site.

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

The project would expand the existing Library to 15,000 total GSF, and would provide four additional toilets, six additional sinks, and one additional drinking fountain. The proposed project is an infill development that would serve existing Berkeley residents and students, and sufficient water supplies are available to serve the project.

e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project’s projected demand in addition to the provider’s existing commitments?

See XVI.a. Adequate wastewater capacity is available to serve the project.

f) Be served by a landfill with sufficient permitted capacity to accommodate the project’s solid waste disposal needs?

The project would not generate a significant amount of solid waste and current landfill capacity is sufficient to serve the project.

g) Comply with federal, State, and local statutes and regulations related to solid waste?

The project would include facilities to recycle cardboard, office paper, aluminum, and glass, and would be in full compliance with all federal, State, and local solid waste statutes and/or regulations related to solid waste.

XVII. MANDATORY FINDINGS OF SIGNIFICANCE --

a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?
b) Does the project have impacts that are individually limited, but cumulatively considerable? (Cumulatively considerable means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?
SOURCE REFERENCES


APPENDIX A

HISTORIC RESOURCES INFORMATION
LANDMARKS
PRESERVATION
COMMISSION

Notice of Decision
FOR MEETING OF: May 5, 2003

Property Address: 1125 University Avenue · APN: 057 2085 011
Also Known As: West Berkeley Branch Library
Property Owner: City of Berkeley
Action: Structure of Merit Designation
Designation Author: Carrie Olson

WHEREAS, on March 3, 2003, pursuant to Section 3.24.120 of the Landmarks Preservation Ordinance, the Landmarks Preservation Commission voted to initiate the property at 1125 University Avenue for landmark consideration and set the Public Hearing for April 7, 2003; and

WHEREAS, on April 4, 2003, the City received the designation proposal from Carrie Olson; and

WHEREAS, on April 7, 2003, the Landmarks Preservation Commission held a public hearing to hear public testimony and to consider the designation proposal for 1125 University Avenue; and

WHEREAS, on April 7, 2003, the Landmarks Preservation Commission voted to close the public hearing and continue 1125 University to the May 5, 2003 meeting to designate as a City of Berkeley Structure of Merit; and

WHEREAS, the Landmarks Preservation Commission finds that the West Berkeley Branch Library building has cultural and historical significance because it was the first branch library built in Berkeley spurring the evolution of the City of Berkeley branch library system; and

WHEREAS, the Landmarks Preservation Commission finds that the West Berkeley Branch Library building has cultural and historical significance because the West Berkeley Branch Library building was the first public library building to be paid for by the citizens of Berkeley; and

WHEREAS, the Landmarks Preservation Commission finds that the West Berkeley Branch Library building has educational, cultural and historical significance because the West Berkeley Branch Library building was an important social, education and cultural center of West Berkeley life, situated intentionally adjacent to the busy intersection of Berkeley’s main entrance into the city (University Ave.) and the state highway (San Pablo Ave.) and contributed to the fabric of that neighborhood, serving as a library for three nearby public schools and serving many tens of thousands of West Berkeley residents for eighty (80) years; and
WHEREAS, the Landmarks Preservation Commission finds that the West Berkeley Branch Library building has architectural significance because the West Berkeley Branch Library building, designed in the Classical Revival style, is the only Carnegie influenced library remaining in the City of Berkeley; and

WHEREAS, the Landmarks Preservation Commission finds that the West Berkeley Branch Library building's significant exterior features to be preserved are the Roman triumphal arched entry with semi-circular window and surrounding engaged columns; the round ornamental medallion right of the arch; window proportions of three banks of windows on either side of the arched entry on south façade; wood framed windows on west and east facades, the cornice on the west, south and east facades, and the remaining incised lettering from the original "WEST BERKELEY BRANCH LIBRARY"; and

WHEREAS, the Landmarks Preservation Commission finds that the West Berkeley Branch Library building has cultural significance because the West Berkeley Branch Library building will celebrate its 80th birthday this year and serves as lasting proof that "Citizens of West Berkeley ... love good literature."

NOW, THEREFORE, BE IT RESOLVED by the Landmarks Preservation Commission that on May 5, 2003, 1125 University Avenue is hereby designated a City of Berkeley Structure of Merit.

VOTE: 8-0-0-0
Aye: Emmington, Johnson, Kaufer, Korte, Kavanaugh-Lynch, O'Malley, Weiss and Chair Olson
Nay: None
Abstain: None
Absent: None

ATTEST:

Greg Powell
Secretary, Landmarks Preservation Commission
DATE NOTICE MAILED: June 9, 2003
THE APPEAL PERIOD EXPIRES (15 DAYS) AT 5 PM: June 24, 2003
Appeal must be filed with City Clerk by this date.

TO APPEAL THIS MATTER:
Pursuant to Section 3.24.300 of the Landmarks Preservation Ordinance: "An appeal may be taken to the City Council by the City Council on its own motion, by motion of the Planning Commission, by motion of the Civic Art Commission, by the verified application of the owners of the property or their authorized agents, or by the verified application of at least fifty residents of the City aggrieved or affected by any determination of the commission made under the provisions of this chapter". Any appeal submitted by the public must be in writing, specifying the reasons for the appeal. The appeal fee is $64.00. The City Clerk's Department is located on the first floor at 2180 Milvia Street, Berkeley, CA 94704; Phone (510) 981-6900.

NOTICE CONCERNING YOUR LEGAL RIGHTS:
If you object to a decision by the Landmarks Preservation Commission to approve or deny a Landmark or Structure of Merit Designation, the following requirements and restrictions apply:

1. You must appeal to the City Council within 15 days after the Notice of Decision of the action of the Landmarks Preservation Commission is mailed. It is your obligation to inquire with the Current Planning Division (981-7410) to determine when a Notice of Decision is mailed.
2. No lawsuit challenging a City decision to deny or approve a Landmark or Structure of Merit Designation (Code Civ. Proc. Section 1094.6(b) may be filed more than 90 days after the date the decision becomes final, as defined in Code of Civil Procedure Section 1094.6(b). Any lawsuit not filed within that 90-day period will be barred.
3. In any lawsuit that may be filed against a City Council decision to approve or deny a Landmark or Structure of Merit Designation, the issues and evidence will be limited to those raised by you or someone else, orally or in writing, at a public hearing or prior to the close of the last public hearing on the project.
4. If you believe that this decision or any condition attached to it denies you any reasonable economic use of the subject property, was not sufficiently related to a legitimate public purpose, was not sufficiently proportional to any impact of the project, or for any other reason constitutes a "taking" of property for public use without just compensation under the California or United States Constitutions, the following requirements apply:
   a. That this belief is a basis of your appeal.
   b. Why you believe that the decision or condition constitutes a "taking" of property as set forth above.
   c. All evidence and argument in support of your belief that the decision or condition constitutes a "taking" as set forth above.

If you do not do so, you will waive any legal right to claim that your property has been taken, both before the City Council and in court.

cc:
City Clerk's Office  
2180 Milvia Street  
Berkeley, CA 94704
Elena Engel  
2090 Kittredge Street  
Berkeley, CA 94704
April 3, 2003

DAVID SCHNEE, AIA, AICP
GROUP 4 ARCHITECTURE, RESEARCH + PLANNING, INC.
301 LINDEN AVENUE
SOUTH SAN FRANCISCO, CA 94080
FAX: 650.871.7911

RE: BERKELEY WEST BRANCH LIBRARY

Dear Mr. Schnee,

You have asked me to speak to the historic importance of the Berkeley West Branch Library at 1125 University Avenue.

