City of Santa Monica

Memorial Park Reservoir

Draft

Mitigated Negative Declaration

August 2011

rincon

Environmental Scientists Planners Engineers

Memorial Park Reservoir

Draft
Mitigated Negative Declaration

Prepared for:

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Santa Monica, CA 90401
Contact: Eric Bailey, Civil Engineer
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August 2011

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CITY OF SANTA MONICA
INITIAL STUDY

1. Project title:

Memorial Park Reservoir Project

2. Lead agency name and address:

City of Santa Monica
1685 Main Street
Santa Monica, CA 90407

3. Contact person and phone number:

Eric Bailey, Civil Engineer
(310) 458-8721

4. Project location:

The proposed reservoir would be located at Memorial Park in the City of Santa Monica, California. Santa Monica is located in western Los Angeles County, about 10 miles west of downtown Los Angeles. Memorial Park is located between Olympic Boulevard and Colorado Avenue, and between 14th and 16th streets. The location of the park within the region and within the neighborhood is shown on figures 1 and 2. Within Memorial Park, the proposed underground reservoir would be located beneath the existing tennis courts along the northeast side of 14th Street. A pump station would be above ground in a masonry block building located immediately adjacent the park in an existing parking lot on the western most edge of the Fisher Lumber property.

5. Project sponsor's name and address:

The City of Santa Monica is the owner of Memorial Park and the adjacent Fisher Lumber property and is the proponent of the proposed reservoir. Santa Monica City Hall is located at:

1685 Main Street
Santa Monica, CA 90401

The City's Water Resources Division is located at:

1212 5th Street Third Floor
Santa Monica, CA 90401

6. General plan designation:

Parks and Open Space

7. Zoning:

Designated Park (DG)

8. Description of project:

The proposed project consists of a 1-million gallon (MG) non-potable water reservoir, a non-potable water pumping station, and supporting pipelines at a site within Memorial Park and immediately adjacent the park to the west at the Fisher Lumber property. The water reservoir and supporting pipelines will be located underground so existing and/or improved park facilities can be located at grade above the buried reservoirs and pumping facilities. Within Memorial Park, the proposed underground reservoir would be located beneath the existing tennis courts along the northeast side of 14th Street. A pump station would be located north and west of the reservoir in an area occupied by a parking lot. The pump station would be above ground in a masonry block building located immediately adjacent the park in an existing parking lot on the western most edge of the Fisher Lumber property.

The project is intended to fit within the goals and strategy framework of the City's Land Use and Circulation Element (LUCE), the Open Space Element and the Parks and Recreation Master Plan. The proposed reservoir project is intended to preserve the uses in the existing park and fit within planned new uses while enhancing the reliability of the City's reclaimed water supply.

The City owns and operates a non-potable water treatment and distribution system that includes an urban runoff treatment plant, supply pumps, distribution mains, and appurtenant equipment. As a means for preventing urban runoff from polluting Santa Monica Bay, an urban runoff treatment plant, the Santa Monica Urban Runoff Recycling Facility (SMURRF), was constructed and placed in operation in 2001 to intercept and treat up to 500,000 gallons per day (gpd) of dry-weather runoff with the capability to also treat small first flush storm events up to 750,000 gpd.

The City is currently experiencing periodic problems delivering recycled water from the SMURRF Project to users. The project has pumps and limited storage at the plant, but no facilities in the delivery system and pumping facilities in a central area of the City.

The overall public benefit of this project will be to provide more reliability for the City's non-potable water supply systems. The City's non-potable water supply system would be provided with more flexibility and reliability. Currently, the City has a greater need for additional recycled water storage than for potable water storage. Providing additional storage for non-potable water will make it possible to more efficiently serve existing and new customers.

Due to design limitations, neither the raw water reservoir nor the finished water reservoir at SMURRF can be taken out of service for routine maintenance without shutting down the entire treatment plant. This presents customer delivery interruptions since dual plumbing demands and some other nonpotable water demands require continuous supply. These operational and reliability issues have made potential customers hesitant to commit to the non-potable water system.

Constructing a centrally-located storage reservoir and booster pump station at Memorial Park would allow for system redundancy as supply could then be delivered from two locations in the system. It would also provide additional storage in the system to meet potential peak system demands and would eliminate existing pressure problems. It would also allow for the SMURRF plant to be taken out of service as required for routine maintenance for the raw and finished reservoirs at the plant. Improving the operational flexibility, reliability, and performance of the system will make the system more attractive for potential customers. Each of the components of the project is described below.

Reservoir

The City currently has 0.5 MG of non-potable water reservoir storage at the treatment plant. By constructing additional non-potable water storage and pumping capacity at a central location such as Memorial Park, the City will be able to meet existing and future water demands more efficiently and with better operational flexibility. Considering existing and future non-potable water demands with the limited availability of storage and pumping capacity at the treatment plant the City estimates the non-potable water storage requirements at Memorial Park at 1 MG.

Circular reservoirs are preferable to rectangular shapes due to economical construction and a circular reservoir provides effective water circulation to maintain water quality. Water circulation in rectangular reservoirs can have stagnant areas causing poor water quality. However, methods such as inlet/outlet configurations; baffles and circulation pumps can be employed to eliminate this problem.

It is estimated that a reservoir depth of 15 feet would be most appropriate for the reservoir as it would result in: 1) reasonable reservoir diameters (assuming a circular shape); 2) a reasonable excavation in the range of 30 feet that would allow for water depth, freeboard, roof, foundation and soil cover over the buried tank. Assuming a circular shape and a 15-foot depth, the 1 MG nonpotable water reservoir would have a diameter of 110 feet. This diameter is very constructible in the proposed location in Memorial Park and has an excellent performance record at similar installations throughout Southern California. Project construction is estimated to be completed within approximately 16 months. During construction activity of the reservoir, the existing tennis courts and adjacent public parking area would be temporarily closed to the public. However, upon completion of construction activities, the courts and the parking area would be rebuilt and reopened for use. Figure 3 shows the proposed site plan within the park. Figure 4 and 5 provide additional reservoir/pump station details.