When we participated in a master planning study of the West Branch some years ago, the building was not considered a historic resource by the City of Berkeley, and we concurred in that assessment. The original building placed on the subject site was opened in September, 1923. If this building were the only occupant of the site at present (and in good condition), there would be no question about its eligibility to the National Register of Historic Places [National Register], the California Register of Historic Resources [California Register], or as a local Landmark. But, in 1973-1974, fairly extensive alterations were designed and built. The alterations, in our opinion, compromise the integrity of the building in its present state.

Criteria used in assessing properties for eligibility to the National Register and the California Register require that a given property retain physical 'integrity.' According to the National Park Service, the seven aspects of integrity that must be assessed are location, design, setting, materials, craftsmanship, feeling and association. In assessing integrity, one defines the "essential physical features that must be present for a property to represent its significance," and one determines "whether the essential physical features are visible."

In terms of design, the additions of 1974 place a mask in front of the original building that hides its original appearance from the public. The original front entrance is closed and a side entrance is provided. One of two main front windows is removed to allow for a 'teen corner.' Additional alterations make it difficult to know where the original building fabric ends and newer material begins.

In terms of setting, the open block shown in newspaper illustrations from 1923 has been substantially built up, and the West Branch is now crowded into a much more urban streetscape.

In terms of feeling ["a property's expression of the aesthetic or historic sense of a particular period of time"], because the present architectural composition derives from two periods, neither of which successfully dominate, the property does not satisfactorily communicate a sense either of the 1920s or of the 1970s.

RECEIVED
GROUP 4 ARCHITECTURE
RESEARCH & PLANNING INC.

APR 17 2003
For the above reasons I do not believe that in its present condition the West Branch would be individually eligible to either the National Register or the California Register. The Landmarks Preservation Commission should speak to the property’s eligibility as either Landmark or Structure of Merit.

That said, the building does have some historic importance. The historic portion was built in 1923 using the City's own money and employing a unique lease-purchase plan. Parts of the original building are still present on site, and these could be identified, evaluated for significance and partially retained. As architects of the forthcoming rehabilitation of the West Branch, your office will have the opportunity to shape a design that may combine the best of what is now present on site with the most advanced 21st century requirements.

Very truly yours,

J. Gordon Turnbull, FAIA
Historic Preservation Architect

N.B.: Quotes, where they occur in the text of this letter, are from *National Register Bulletin 15*, last published by the U.S. Department of the Interior in 1998.
APPENDIX B

WEST BRANCH LIBRARY USER SURVEY AND TRAFFIC ASSUMPTIONS

USER SURVEY SUMMARY

In the Winter and Spring of 2003, the City of Berkeley Public Library conducted a written survey of patrons of the West Berkeley Library (a copy of which is attached). Surveys were received from 275 library users and 146 non-users. The surveys were compiled and summarized by Elena Engel, Berkeley Public Library staff, as follows.

Of the users, the frequency of use of the West Berkeley Branch is:
- 36% weekly use
- 35% monthly use
- 23% every 3 to 6 months
- 6% once in the past year

Of the users, the mode of transportation to the West Berkeley Branch is:
- 45% car
- 36% walk
- 9% public transit
- 9% bike
- 2% other

Of the users, those who drive to the West Berkeley Branch park:
- 54% in the lot
- 40% on the street
- 4% within a block
- 1% far away

Ms. Engel has also reported that the currently number of visitors to the library is 238 per day. Prior to restoration and expansion of the Central Library, a 25 percent increase in visitation was projected as a result of the improvements. After restoration and expansion, the Library experienced an approximately 10 percent increase in visitation. For the West Branch Library, a conservative increase in visitation by 25 percent after expansion and restoration has been assumed. This would be an increase of approximately 71 visitors, for a total of 354 visitors per day.
TRAFFIC ASSUMPTIONS

It is estimated that the expansion and renovation of the West Branch Library would increase visitation to the site by 71 visitors. Of the 71 visitors, based on the User Survey, approximately 45 percent of the visitors would drive to the site. These 32 visitors would generate 2 trips each, one coming to the site and one leaving the site, for a total of 64 additional vehicle trips per day. This analysis assumes that people visit the library once per day. Of the 64 new vehicle trips, approximately 10 percent (6 vehicle trips) would occur during the peak traffic hours. The generation of 6 additional vehicle trips during peak hour traffic would not significantly impact the surrounding intersections.

In June 2003, LSA Associates Inc. discussed the above assumptions and methodology with Chuck DeLeuw, Traffic Engineer, City of Berkeley. Mr. DeLeuw generally agreed with the above conclusions.
BERKELEY PUBLIC LIBRARY SURVEY
FEBRUARY, 2003

The Library is planning to apply for State funds to remodel the WEST BRANCH LIBRARY. Please help us evaluate library services and the facility by answering the following questions:

1. Have you used the West Branch Library in the last year?
   ___ Yes (Skip to question 3) ___ No ___ Don't know

2. Why have you not used the library during this period? (Check all that apply)
   ___ 1. Haven't had a need to use it.
   ___ 2. Don't have time.
   ___ 3. Don't have any transportation.
   ___ 4. Don't know where the library is located.
   ___ 5. Don't have a library card.
   ___ 6. I use another public library (Name of library__________________________)
   ___ 7. I buy my own books and magazines.
   ___ 8. The library doesn't have what I need. I need__________________________
   ___ 9. Other__________________________

If you have not used the library or its services please skip to question 9.

3. Which of the areas or services have you—or a member of your household—used at the West Branch Library in the past twelve months (Check all that apply).
   ___ 1. Children's area
   ___ 2. Teen area
   ___ 3. Adult area
   ___ 4. Internet computers
   ___ 5. Word Processing computers
   ___ 6. Materials in languages other than English (which language?__________________________)
   ___ 7. Video collection
   ___ 8. Literacy program
   ___ 9. Attended a meeting or program
   ___ 10. Visited the website for information
   ___ 11. Telephoned the library to obtain information
   ___ 12. Borrowed books

4. About how often have you used the West Branch Library during the past twelve months?
   ___ 1. Weekly ___ 3. Every three to six months
   ___ 2. Monthly ___ 4. At least once during the past twelve months
5. How do you get to the Library?
   - Car
   - Public transportation
   - Bike
   - Walk
   - Other

6. If you parked a car to visit the Library, where did you park?

7. How do you rate the following: (please circle) If you don't know or don't use that service or area, just leave that one blank.

<table>
<thead>
<tr>
<th>Service</th>
<th>Unsatisfactory</th>
<th>Satisfactory</th>
<th>Excellent</th>
</tr>
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<tbody>
<tr>
<td>Children's Area</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Children's Materials</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Children's storytime</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Summer reading program</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Teen Area</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Teen Materials</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Adult Area</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Adult Materials</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Videos, DVD's CD's</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Amount of seating</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Amount of study space</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Amount of internet computers</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Amount of word processing</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Literacy program</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Meeting room</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Restrooms</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Comfortable atmosphere</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

8. Do you have any comments or suggestions on how to improve West Branch library services and building?

9. Can you provide some information about yourself, so the library can understand who uses or doesn't use our services?
   - Male
   - Female
   - Your age

Do you have children?   No   Yes   Ages

Ethnicity

Language(s) spoken at home
APPENDIX C

WEST BRANCH LIBRARY SHADOW STUDY
SHADOW STUDY

- Building Program: 14,000 - 16,000 GSF

- To satisfy program goals, the project needs to maximize building SF while taking into account site constraints:
  - Preserve existing redwoods to the North
  - Restore the original 1923 library and relocate it to an appropriate location on the site with landscape and entry forecourt
  - Setbacks (City of Berkeley Zoning Ordinance)
    - Front yard = 0 ft.
    - Side yard = 0 ft.
    - Rear yard = 10% depth of lot = 12 ft.
    - Max. height = 40 ft. (2 story)
SHADOW STUDY

- The project proposes to obtain a conditional use permit to build a first floor extension into the 12 ft. rear yard setback.

- The second floor of the library will stay behind the 12 ft. setback.

- A set of shadow studies will show the impact of the first floor extension on the neighboring North property.

---

SHADOW STUDY

- Study Contents
  - Summer Solstice (June 21)
    - Morning = 06:52 AM Plan
    - Noon = 12:11 AM Plan & Section
    - Afternoon = 05:30 AM Plan
  - Winter Solstice (December 21)
    - Morning = 09:26 AM Plan
    - Noon = 12:03 PM Plan & Section
    - Afternoon = 02:49 PM Plan
  - Maximum Scenario Section

* Date and time for solar angle study is provided by Berkeley Planning Dept.
SHADOW STUDY - CONCLUSION

- The first floor extension will only cast new shadows on the North property between 3/15 to 9/28. The maximum depth of the shadow is 10 ft. from the property line (fence) at the summer solstice. Therefore it will never cast a shadow on the neighboring residential building to the north.

- The second floor parapet is designed 20% below the permitted zoning requirements where the maximum height is 40 ft. and the setback is 12 ft. from the North property line. By complying with these guidelines, the shadows created by the new structure should also be regarded as within code limits.
APPENDIX D

MITIGATED NEGATIVE DECLARATION
COMMENTS AND RESPONSES
September 10, 2003

Elena Engel
Building Project Manager
Berkeley Public Library
2090 Kittredge Street
Berkeley, California 94704

Dear Ms. Engel:

Thank you for the opportunity to comment on the Initial Study and Mitigated Negative Declaration (SCH # 2003082091) for the Berkeley West Branch Renovation & Expansion Project. As you may be aware, the California Department of Toxic Substances Control (DTSC) oversees the cleanup of sites where hazardous substances have been released pursuant to the California Health and Safety Code, Division 20, Chapter 6.8. As a potential Responsible Agency, DTSC is submitting comments to ensure that the environmental documentation prepared for this project to address the California Environmental Quality Act (CEQA) adequately addresses any required remediation activities which may be required to address any hazardous substances release.

The Initial Study states that key components of the renovation will include demolition of the 1974 building additions and rebuilding of the foundation. It further states that a geotechnical investigation of the project site was conducted, and no hazardous soils were found. Please provide a summary of the results of this report. Additionally, the Initial Study states that building footing and subterranean portions of the project may encounter contaminated groundwater, and that a de-watering system will be used if contaminated groundwater is present. There is insufficient information regarding groundwater contamination at the site. Please describe contaminants found at the site, and concentrations of these contaminants. Also, describe prior studies that have been done to ensure that de-watering activities won’t exacerbate existing groundwater contamination.

At project sites where contamination is suspected, DTSC recommends sampling in order to characterize the extent and magnitude of contamination prior to any construction activities. Based on sampling results, appropriate mitigation measures can be proposed and analyzed subsequent to site clean-up. If any sites were previously contaminated but the contamination was subsequently mitigated, please include a discussion of the contamination that existed and the clean-up measures that were implemented, and residual contaminant levels.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at www.dtsc.ca.gov
Ms. Elena Engel  
September 10, 2003  
Page 2  

DTSC can assist your agency in overseeing characterization and cleanup activities through our Voluntary Cleanup Program. A fact sheet describing this program is enclosed. We are aware that projects such as this one are typically on a compressed schedule, and in an effort to use the available review time efficiently, we request that DTSC be included in any meetings where issues relevant to our statutory authority are discussed.

Please contact Monica Gan of my staff at (510) 540-3748 if you have any questions or would like to schedule a meeting. Thank you in advance for your cooperation in this matter.

Sincerely,

[Signature]  
Barbara J. Ciolk, P.E., Chief  
Northern California - Coastal Cleanup Operations Branch

Enclosures

cc: without enclosures

Governor's Office of Planning and Research  
State Clearinghouse  
P.O. Box 3044  
Sacramento, California 95812-3044

Guéthier Moskat  
CEQA Tracking Center  
Department of Toxic Substances Control  
P.O. Box 806  
Sacramento, California 95812-0806
September 30, 2003

Barbara J. Cook, P.E., Chief
Northern California - Coastal Cleanup Operations Branch
Department of Toxic Substances Control
700 Heinz Avenue, Suite 200
Berkeley, CA 94710-2721

Dear Ms. Cook:

Thank you for your comments on the Initial Study and Mitigated Negative Declaration (SCII #2003082091) for the Berkeley West Branch Library Renovation and Expansion Project. In your letter dated September 10, 2003, you requested a summary of the geotechnical investigation. In response, a summary is provided below.

The Geotechnical Exploration, prepared by Fugro West, Inc, consisted of conducting a geotechnical exploration of the site by drilling two soil test borings, geotechnical laboratory tests, engineering analyses to develop recommendations regarding the geotechnical aspects of the project, and preparing a report summarizing their findings and conclusions. This report is available for review at the City of Berkeley Planning Department.

The regional geology of the site consists of the Coast Ranges geomorphic province, which is characterized by northwest-southwest trending valleys and ridges. The site and vicinity are underlain by Alluvial Fan and Fluvial Deposits (Qafl). Regional seismic conditions are similar to other sites in the San Francisco Bay Area, one of the most seismically active regions in the United States. The surface conditions at the site consist primarily of the existing building, driveway, retaining wall and a small stand of trees. The subsurface conditions, below the 4 inches of concrete and 4 inches of aggregate base, consist of 1 to 2 feet of fill overlying very stiff to hard clay. The very stiff to hard clay extends to a depth of about 18 feet, and interlayered medium dense to dense clayey sand and stiff clay was observed from about 18 feet to the maximum depth of 31.5 feet. The upper 5 feet of soils are moderately expansive. Groundwater was measured at about 18 feet below ground surface.

The report concludes that the proposed development is feasible from a geotechnical standpoint, provided that the conclusions and recommendations presented in the report are incorporated into the project design and specifications. Conclusions and recommendations include details such as the following: how the structure should be designed to resist lateral and uplift forces generated by earthquake shaking; how expansive soil should be altered to reduce its expansion potential; that deepened spread footing system could be used to support the proposed building; that a drilled piers system may be utilized to resist uplift loads (drilled piers may extend below the water table); and other earthwork considerations.

Also in your letter of September 10, you requested a description of the contaminants at the site and concentrations of these contaminants, and a description of prior studies that have been done to ensure that de-watering activities would not exacerbate existing groundwater contamination. There are no known groundwater contaminants at the site, and groundwater contamination is not suspected.
However, the site is located in an urban area where there is the potential for non-point source pollution and unreported point source pollution to enter the groundwater. Mitigation Measure HAZ-3, the filtering of water if de-watering is required, has been included to protect the City’s sanitary sewer system.

The only contaminants found at the site were asbestos and lead, as discussed in VII. Hazards and Hazardous Materials. The Asbestos & Lead Survey Report prepared by RGA Environmental Inc. is available for review at the City of Berkeley Planning Department.

A Phase I Environmental Site Assessment was completed for the proposed Berkeley Montessori School at 1310 University, approximately 0.2 miles southeast of the project site. The Phase I assessment found that no contaminated sites in the vicinity of that project, including the library site, had been documented.

I hope this response has cleared up any concerns you may have had regarding the site and the proposed project. It is anticipated that the City of Berkeley Zoning Adjustments Board will consider this environmental documentation on October 9, 2003.