Pumping Facilities

The recommended non-potable water pumps at the treatment plant include one 20-gpm pump driven by a constant-speed motor and two 550-gpm pumps, one for duty use and one for standby use, both driven by variable speed motors. A spare pump barrel will be provided within the station for installation of a future pump. The new non-potable pumps at Memorial Park will be identical to the existing pumps at the Santa Monica Urban Runoff Recycling Facility (SMMURF) treatment plant in terms of supply capacities and drives in order to provide similar operation and capacities from two separate sites in the non-potable water system. This will allow for more efficient station operations and will provide complete supply redundancy.

An approximately 1,488 pump station would be located above ground (approximately 14 feet tall) in an enclosed masonry building at the existing parking area on the western most portion of the Fisher Lumber property (adjacent to the northwest of the tennis courts). The pump station will be provided with pump control discharge valves, air release valves, pressure sensing and gauge devices, and isolation valves on each discharge line with the flows from the pumps to be monitored by a flow meter. A surge relief valve and line will be provided on the discharge header from the pumps.

Pipelines

Reservoir supply will be via a new 10-inch supply pipeline connected to the existing 12-inch SMURRF line in Olympic Boulevard. A 10-inch discharge pipeline back to the existing 12-inch

SMURRF line in Olympic Boulevard will be needed to supply non-potable water from the new 1.0 MG reservoir to the system. The approximate length of each pipeline is 600 feet.

The reservoir will require an overflow and drain pipeline. The tank and pump station subdrains, the tank main drain, and overflow pipe will convey emergency overflows into the wet well/inspection manhole. In the event any of these lines drains water into the well and it reaches a certain depth, a 550 gpm submersible pump will pump the water through an 8-inch forcemain to a 30-inch sewer line in Colorado Ave. The preliminary alignment of the drain and overflow pipelines is shown on Figure 3. Figures 4 and 5 provide the pump station floor plan and additional pump station details.

Construction Excavation

In order to construct the reservoirs a large excavation will be required below the area of the existing tennis courts and a portion of the adjacent parking lot at Memorial Park. The material generated by the excavation would generate an approximate amount of 15-foot tall stockpile around the excavation. The City will not temporarily stockpile at the park site and will leave as much open space for the park available and unaffected during project construction. The depth of the reservoir excavation would be approximately 30 feet deep. Excavation will require shoring to protect the internal work area as well as the outside perimeter of the excavation. The type of shoring required will be a combination of cantilevered and tie back type. The excavation will generate approximately 26,000 cubic yards of material that will need to be removed. A portion of the material (about 16,500 cubic yards) will need to be brought back to the site to backfill and restore the park to the original condition. As required by the Santa Monica Municipal Code, drilled cast-in-place foundations shall be used instead of pile driving. The remaining 9,500 CY portion of the material will need to be disposed of at another site (Tetra Tech, April 2010).

Depending on when the project is built, the City will look at all project permits in Santa Monica and Los Angeles that may be able to use the fill prior to exporting it. If conditions warrant, the City may look at possible storage sites within Santa Monica for City projects. Possible leasing of a property is also an option to stockpile the dirt for a period of time.

The proposed Construction Schedule (Tetra Tech April 2010) used for this analysis proposes that construction would commence in March of 2012 and be completed in July of 2013 (approximately 345 work days or 16 months).

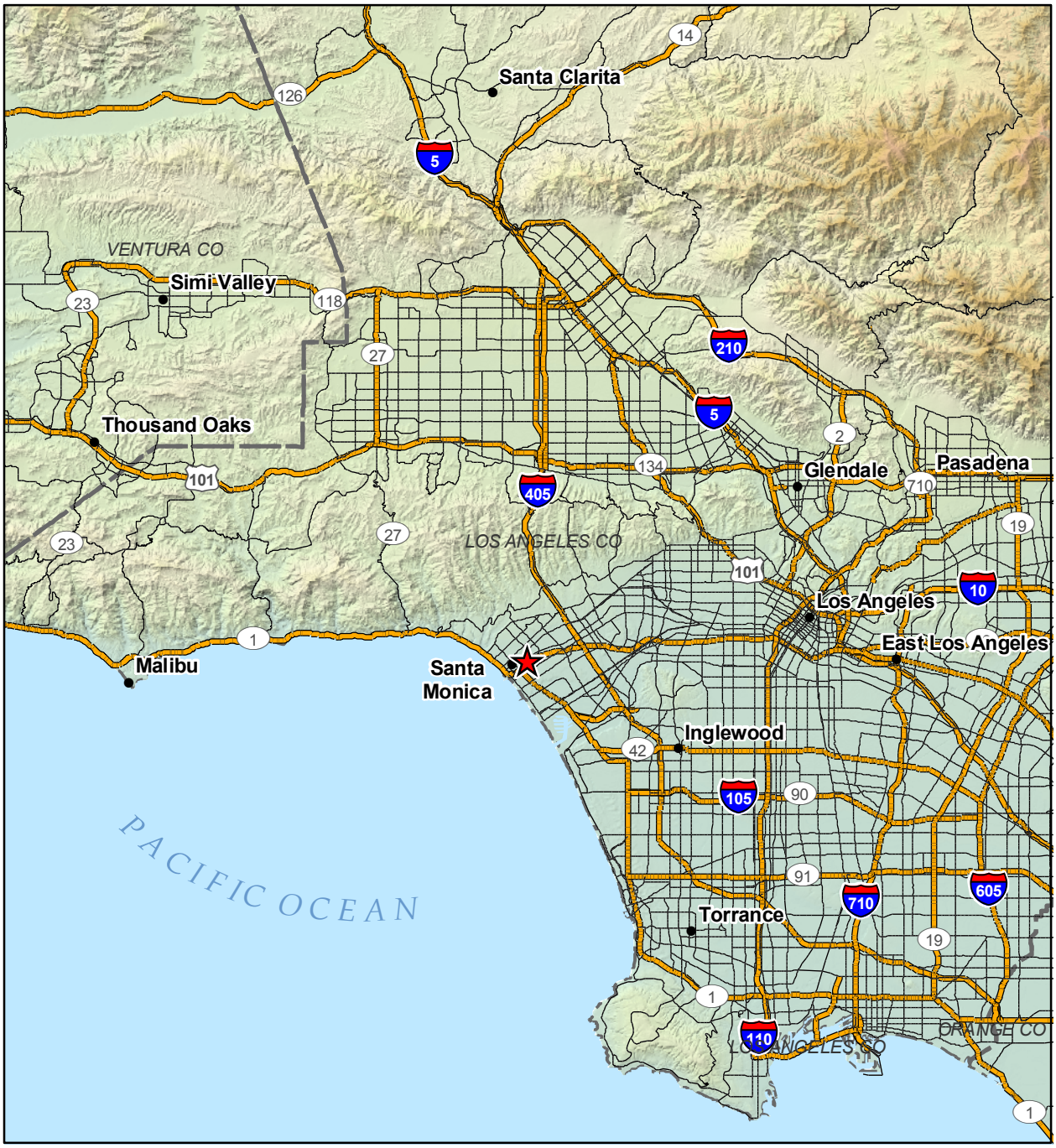
9. Surrounding land uses and setting:

The project site is located in the western portion of Los Angeles County, in the City of Santa Monica. Memorial Park is located between Olympic Boulevard and Colorado Avenue, and between 14th and 16th streets. The project site is regionally accessible from Interstate 10 (the Santa Monica Freeway) and State Route 1 (Pacific Coast Highway). Memorial Park is a large community park that includes playfields, a playground, a skateboard park, tennis courts, a dog walk, a gymnasium, and a community center with meeting rooms. A surface parking lot is located in the western portion of the park along the east side of 14th Street. The park has 63 off street parking spaces. Immediately surrounding land uses include a mix of commercial, light industrial, and institutional uses. The proposed site of the pump station is immediately adjacent the park on western most portion of the Fisher Lumber property (northwest of the tennis courts).

10. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.)

The proposed project would require the discretionary approval of the City of Santa Monica City Council prior to initiating construction. If appealed, the City Council would make decisions related to approval prior to initiation of construction. The proposed project would require approval by the Architectural Review Board for design-related matters, approval by the Building and Safety Department for construction permits, and approval by the Transportation Management Department for transportation and parking related matters. Specifically, the following approvals would be required:

- Adoption of the MND (City of Santa Monica City Council)
- Authorization to proceed with final design (City of Santa Monica City Council)
- Approval of design and materials, as well as landscaping (City of Santa Monica Architectural Review Board)
- Demolition and Construction Permits (City of Santa Monica Building and Safety Division)
- Traffic Control Plans (Transportation Management Department)
- Temporary Use Permit (TUP) for the interim parking area (Transportation Management Department)
- Any other incidental discretionary approvals needed for the construction and operation of the proposed project



Basemap Sources: ESRI data, 2004 and USGS, 2002.