Sincerely,

[Signature]

David R. Clore, AICP
Principal-in-Charge
September 23, 2003

Greg Powell
Current Planning Division
2120 Milvia Street
Berkeley, CA 04704

Re: Berkeley Public Library West Branch Renovation and Expansion Project

Dear Mr. Powell:

This letter is in regard to the proposed Library Expansion Project at 1125 University Avenue. As a neighboring property owner, I am concerned that this project does not address the issue of parking, except to say in the recently mailed Mitigated Negative Declaration that on-site parking will not be provided due to the "small lot size". It also appears that the current library parking lot will be used for expansion purposes, although the MND does not give any information on the number of spaces being removed, or the impact this will have on neighboring property owners.

It is our concern that this proposed expansion will significantly increase the unauthorized parking behind the Haimar Clothing Store, and in our parking lot in general. As a property owner at the neighboring University and San Pablo center, I have spoken with other building owners and tenants. We are concerned about this proposal, because when Pet Food Express and Long's Drugs open for business, our center will see a much higher traffic count. Although the majority of library patrons have been using our lot as their primary source of parking for many years, if the library becomes three times larger under this proposal, we may be left with no choice but to post signs and begin towing cars. This is not a situation we wish to be placed in. However, the lack of dedicated city parking adjacent to the library combined with the current expansion request are the direct source of the problem, and would seem to be incompatible.

Were it not for the parking issue (which is so casually waived in the MND), we would have no objections to this proposal. However, this expansion has the potential to create a serious parking problem for our patrons during peak hours, and would create a financial burden which would fall directly, and unfairly, upon neighbors adjacent to the library. In particular, we may have to begin policing the lot at our own expense, as well as continue to pay for parking lot repairs such as the $51,385 repair from last year (see attached American Asphalt bill). It should be noted that a good percentage of this bill was to repair the area adjacent to the library where years of traffic (by all parties) had caused the lot to deteriorate.

In closing, we would ask that you re-visit the parking issue before placing this potential burden on the property owners at the University and San Pablo Center. It may seem that there is sufficient public transportation, metered parking, or foot traffic at the library to warrant this expansion - but in terms of real-world parking behavior by library patrons I can assure you that we are providing the majority of off-site car parking (see attached aerial photo).

If you have any questions or require any additional information, please do not hesitate to contact me. Thank you for your consideration of this request, and for presenting our concerns to the Zoning Adjustments Board on October 6, 2003.

Yours truly,

Joel Avila
Ms. Mary Palmerin  
Smart & Final Stores Corporation  
600 Citadel Drive  
Commerce, CA 90040  

Re: Payment of Billing  

Upon completion of the scope of work for the following proposals, please have your accounting department issue one check for the total amount of work performed:

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<tr>
<th>Proposal #</th>
<th>Area</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>001620</td>
<td>Area A</td>
<td>$19,895</td>
</tr>
<tr>
<td>001621</td>
<td>Area B</td>
<td>18,735</td>
</tr>
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<td>001622</td>
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</tr>
<tr>
<td>001623</td>
<td>Area D</td>
<td>1,360</td>
</tr>
<tr>
<td>001624</td>
<td>Area E</td>
<td>2,650</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>$51,385</td>
</tr>
</tbody>
</table>

Please do not hesitate to contact our office if you have any questions or concerns.

Thank you very much for your business.

Very truly yours,

AMERICAN ASPHALT

[Signature]
Troy Lamb  
Estimator

www.AmericanAsphalt.com  
27601 INDUSTRIAL BLVD. • P.O. BOX 3367 • HAYWARD, CA 94540-3367 • (800) 541-5539 • FAX (510) 725-0288 • CA LIC. #398991.
RESPONSE TO COMMENT LETTER
Joel Avila, neighboring property owner
September 23, 2003

Mr. Avila has expressed concern that the issue of parking has not been adequately addressed. However, Section XV.f) on page 31 of the Initial Study and Mitigated Negative Declaration discusses existing parking, proposed parking, parking in the vicinity, and the accessibility of public transit. In addition, information on how library users get to libraries is included in Appendix B. Section XV.d) notes that the existing library currently has four on-site parking spaces that are used for staff. These four spaces would be removed as part of the proposed project, as shown in Figure 3, Preliminary Floor Plans, on page 7, and the proposed project would not include any off-street parking. The impacts of this proposal are discussed on pages 31 and 32, and the Initial Study concludes that the lack of off-street parking would not adversely affect adjacent properties or persons residing or working in the area because of the combination of adequate on-street parking and transit opportunities in the project vicinity.

The City understands that library patrons may tend to use the off-street parking adjacent to the library but owned by others and designated for use by patrons of Halmar Clothing, Longs Drugs, and PetFood Express. While not found to be a physical environmental impact per se, the Library could help avoid potential friction between its users and adjacent property owners/merchants by posting notices on the library site and in the library alerting patrons that that space is not available for their use and that cars parked there may be towed.
Environmental Review Officer  
Via Fax: (510) 981-7420

RE: Opposition to Renovation and Expansion of Berkeley West Branch Library

September 24, 2003

Dear Environmental Review Officer,

I am writing this letter on behalf of all the owners for the property located at 1136-44 Hearst Ave, Berkeley. Our property is located directly behind the proposed renovation and expansion of the Berkeley West Branch Public Library.

After review of the proposed design and discussions with our owners, we are opposed to this project as it will negatively impact our property. Please record our opposition to the project. We are in the process of turning this matter over to our attorney. Should you have any questions or comments please call me at (510) 482-8100. Should you need to mail any items, please send any information to the following address:

David Seyranian  
Discount Brokers Real Estate  
4144 Redwood Rd.  
Oakland, CA  94619

Thank you for your consideration of this matter.

Very truly yours,

[Signature]
David Seyranian
RESPONSE TO COMMENT LETTER
David Seyranian, on behalf of property owners at 1136-44 Hearst Avenue
September 24, 2003

Mr. Seyranian has expressed his general opposition to this project. This comment does not address the adequacy of the analysis or findings of the Initial Study and Mitigated Negative Declaration; no further response is required.
A P P E N D I X  O

C O R R E S P O N D E N C E
I wear both hats. Officially, Harley Ellis Devereaux is the architect of record for the project. GreenWorks Studio is under contract with PG&E for the zero net energy analysis. (It is not a separate company, just a technical branch of HED.) The author of the architectural report, *Schematic Design Phase Report*, is therefore just Harley Ellis Devereaux.

I intend to carry out that embodied energy analysis and create that graph for use at the Landmarks Commission hearing. I will pass it by recognized experts in the field for their review and comment, so that it is not just coming from the architect of the building but has some technical vetting.

One comment is that I think West has it easier than South. I could make a conjecture of a similar graph for South, but they would be forced to reuse the entire structure in the preservation alternative and their energy use projection will show some annual consumption (though they have some solar PV panels). Their breakeven point, therefore, would be out a number of years. Still, I think that point would be much less than even a short building lifetime, meaning that the new building has lower GHG impact. But the argument is not nearly as convincing as in the case of West.

Ed
Nicola,

- Yes, we are on track for the LEED points indicated.
- What “references to authorship” are you talking about—I don’t understand the question.
- With regard to GHG “references to energy embodied in buildings”, perhaps we should be clear on what you are trying to write and what you need to support certain statements. I have spent some time looking through various sources of information and I think that it is appropriate to make the following points:

1. The “Embodied energy” comparison for this particular project is between two alternatives: reconstruct the existing historic structure per the schemes considered in the EIR and construct an all-new building after demolishing the existing structure. The embodied energy can actually be calculated (in a reasonable but approximate way) for each of the alternatives—that is, the non-renewable energy consumed in the acquisition of raw materials, processing, manufacturing and transport to the site. These can then be compared.

2. The operating energy for each alternative can also be calculated. For the reconstruction of the existing historic structure, there are two cases: (1) reconstruct to meet current energy code, Title-24 number; (2) reconstruct to exceed Title-24 by a defined percentage equivalent to LEED-Silver. For the new building, we have zero net operating energy.

3. The demolition energy for the new-building alternative versus the reconstruction alternative will be negligible by comparison, but this can be shown. The additional energy required during construction for the reconstruction alternative (moving the building twice, extended construction period) is also likely to be negligible compared to the total embodied energy for this scheme, but this point needs to be mentioned. There is at least a balance of the two “second-order effects”.

4. A graph can then be shown that adds the embodied energy to the operating energy for each alternative, thus arriving at the breakeven point when the GHG impact is the same. (My intuition tells me that this is no more than one year after occupancy even for the LEED-Silver/reconstruction alternative.)

This picture for this particular project (and South Branch as well) should be clear from this analysis. I have references for the databases of information about the embodied energy of different building materials, which would be used for the calculation. Beyond that, the focus of various articles and reports seems to be on studies of retrofitting historic buildings versus replacing with standard code buildings (not ZNE or very low energy structures). This is not our situation. Also, It is an error to talk about “wasting embodied energy” in an old building by tearing it down—that energy was spent decades ago and is not part of a comparison of the impact on the GHG emissions now; some mention should be made about this erroneous concept since I think it will be brought up.
APPENDIX P1

NORTH EXEMPTION
1170 The Alameda

Use Permit #10-10000028 to construct an addition of approximately 3,850 square feet to the existing North Branch Library, and make other interior and exterior improvements. Includes modification of parking and lot coverage requirements, subject to a pending zoning amendment.

I. Application Basics

A. Land Use Designations:
   - General Plan: Low Density Residential
   - Zoning: R-1, Single-Family Residential

B. Zoning Permits Required:
   - Use Permit to expand an existing lawful nonconforming public library\(^1\), under BMC Section 23C.04.076
   - Use Permit to allow lot coverage of 43%, where the maximum normally allowed is 40%, under BMC Section 23C.04.076
   - Use Permit to waive six required parking spaces for proposed addition, under BMC Section 23C.04.076

C. CEQA Determination:
   - Categorically exempt pursuant to Section 15301(e)(2) of the CEQA Guidelines ("Existing Facilities").

D. Parties Involved:
   - Applicant/Architect: Architectural Resources Group, Pier 9, The Embarcadero, San Francisco, CA 94111
   - Property Owner: Donna Corbeil, Director of Library Services, 2090 Kittredge Street, Berkeley

---

\(^1\) Existing library is lawfully nonconforming due to lack of a Use Permit.
Figure 1: Vicinity Map
Figure 2: Site/Main Floor Plan
### Table 1: Land Use Information

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<th>Existing Use</th>
<th>Zoning District</th>
<th>General Plan Designation</th>
</tr>
</thead>
<tbody>
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<td>Subject Properties</td>
<td>Public library</td>
<td>R-1</td>
<td>Low Density Residential</td>
</tr>
<tr>
<td>North</td>
<td>Single-family dwellings</td>
<td>R-1H</td>
<td>Low Density Residential</td>
</tr>
<tr>
<td>South</td>
<td>Single-family dwellings, middle school</td>
<td>R-2</td>
<td>Low Medium Density Residential, Institutional</td>
</tr>
<tr>
<td>East</td>
<td>Single-family dwellings, gas station</td>
<td>R-1H, R-2H</td>
<td>Low/Low Medium Density Residential</td>
</tr>
<tr>
<td>West</td>
<td>Single-family dwellings</td>
<td>R-1</td>
<td>Medium Density Residential</td>
</tr>
</tbody>
</table>

### Table 2: Special Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Applies to Project?</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creeks</td>
<td>No</td>
<td>There are no open or culverted creeks within 30 feet of the site.</td>
</tr>
<tr>
<td>Historic Resources</td>
<td>Yes</td>
<td>The existing building is a City landmark. The LPC has approved a Structural Alteration Permit for the project.</td>
</tr>
<tr>
<td>Oak Trees</td>
<td>No</td>
<td>None on site.</td>
</tr>
<tr>
<td>Seismic Hazard/Flood Zone</td>
<td>No</td>
<td>Site is not in any mapped seismic hazard or flood zones.</td>
</tr>
<tr>
<td>Green Building Score</td>
<td>Yes</td>
<td>Pursuant to City ordinance, the project would have to qualify for a minimum LEED Silver rating. The applicant has met with the Office of Energy and Sustainable Development and green building consultants to discuss ideas for meeting or exceeding this requirement.</td>
</tr>
</tbody>
</table>

### Table 3: Project Chronology

<table>
<thead>
<tr>
<th>Date</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 31, 2010</td>
<td>Use Permit #10-10000028 submitted</td>
</tr>
<tr>
<td>April 30, 2010</td>
<td>Application deemed complete</td>
</tr>
<tr>
<td>May 6, 2010</td>
<td>LPC approves Structural Alteration Permit for the project (see Attachment 7).</td>
</tr>
<tr>
<td>May 26, 2010</td>
<td>Planning Commission recommends approval of zoning amendment allowing modification of zoning requirements for public libraries with a Use Permit</td>
</tr>
<tr>
<td>June 10, 2010</td>
<td>ZAB Preview</td>
</tr>
<tr>
<td>June 29 and July 6, 2010</td>
<td>City Council approves first and second readings of zoning amendment</td>
</tr>
<tr>
<td>July 8, 2010</td>
<td>Public hearing notices mailed/posted</td>
</tr>
<tr>
<td>July 22, 2010</td>
<td>ZAB Hearing</td>
</tr>
<tr>
<td>August 9, 2010</td>
<td>Zoning amendment takes effect</td>
</tr>
</tbody>
</table>
II. Project Setting

A. Neighborhood/Area Description:
The project site is located in a relatively low-density residential neighborhood in North Berkeley, at the northwest corner of The Alameda and Hopkins Street. Other than a gas station located at the southeast corner of The Alameda and Hopkins Street, the site is surrounded by single-family residences. The architectural character of the area is fairly consistent, with structures dating mainly from the 1920s and 1930s.

B. Site Conditions:
The site is a triangular-shaped parcel with an area of 16,980 square feet. The site is developed with the North Branch of the Berkeley Public Library, a predominantly one-story building with a small basement in the rear and a floor area of 5,706 square feet. The building was designed by noted Berkeley architect James Plachek, and was completed in 1936. The building was designated as a City landmark in 2001.

---

2 Existing lawfully nonconforming elements.
3 Requires Use Permit pursuant to pending zoning amendment.

---
III. Project Description

Consistent with Measure FF, which Berkeley voters approved in November 2008, the intent of the project is not to substantially expand library book collections, programs or services, but rather to upgrade and expand the existing facilities to meet current requirements for accessibility for persons with disabilities, energy efficiency, seismic safety, staff work areas, and technology, among other goals. See Attachment 8 of the June 10 staff report for further background on Measure FF.