★ Project Location

N

0 5 10 Miles

Regional Location

Figure 1

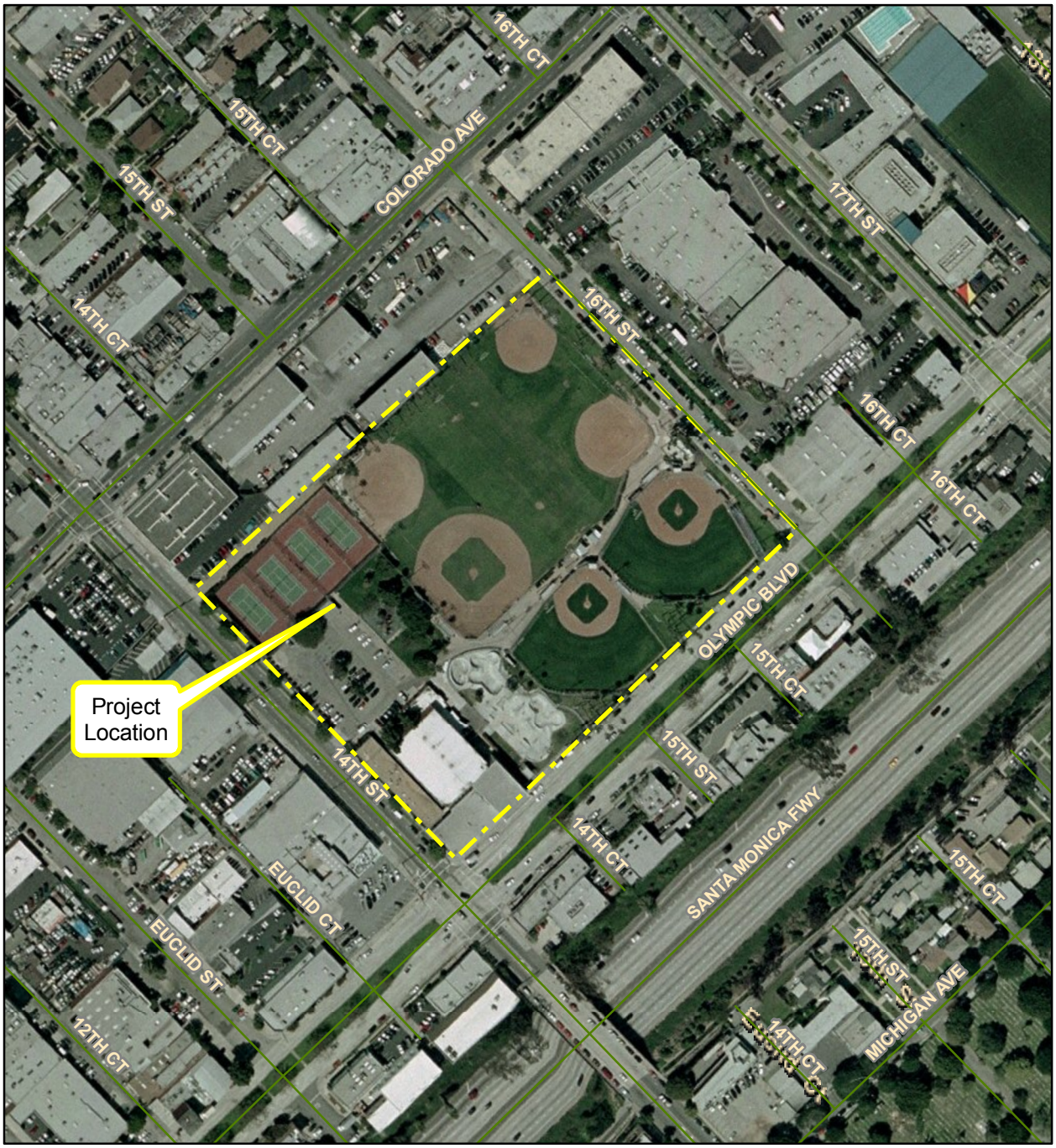


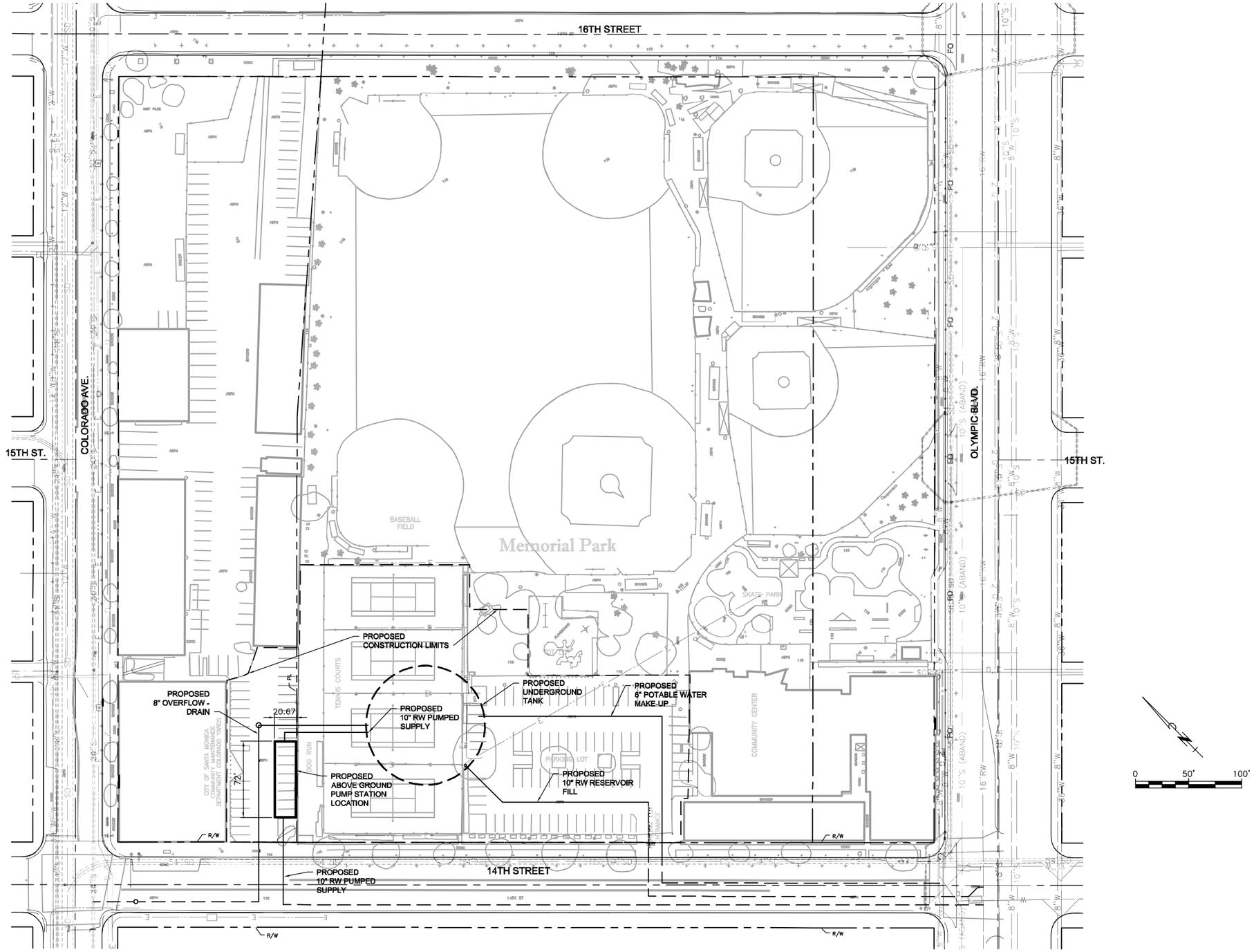
Image Source: TerraServer, 2009.

N

0 200 400 Feet

Project Site Location

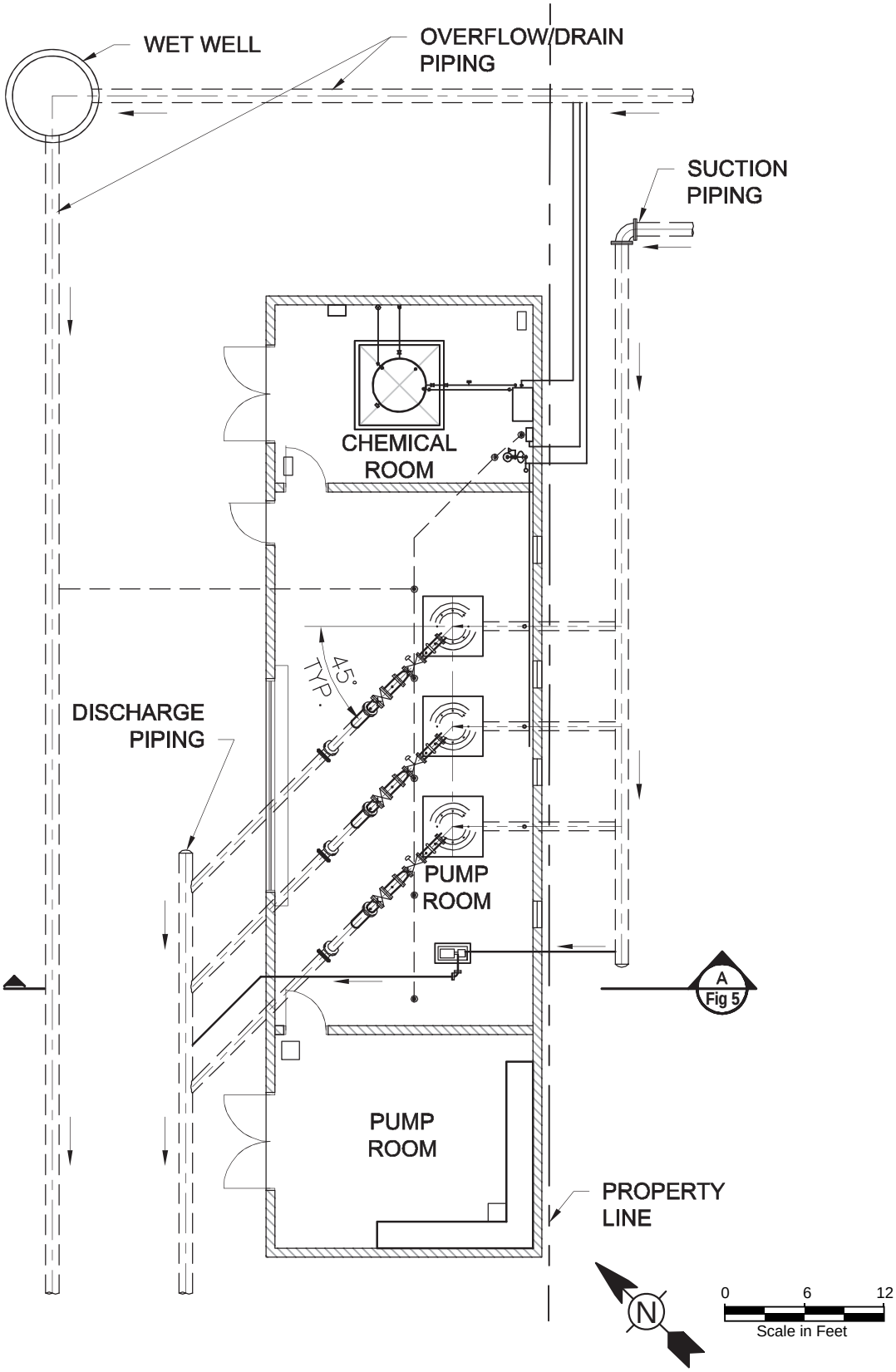
Figure 2



Reservoir Site Plan

Figure 3

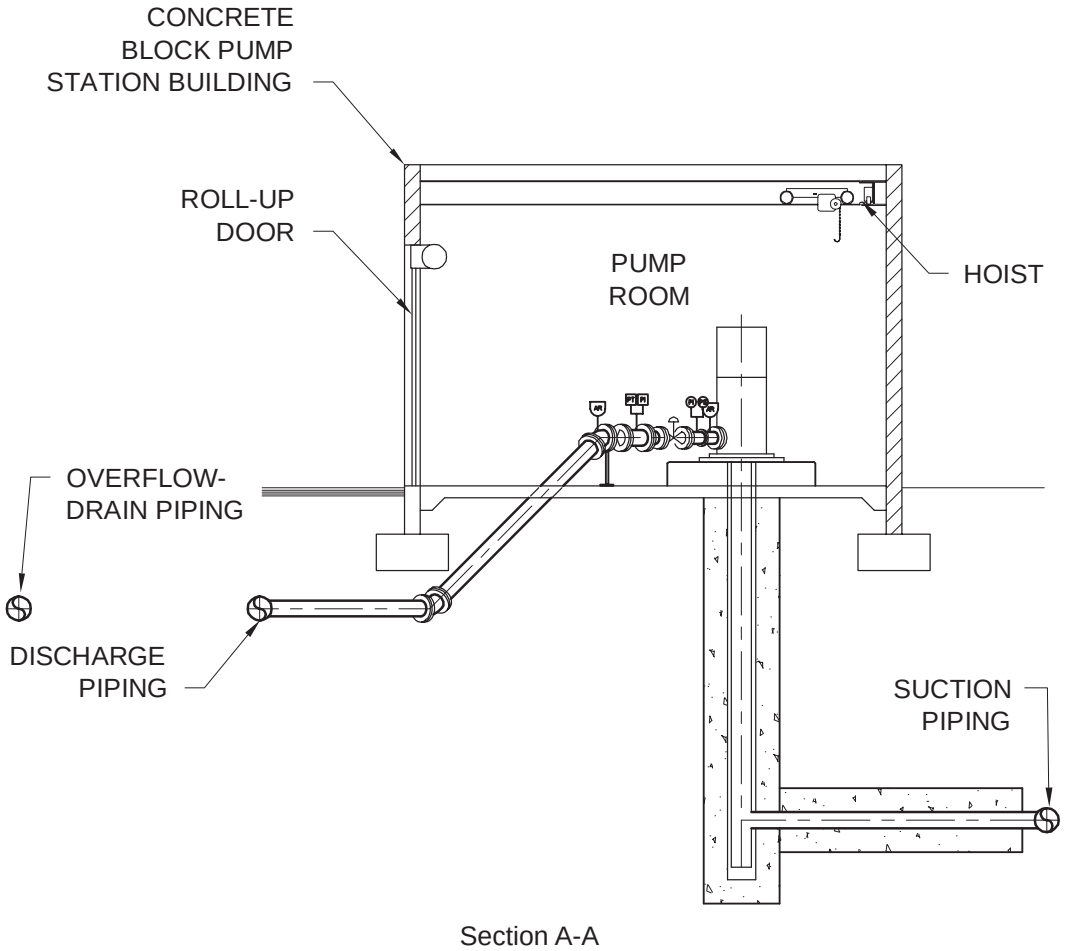
Drawing Source: Tetra Tech, Inc., August 8, 2011.