The project would expand the existing North Branch library from 5,706 to 9,555 square feet. The addition would be located on the west (rear) side of the building, facing Josephine Street. The addition would have two stories and would be set back 4 feet from the property line along Josephine Street (16 feet from the street itself). Restrooms, staff work areas, and a teen reading room would be located on the upper story of the addition, and additional restrooms, a multi-purpose meeting room and utility rooms would be located on the lower story, partially below grade. In order to relate properly to the existing building, the addition would have a flat roof and would not exceed the height of the existing eaves. The existing building would be restored, and no substantial change of use would occur, except that meetings currently being held in the children’s reading room would now be held in the new multi-purpose room. See Attachments 3 and 5 of the June 10 staff report for further details.

The project also includes the following improvements:
- ADA (Americans with Disabilities Act) compliant restrooms, corridors, and ramp
- New drought tolerant landscaping with bio-retention area for stormwater runoff
- Restoration of exterior of existing structure
- Energy efficiency improvements
- Seismic upgrades

Based on the additional floor area, six additional parking spaces would be required; the site does not have adequate space for this parking (without removing existing green space) and the applicant has requested that this requirement be waived under a pending zoning amendment (see Issues and Analysis for further information), along with the proposed lot coverage of 43 percent.

IV. Community Discussion

A. Neighbor/Community Concerns:

As discussed in the June 10, 2010 staff report, the project design team and library staff have held four community meetings and two public hearings with the Board of Library Trustees to discuss the project and hear community concerns. The community meetings were attended by up to 40 non-library participants. On July 8, 2010, the City mailed notices to property owners and occupants within 300 feet, as well as to interested neighborhood organizations. At this writing, the City has
received two communications objecting to the project, one relating to the loss of trees and the “natural aesthetic” of the site, and another relating to the number of books being provided in the expanded building. The City has also received communications in support of the project. See Attachment 5 for communications.

B. Design Review Committee:
Because the project is located in the R-1 District, the Design Review Committee does not have jurisdiction over the project. Staff believes that the design review conducted by the Landmark Preservation Commission (LPC) has been adequate for the project.

C. Landmarks Preservation Commission:
As noted above, the existing building is a City landmark, and therefore LPC review is required. After several previous meetings, on May 6, 2010, the LPC approved a Structural Alteration Permit for the project. The project’s compatibility with the existing building is discussed further under Key Issues.

D. Zoning Adjustments Board:
The ZAB held a preview of the project on June 10, 2010. Notices were sent to property owners and occupants within 300 feet, as well as to interested neighborhood organizations. One speaker objected to the number of books being provided in the expanded building. ZAB members did not raise any concerns or objections to the project.

V. Issues and Analysis

A. Zoning Issues:

1. Pending Zoning Amendment: As noted earlier, on July 6, 2010, the City Council approved the second reading of a zoning amendment that allows the ZAB to modify zoning requirements for public libraries with a Use Permit rather than a Variance. The amendment, which will take effect on August 9, 2010, reads as follows:

   Section 23C.04.076 – Exemptions for Existing Public Libraries

   Notwithstanding any other provision of this Title, any conforming or lawful non-conforming public library existing as of May 1, 2010 may be (1) changed, (2) expanded, or (3) demolished and a new public library constructed on the same site, subject to issuance of a Use Permit, unless such change, expansion or new library is otherwise allowed by this Title. The Board may modify any requirement of this Title applicable to such change, expansion or new library as part of the Use Permit.
The project includes two Use Permits under this amendment, one waiving the required off-street parking for the addition (6 spaces), and another allowing the addition to exceed the maximum lot coverage. Analysis of these requests is provided below. Staff is recommending approval of the project, with a condition of approval stating that the Use Permit shall become effective upon the amendment becoming effective.

2. Compatibility with Landmark Structure: The LPC considered the project several times, heard public testimony, and requested several changes prior to approving the project’s Structural Alteration Permit on May 6, 2010. In making its decision, the LPC found that the project would be consistent with the Secretary of the Interior's Standards for the treatment of historic properties. Based on the LPC’s findings, staff concludes that the project would not be detrimental to the historic character of the existing structure.

3. Parking/Traffic: The parking requirement for libraries is one space per 500 square feet of publicly accessible area; areas reserved for staff do not count toward the parking requirement. While the building’s total floor area would increase by about 3,850 square feet, the publicly accessible portion of the building would increase by about 2,800 square feet. Therefore, the project requires a waiver of six required parking spaces. The increased floor area is mainly related to the new multi-purpose room and adjacent restrooms, expanded teen reading room, and larger restrooms and hallways (to meet accessibility requirements). The following table provides a breakdown of the increase in public areas:

Table 5: Increased Public Areas

<table>
<thead>
<tr>
<th>Area Description</th>
<th>Current</th>
<th>New</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lobby Services</td>
<td>1,095</td>
<td>1,612</td>
<td>517</td>
</tr>
<tr>
<td>Adult</td>
<td>1,260</td>
<td>1,382</td>
<td>122</td>
</tr>
<tr>
<td>Children</td>
<td>945</td>
<td>945</td>
<td>0</td>
</tr>
<tr>
<td>Teens</td>
<td>155</td>
<td>383</td>
<td>228</td>
</tr>
<tr>
<td>Multipurpose</td>
<td>0</td>
<td>868</td>
<td>868</td>
</tr>
<tr>
<td>Restrooms</td>
<td>202</td>
<td>590</td>
<td>388</td>
</tr>
<tr>
<td>Circulation</td>
<td>61</td>
<td>726</td>
<td>665</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>3,718</strong></td>
<td><strong>6,506</strong></td>
<td><strong>2,788</strong></td>
</tr>
</tbody>
</table>

This additional area would not substantially increase the project’s parking demand or traffic for the following reasons:

- The main purpose of the multi-purpose room is to provide a dedicated meeting room for existing meetings or programs which are currently being held in the children’s reading room, not to allow for additional meetings or
programs. The Library has no intent to allow non-Library meetings or programs in this room, and such a change would be subject to a Use Permit modification under BMC Section 23B.56.020.

- The additional area for lobby services, restrooms and circulation are intended to ease overcrowding and meet accessibility requirements, not to accommodate additional patrons.
- The increase in teen and adult areas is relatively minor and is also intended to ease overcrowding rather than to accommodate additional patrons.

Regarding the additional staff area, the Library states that this increase is designed to address severe overcrowding and clutter in the existing staff areas, not to accommodate additional staff or provide services to additional patrons. The Library has no plans to hire additional staff, nor is this likely given the current economic situation. Future expansions in staffing would be subject to a Use Permit modification under BMC Section 23B.56.020. See Attachment 3 for the applicant’s summary of existing and proposed building programs.

Based on the above, staff does not expect the project to substantially increase library patronage or staffing, and therefore traffic and parking demand should not increase substantially. In the event that library patronage does increase, the site has a relatively high number of on-street parking spaces nearby due the extensive street frontage, and it is located along two AC Transit lines and provides bicycle parking, thus helping to reduce vehicle trips. In order to further promote bicycle usage by patrons and staff, the Library has agreed to a condition of approval requiring additional bicycle parking near the front and rear (staff) entrances.

4. **Lot Coverage:** As noted earlier, the project requires a Use Permit under the pending zoning amendment to increase the building’s lot coverage to 43 percent, where the maximum allowed in the R-1 District is 40 percent. This additional coverage would not be detrimental because the site is not located adjacent to any residential properties, the project maintains adequate setbacks and landscaping on the site, and because well over 50 percent of the site would still be uncovered.

**B. Other Issues**

Communications have been received expressing concern about the aesthetics of the site and the program for the library, particularly the relative emphasis on books. The LPC considered and addressed the aesthetics of the site by requiring certain landscaping elements to be retained and enhanced as part of the project. The Board of Library Trustees has addressed the program requirements for the project during its deliberations on the scope of the project, including the design, budget, staffing and other considerations. The ZAB is not required nor given authority to consider the functional aspects of the library aside from the ways in which it may affect the zoning issues discussed above. The changes to public floor area, exterior
expansion, lot coverage and parking have been described and evaluated in the Key Issues section of this report. Staff believes this analysis is sufficient for the ZAB.