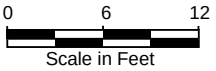


Pump Station Floor Plan

Drawing Source:
Tetra Tech, Inc., May 2011.

Figure 4





Drawing Source:
Tetra Tech, Inc., May 2011.

Pump Station Details

Figure 5

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 and Forestry Resources	☐	Air Quality
☒	Biological Resources	☒	Construction Effects	☒	Cultural Resources
☐	Greenhouse Gas Emissions	☐	Geology/Soils	☐	Hazards & Hazardous Materials
☐	Hydrology/Water Quality	☐	Land Use/Planning	☐	Mineral Resources
☐	Neighborhood Effects	☐	Noise	☐	Population/Housing
☐	Public Services	☐	Recreation	☐	Shadows
☒	Transportation/Traffic	☐	Utilities/Service Systems	☐	Mandatory Findings of Significance

DETERMINATION: (To be completed by the Lead Agency)

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.

_____ _____

Eric Bailey
Civil Engineer

Date

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
I. AESTHETICS. Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the 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?	☐	☐	☐	☒

a-c) The project site is an existing public park, which is located in a highly urbanized setting. The site of proposed construction activity is flat and is currently occupied by tennis courts and surface parking lots. Three existing public trees (one magnolia tree and two pine trees) are located south of the tennis courts within the public parking lot. During construction, the trees would be removed in accordance with Section 7.40.100 of the Santa Monica Municipal Code. However as discussed below in Section IV, *Biological Resources*, Mitigation Measure BIO-2 would require that these trees be boxed and stored onsite during construction activities prior to being replanted in their existing location following construction activity. The construction area can be viewed from 14th Street, but does not contain any identified scenic resources.

Construction activity for the proposed project would temporarily disturb the site. Stockpiles of debris and soil would alter the view through portions of the site for recreation users at the park or to pedestrians and motorists passing by on 14th Street. However, upon the completion of construction activity, the site would be returned to its current condition as the stockpiles would be removed/replaced below the surface and the proposed reservoir would be located underground. The approximately 1,488 square foot pump station would be located above ground (approximately 14 feet tall) in a new enclosed masonry building at the existing parking area on the western most portion of the Fisher Lumber property (adjacent to the northwest of the tennis courts). However, the pump station would not be located in an area that would impact any public views or scenic resources and would not substantially alter the visual character of the parking area. In addition, although construction would remove the existing trees located south of the tennis courts within parking lot, the trees would be replanted as required by Mitigation Measure BIO-2. Consequently, the proposed project would not have any long-term effect on public views, adversely affect scenic resources, or degrade the visual character of the site. **No impact** would occur.

d) The proposed reservoir would be underground and would not alter light or glare conditions in the site vicinity. The pump station for the proposed project would be

located above ground in a masonry building at the existing parking area on the western most portion of the Fisher Lumber property (adjacent to the northwest of the tennis courts). However, this building would not be expected to have outdoor lighting beyond low-level security lighting (similar to existing buildings at Memorial Park). In addition, the masonry building would not contain any material that would be expected to result in significant glare. **No impact** would occur with respect to light or glare.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
II. AGRICULTURE AND FORESTRY 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 Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. 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?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use?	☐	☐	☐	☒

a-e) Memorial Park is within a highly urbanized neighborhood of the City of Santa Monica. No agricultural land is present onsite or in the site vicinity, and no lands in the area has agricultural zoning or are under Williamson Act contract. No impact to agricultural resources would occur. The project would also have no effect on forest land and would not conflict with existing zoning for, or cause rezoning of, forest land.

The proposed project would not directly or indirectly result in the conversion of farmland to non-agricultural use or result in the loss of forest land or the conversion of forest land to non-forest use. **No impact** would occur.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
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?	☐	☐	☒	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

a-e) The project site is within the South Coast Air Basin, which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The local air quality management agency is required to monitor air pollutant levels to ensure that the air quality standards are met and, if they are not met, to develop strategies to meet the standards.

Depending on whether or not the standards are met or exceeded, the air basin is classified as being in "attainment" or "nonattainment." The South Coast Air Basin is in nonattainment for both the federal and state standards for ozone and particulate matter (PM10 and PM2.5). In addition, the South Coast Air Basin is in nonattainment for the state standards for nitrogen dioxide (NOx). Thus, the basin currently exceeds several state and federal ambient air quality standards and is required to implement strategies that would reduce the pollutant levels to recognized acceptable standards. This non-attainment status is a result of several factors, the primary ones being the naturally adverse meteorological conditions that limit the dispersion and diffusion of pollutants, the limited capacity of the local airshed to eliminate pollutants from the air, and the number, type, and density of emission sources within the South Coast Air Basin. The SCAQMD has adopted an Air Quality Management Plan (AQMP) that provides a strategy for the attainment of state and federal air quality standards.