VI. Recommendation

Staff recommends that the ZAB APPROVE Use Permit #10-10000028 pursuant to Section 23B.32.040 and subject to the attached Findings and Conditions (see Attachment 1).

Attachments:
1. Findings and Conditions
2. Project Plans
3. Applicant’s Statement re: Floor Area and Parking
4. Public Hearing Notice
5. Correspondence

Staff Planner:
Aaron Sage, AICP, asage@ci.berkeley.ca.us, (510) 981-7425
APPENDIX P1

CLAREMONT EXEMPTION
2940 Benvenue Avenue

Use Permit #10-1000027 to construct an addition of approximately 340 square feet to the existing Claremont Branch Library, and make other interior and exterior improvements. Includes modification of lot coverage requirement, subject to a pending zoning amendment.

I. Application Basics

A. Land Use Designations:
   • General Plan: MDR, Medium Density Residential
   • Zoning: R-2A, Restricted Multiple-Family Residential

B. Zoning Permits Required:
   • Use Permit to expand a nonconforming public library\(^1\), under BMC Section 23C.04.076
   • Use Permit to allow expansion of lot coverage from 60% to 63%, where the maximum normally allowed is 45%, under BMC Section 23C.04.076
   • Use Permit to allow new bay window at southwest portion of building to encroach into required rear yard

C. CEQA Determination:
   • Categorically exempt pursuant to Section 15301(e)(1) of the CEQA Guidelines ("Existing Facilities").

---

\(^1\) Existing library is lawfully nonconforming due to lack of a Use Permit, and because it exceeds the maximum allowable lot coverage for the district (60% existing coverage, 45% allowed).
Parties Involved:
- Applicant/Architect: Gould Evans Baum Thornley, Inc., 95 Brady St., San Francisco, CA 94103
- Property Owner: Donna Corbeil, Director of Library Services, 2090 Kittredge Street, Berkeley

Figure 1: Vicinity Map
Figure 2: Site Plan (shading indicates additions)
### Table 1: Land Use Information

<table>
<thead>
<tr>
<th>Location</th>
<th>Existing Use</th>
<th>Zoning District</th>
<th>General Plan Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Properties</td>
<td>Public library</td>
<td>R-2A</td>
<td>Medium Density Residential</td>
</tr>
<tr>
<td>North</td>
<td>Apartments, single-family dwellings</td>
<td>R-2A</td>
<td>Medium Density Residential</td>
</tr>
<tr>
<td>South</td>
<td>Single-family dwelling</td>
<td>R-1</td>
<td>Low Density Residential</td>
</tr>
<tr>
<td>East</td>
<td>Apartment building</td>
<td>R-2A</td>
<td>Medium Density Residential</td>
</tr>
<tr>
<td>West</td>
<td>Dental office (on Ashby), Single-family dwelling (on Hillegass)</td>
<td>R-2A</td>
<td>Medium Density Residential</td>
</tr>
</tbody>
</table>

### Table 2: Special Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Applies to Project?</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creeks</td>
<td>No</td>
<td>There are no open or culverted creeks within 30 feet of the site.</td>
</tr>
<tr>
<td>Historic Resources</td>
<td>Yes</td>
<td>The existing building is not a City landmark, but it is considered a potential historical resource due to its association with James Plachek. Although LPC review is not required, the applicant met voluntarily with the LPC to solicit input on the design. On April 1, 2010, the LPC considered the project and did not express any opposition or concerns.</td>
</tr>
<tr>
<td>Oak Trees</td>
<td>No</td>
<td>None on site.</td>
</tr>
<tr>
<td>Seismic Hazard/Flood Zone</td>
<td>No</td>
<td>Site is not in any mapped seismic hazard or flood zones.</td>
</tr>
<tr>
<td>Green Building Score</td>
<td>Yes</td>
<td>According to a preliminary LEED checklist submitted by the applicant, the proposed project would qualify for a LEED Silver or Gold rating.</td>
</tr>
</tbody>
</table>

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Table 3: Project Chronology

<table>
<thead>
<tr>
<th>Date</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 1, 2010</td>
<td>Use Permit #10-10000027 submitted</td>
</tr>
<tr>
<td>April 1, 2010</td>
<td>After several meetings with LPC subcommittee, LPC reviews project; no opposition or concerns stated</td>
</tr>
<tr>
<td>May 1, 2010</td>
<td>Application deemed complete</td>
</tr>
<tr>
<td>May 26, 2010</td>
<td>Planning Commission recommends approval of zoning amendment allowing modification of zoning requirements for public libraries</td>
</tr>
<tr>
<td>May 27, 2010</td>
<td>Public hearing notices mailed/posted</td>
</tr>
<tr>
<td>June 10, 2010</td>
<td>ZAB Preview</td>
</tr>
<tr>
<td>June 29 and July 6, 2010</td>
<td>City Council approves first and second readings of zoning amendment</td>
</tr>
<tr>
<td>July 8, 2010</td>
<td>Public hearing notices mailed/posted</td>
</tr>
<tr>
<td>July 22, 2010</td>
<td>ZAB Hearing</td>
</tr>
<tr>
<td>August 9, 2010</td>
<td>Zoning amendment takes effect</td>
</tr>
</tbody>
</table>

Table 4: Development Standards

<table>
<thead>
<tr>
<th>Standard (R-2A District) BMC Sections 23D.32.070-080</th>
<th>Existing</th>
<th>Addition/ (Reduction)</th>
<th>Proposed Total</th>
<th>Permitted/ Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lot Area (sq. ft.)</td>
<td>11,652</td>
<td>--</td>
<td>11,652</td>
<td>5,000</td>
</tr>
<tr>
<td>Gross Floor Area (sq. ft.)</td>
<td>7,768</td>
<td>342</td>
<td>8,110</td>
<td>N/A</td>
</tr>
<tr>
<td>Floor Area Ratio</td>
<td>0.67</td>
<td>0.03</td>
<td>0.70</td>
<td>N/A</td>
</tr>
<tr>
<td>Building Height Average (ft.)</td>
<td>22.2</td>
<td>--</td>
<td>22.2</td>
<td>28</td>
</tr>
<tr>
<td>Stories</td>
<td>2</td>
<td>--</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Building Setbacks (ft.)</td>
<td>~12²</td>
<td>--</td>
<td>~12</td>
<td>15</td>
</tr>
<tr>
<td>Front (Ashby)</td>
<td>15</td>
<td>--</td>
<td>13 at bay window³ (15 otherwise)</td>
<td>15</td>
</tr>
<tr>
<td>Rear (Southwest)</td>
<td>4</td>
<td>--</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>West Side</td>
<td>6</td>
<td>--</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>East Side (Benvenue)</td>
<td>~10</td>
<td>--</td>
<td>~10</td>
<td>4</td>
</tr>
<tr>
<td>Lot Coverage (%)</td>
<td>60²</td>
<td>3</td>
<td>63³</td>
<td>45</td>
</tr>
</tbody>
</table>

² Existing lawfully nonconforming elements.
³ Requested pursuant to pending zoning amendment.
II. Project Setting

A. Neighborhood/Area Description:
The project site is located at the southwest corner of Ashby and Benvenue Avenues in the Elmwood neighborhood, a predominantly residential neighborhood with a small-scale commercial district along Ashby and College Avenues. The site is adjoined on the west and south by a dental office and single-family residences. The site and surrounding area are urbanized, with no significant biological resources. The architectural character of the area is fairly consistent, with structures dating mainly from 1906 to 1930.

B. Site Conditions:
The site is comprised of two separate parcels with a total area of 11,652 square feet. These parcels would be merged into a single parcel as part of the project. Together the parcels form a “reverse L” with the longer portion along Benvenue Avenue, and the shorter portion extending 75 feet to the west. The site is developed with the Claremont branch of the Berkeley Public Library, a predominantly one-story building with a small second story in the northern portion and a floor area of 7,768 square feet.

The northern portion of the building was designed by noted Berkeley architect James Plachek, and was built in 1923. This portion is not a City landmark, but it is considered a potential historical resource due to its association with Plachek. The southern portion of the building was built in 1973 in a contemporary style, and has no historical significance.

Although the 1973 addition was granted a Use Permit (and parking Variance), the building is nonconforming because it lacks a Use Permit for the entire building, and also because it lacks a Variance to exceed the maximum lot coverage.

III. Project Description

Consistent with Measure FF, which Berkeley voters approved in November 2008, the intent of the project is not to substantially expand library book collections, programs or services, but rather to upgrade the existing facilities to meet current requirements for accessibility for persons with disabilities, energy efficiency, seismic safety, staff work areas, and technology, among other goals.

The project would expand the existing Claremont branch library from 7,768 to 8,110 square feet. Of the 342 square feet, 206 square feet would be added below existing roof overhangs on the west and south walls of the 1973 addition, and in the former entry of the 1923 building, which was closed after the 1973 addition. The remaining 136 square feet would be added on the west side of the building where the two wings come
together. Although the project increases the building’s total floor area, it also converts some of the existing public area to staff area, thereby decreasing the total public area in the building by about 230 square feet. Therefore, because the parking requirement for libraries is based on the amount of publicly accessible area, no additional parking is required for the project.

The project also includes the following improvements:

- ADA (Americans with Disabilities Act) compliant restrooms, corridors, and front ramp
- New drought tolerant landscaping with bio-retention area for stormwater runoff
- Restoration of exterior of 1923 structure
- Energy efficiency improvements, including a “cool roof”; building would qualify for at least a LEED Silver rating
- New architectural treatment for entry (on Benvenue side of 1973 addition), including new dormer, additional glazing, and new glass and steel canopy.
- Reorganization of interior for more efficient layout
- Additional adult and children seating, and computer areas
- Seismic upgrades, including new shear panels, masonry ties, chimney bracing, and roof diaphragm strengthening
- Removal of stair on west wall of 1973 addition; relocation of stair on south wall about 20 feet closer to Benvenue.

IV. Community Discussion

A. Neighbor/Community Concerns:
The project design team and library staff have held four community meetings and two public hearings with the Board of Library Trustees to discuss the project and hear community concerns. The community meetings were attended by up to 19 non-library participants. On July 8, 2010, the City mailed notices of this hearing to property owners and occupants within 300 feet, as well as to interested neighborhood organizations. At this writing, the City has received one communication opposing the project. More specifically, the communication objects to the proposed reduction in the number of books at the site (23 percent, according to the communication). The City has also received several communications in support of the project. See Attachment 4 for communications.

B. Design Review Committee:
Because the project is located in the R-2A District, the Design Review Committee does not have jurisdiction over the project. Staff believes that the design review conducted by the Landmark Preservation Commission (LPC) has been adequate for the project.

C. Landmarks Preservation Commission:
As noted earlier, the existing building is not a City landmark, but it is considered a potential historical resource due to its association with James Plachek. Therefore, although LPC review is not required, staff suggested that the applicant meet voluntarily with the LPC to solicit input on the design. The LPC established a subcommittee to review the project and met with the project design team several times. On April 1, 2010, the full LPC considered the project and did not express any opposition or concerns.

V. Issues and Analysis

A. Zoning Issues:

1. Pending Zoning Amendment: As noted earlier, on July 6, 2010, the City Council approved the second reading of a zoning amendment that allows the ZAB to modify zoning requirements for public libraries with a Use Permit rather than a Variance. The amendment, which will take effect on August 9, 2010, reads as follows:

   Section 23C.04.076 – Exemptions for Existing Public Libraries

   Notwithstanding any other provision of this Title, any conforming or lawful non-conforming public library existing as of May 1, 2010 may be (1) changed, (2) expanded, or (3) demolished and a new public library constructed on the same site, subject to issuance of a Use Permit, unless such change, expansion or new library is otherwise allowed by this Title. The Board may modify any requirement of this Title applicable to such change, expansion or new library as part of the Use Permit.

   The project includes two Use Permits under this amendment, one allowing the project to further increase the existing non-conforming lot coverage, and another allowing a bay window at the southwest portion of the building to encroach two feet into the required rear setback. Analysis of these requests is provided below. Staff is recommending approval of the project, with a condition of approval stating that the Use Permit shall become effective upon the amendment becoming effective.

2. Compatibility with 1923 Structure: Although the 1923 structure is not a designated historical resource, the applicant has submitted an analysis by an architectural historian finding that the project would be consistent with the Secretary of the Interior’s Standards for the treatment of historic properties. This analysis was provided to the LPC and the LPC did not express any disagreement with the findings. Based on the LPC’s apparent support for the project, and the fact that the project restores the 1923 structure and introduces elements to the 1973 addition that will better integrate it with the 1923 structure (e.g., similar window
dimensions and materials, similar roof pitch), but without mimicking its style, the project would not be detrimental to the historic character of the existing structure.

3. Lot Coverage: As noted earlier, the project requires a Use Permit under the pending zoning amendment to increase the building's lot coverage from 60 to 63 percent, where the maximum allowed in the R-2A District for a two-story building on a corner lot is 45 percent. This additional coverage would not be detrimental to adjacent properties because the project does not expand the existing building envelope, except for the bay window at the southwest portion, and several areas where existing "nooks" are being filled in under the existing roof line. Furthermore, the proposed coverage increase is relatively minor.

4. Bay Window: As noted earlier, the project requires a Use Permit to allow a new bay window at the southwest portion of the building to encroach two feet into the required 15-foot rear yard. This window is about 10 feet in height and 13 feet, 9 inches in width. The wall from which the window projects is 36 feet, 3 inches long. If the window were 9 feet or less in width, it would not require special approval, because it would comply with the definition of "bay window" which allows bays to project into required yards if they do not exceed 25 percent of the length of the wall from which they project. This bay would not be detrimental because it would occupy a relatively minor portion (a little over one third) of the main southwest wall, a setback of 13 feet would be provided, and there are mature trees and a tall fence in this portion of the lot, which provide adequate privacy screening for the residence to the west.

B. Other Issues

As noted earlier, the City has received a communication expressing concern about the program for the library, particularly the relative emphasis on books. The Board of Library Trustees has addressed the program requirements for the project during its deliberations on the scope of the project, including the design, budget, staffing and other considerations. The ZAB is not required nor given authority to consider the functional aspects of the library aside from the ways in which it may affect the zoning issues discussed above. The historic compatibility, lot coverage and bay window issues have been described and evaluated in the Key Issues section of this report. Staff believes this analysis is sufficient for the ZAB.

VI. Recommendation

Staff recommends that the ZAB APPROVE Use Permit #10-10000027 pursuant to Section 23B.32.040 and subject to the attached Findings and Conditions (see Attachment 1).
Attachments:
1. Findings and Conditions
2. Project Plans
3. Public Hearing Notice
4. Correspondence

Staff Planner:
Aaron Sage, AICP, asage@ci.berkeley.ca.us, (510) 981-7425