Certain population groups are considered more sensitive to air pollution than others. Sensitive population groups include children, the elderly, the acutely ill and the chronically ill, especially those with cardio-respiratory diseases. Residential uses are also considered sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Sensitive receptors within the vicinity of the project site include the users of the recreation areas in the park and the Santa Monica Police Activities League (PAL) which is located approximately 200 feet south of the project site (1401 Olympic Boulevard). The nearest residences are northwest of Colorado Avenue, more than 500 feet away.

The proposed project would involve the construction of an underground reservoir and an above ground pump station. Temporary emissions generated during construction are discussed in Section V, Construction Effects.

In the long-term, the project would not generate population growth and, therefore, would not conflict with the AQMP. The City would be required to obtain and maintain a SCAQMD permit for the pump located within the enclosed masonry building. With adherence to the permit requirement, daily emissions would be within SCAQMD standards for operating equipment and would not exceed SCAQMD thresholds. Energy use associated with the pump station would generate a minor amount of emissions, but such emissions are expected to be more than offset by the energy savings associated with the increased storage capacity and use of reclaimed water and reducing the demand for imported water, the delivery of which generates demand for energy. The project would not expose sensitive receptors to air pollutant emissions or odors. Long-term impacts to local and regional air quality **would not be significant**.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
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?	☐	☐	☐	☒
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
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 wetlands, etc.), through direct removal, filling, hydrological interruption or other means?	☐	☐	☐	☒
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?	☐	☒	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☒	☐	☐
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?	☐	☐	☐	☒

a-c, f) Memorial Park is a city park located within a highly urbanized area. The site of the proposed construction consists of tennis courts and surface parking lots. The area for the proposed project is not subject to an adopted habitat conservation plan and does not contain special status species or their habitats. As such, project implementation would have **no impact** to sensitive plant or animal species, or wetlands.

d) The proposed project would remove three existing trees located south of the existing tennis courts in the public parking lot. These trees, one magnolia tree and two pine trees may support birds that are protected by the MBTA and the Fish and Game Code of California (3503, 3503.5, 3511, 3513 and 3800). These regulations protect almost all native nesting birds, not just special-status birds. Although no nesting birds were observed on the site during the site survey (Rincon Consultants, 2010), if any bird species are nesting in the existing trees at the time of tree removal, a significant impact could occur as a result of harm to the reproductive success of species protected by the MBTA and the Fish and Game Code of California. The impact to nesting birds as a result of tree removal would be **potentially significant** unless mitigation is incorporated.

Mitigation Measure BIO-1 requires that tree removal be either conducted outside of the bird breeding season or after pre-construction nesting bird surveys to determine appropriate buffer distances from nests.

BIO-1 **Nesting Bird Surveys and Avoidance.** Tree pruning and removal shall be conducted outside of the bird breeding season (February 15 through August 31). If vegetation clearing (including tree pruning and removal) or other project construction is to be initiated during the bird breeding season, pre-construction nesting bird surveys shall be conducted by a qualified biologist. To avoid the destruction of active nests and to protect the reproductive success of birds protected by MBTA and the Fish and Game Code of California, nesting bird surveys shall be performed twice per week during the three weeks prior to the scheduled felling of the trees on the site. The surveys shall be conducted by a qualified biologist approved by the Community Development Director. If any active non-raptor bird nests are found, the trees or vegetation shall not be cut down and a suitable buffer area (varying from 25-300 feet) depending on the particular species found is established from the nest, and that area is avoided until the nest becomes inactive (vacated). If any active raptor bird nests are found, a suitable buffer area of typically 250-500 feet from the nest is established, and that area is avoided until the nest becomes inactive (vacated). Limits of construction to avoid a nest should be established in the field with flagging and stakes or construction fencing. Construction personnel shall be instructed on the sensitivity of the area.

With implementation of Mitigation Measure BIO-1, impacts to nesting birds would be reduced to a less than significant level.

e) The project would removes three existing trees (one magnolia tree and two pine trees) located south of the tennis courts in the public parking lot. Removal of existing public trees that are deemed to be site appropriate may conflict with policies contained in the City's pending Long Range Forest Master Plan. As such, impacts would be **potentially significant** unless mitigation is incorporated.

Mitigation Measure BIO-2 requires that the three existing public trees be temporarily boxed onsite during construction activity and then replanted in their existing location in order to be consistent with the policies contained in the City's pending Long Range Forest Master Plan that require tree protection during construction of public improvement projects.

BIO-2 **Temporary Relocation and Restablishment.** During the demolition and excavation phase of the project, the three public trees currently located in the parking lot south of the tennis courts shall be temporarily removed from their existing location, boxed according to standards approved by a certified arborist, and stored within a suitable location in Memorial Park. Upon completion of construction activities, the three trees shall be relocated and replanted in their current locations.

With implementation of Mitigation Measure BIO-2, impacts related to removal of trees onsite would be reduced to a less than significant level.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
V. CONSTRUCTION EFFECTS. Would the project:				
a) Have considerable construction-period impacts due to the scope, or location of construction activities?	☒	☐	☐	☐

a) Construction activity for the proposed project may temporarily re-route traffic on 14th Street and/or Olympic Boulevard. During construction, the temporary removal of the existing parking lot and the storage of construction equipment may require the use of alternate street parking and temporary closure of a portion of the abovementioned streets. Construction activity may also require the temporary closure of sidewalks adjacent to the site, disrupting pedestrian activity in the area. In addition to the reduction of the on-street parking during construction of the proposed project, construction site workers would temporarily compete with other users for parking facilities, temporarily reducing the available supply of public parking. Mitigation measures CON-1 (a-f) are required to ensure that traffic and parking impacts due to construction activities would be reduced to a less than significant level.

Sensitive receptors within the vicinity of the construction area for the proposed project include the users of the recreation areas in the park and the Santa Monica Police Activities League (PAL) which is located approximately 200 feet south of the project site (1401 Olympic Boulevard). The nearest residences are northwest of Colorado Avenue, more than 500 feet away. The SCAQMD has adopted the following thresholds for temporary construction-related pollutant emissions:

- *75 pounds per day ROG*
- *100 pounds per day NO_x*
- *550 pounds per day CO*
- *150 pounds per day of PM_{10}*
- *55 pounds per day of $PM_{2.5}$*

In addition to the regional air quality thresholds shown above, the SCAQMD has developed Localized Significance Thresholds (LSTs) in response to the Governing Board's Environmental Justice Enhancement Initiative (1-4), which was prepared to update the CEQA Air Quality Handbook. LSTs were devised in response to concern regarding exposure of individuals to criteria pollutants in local communities. LSTs represent the maximum emissions from a project that will not cause or contribute to an air quality exceedance of the most stringent applicable federal or state ambient air quality standard at the nearest sensitive receptor, taking into consideration ambient concentrations in each source receptor area (SRA), project size, distance to the sensitive receptor, etc. However, LSTs only apply to emissions within a fixed stationary location, including idling emissions during both project construction and operation. LSTs have been developed for NOx, CO, PM10 and PM2.5. LSTs are not applicable to mobile sources such as cars on a roadway (Final Localized Significance Threshold Methodology, SCAQMD, June 2003). As such, only LSTs for construction emissions would apply to the

proposed project since the project would not include any fixed stationary sources of emissions as part of the proposed site improvements.

LSTs have been developed for emissions within areas up to 5 acres in size, with air pollutant modeling recommended for activity within larger areas. The SCAQMD provides lookup tables for project sites that measure 1, 2 or 5 acres. The project site is 1.78 acres and is located in Source Receptor Area 2 (SRA-2) which is designated by the SCAQMD as the Northwest Coastal LA County and includes the City of Santa Monica. The closest sensitive receptors are users of the recreation areas in the park (approximately 100 feet from the project site) and the Santa Monica Police Activities League (PAL) which is located approximately 200 feet south of the project site. Table 1 provides the SCAQMD's LSTs for construction at the project site.

Table 1
SCAQMD LSTs for Construction

Pollutant	Allowable emissions as a function of receptor distance in meters from a two acre site (lbs/day)				
	25	**50**	**100**	**200**	**500**
Gradual conversion of NO_x to NO_2	147	143	156	186	262
CO	827	1,213	1,695	2,961	8,446
PM_{10}	6	19	34	64	154
$PM_{2.5}$	4	5	10	21	82

Source: http://www.aqmd.gov/CEQA/handbook/LST/appC.pdf, accessed online April 2010.

Table 2 shows the maximum daily emissions that would occur during construction of the proposed project. Construction activity includes demolition (removal of debris such as asphalt), excavation (removal and stockpiling of dirt), and building the reservoir, pump station and pipelines. As indicated in Table 2, emissions generated by construction of the proposed project would be below SCAQMD thresholds. However, emissions generated by construction of the proposed project would exceed the LST thresholds for PM10 and PM2.5. For this analysis, since users of the recreation areas in the park may be within 100 feet of the construction area, the LST thresholds for a distance of 25 meters from the source of emissions was used.

Mitigation Measure CON-1(g) is required to ensure that air quality impacts associated with particulate emissions during construction activities would be reduced to a less than significant level. In addition, during construction activity, the excavated soil stockpiled onsite would be required to adhere to SCAQMD Rule 403 ("Fugitive Dust") and specifically the "Best Available Control (BAC) Measures" related to stockpiles. This would include stabilizing stockpiled material by adding or removing material from the downwind portion of the storage pile (BAC Measure 14-1) and limiting the stockpile to

eight feet in height or watering the stockpile by either water truck or through an irrigation system (BAC Measure 14-2).

Table 2
Peak Construction Emissions (lbs/day)

Pollutant	ROC	NO_x	CO	PM_{10}	$PM_{2.5}$	SO_x
Project Emissions	4.49	38.66	23.21	98.55	21.84	0.03
SCAQMD Threshold	75	100	550	150	55	150
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**
Local Significant Thresholds * (LSTs)	n/a	147	827	6	4	n/a
Threshold Exceeded?	**n/a**	**No**	**No**	**Yes**	**Yes**	**n/a**

Source: California Air Resources Board's (ARB's) URBEMIS 2007 (Version 9.2.4) computer model. See Appendix A for complete results.
* LSTs are for a two-acre project in SRA-2 within a distance of 25 meters (82 feet) from the site boundary.

Temporary construction activities could create noise in excess of established noise standards. A Noise Study for the proposed project was conducted by Behrens and Associates, Inc. (2010). Two 24-hour noise measurements and three 15 minute noise measurements were taken at the project site. Table 3 summarizes the noise measurement results.

Table 3
Ambient Noise Measurement Summary

Location #	Description	Measurement Period	Measured 15-minute Average Noise Level (dBA)	Measured Maximum Noise Level (dBA)	CNEL (dBA)
1	Sidewalk of 14th St.	May 3 – 4, 2010	Day (7 am – 10 pm): 56.3 to 70.1 Night (10 pm - 7 am): 45.7 to 64.1	Day (7 am – 10 pm): 71.3 to 83.2 Night (10 pm - 7 am): 60.5 to 84.9	63.1
2	City yard building at edge of Memorial Park	2:03 pm to 2:18 pm	53.4	64.3	N/A
3	At rear of Gymnasium at 1401 Olympic Blvd.	12:13 pm to 12:28 pm	59.2	73.4	N/A

Table 3
Ambient Noise Measurement Summary

Location #	Description	Measurement Period	Measured 15-minute Average Noise Level (dBA)	Measured Maximum Noise Level (dBA)	CNEL (dBA)
4	Adjacent to 1430 Olympic Blvd.	12:55 pm to 1:10 pm	67.5	83.9	N/A
5	Adjacent to Storage Facility at 1620 14th St.	May 3 to May 4, 2010	Day (7 am – 11 pm): 62.7 to 74.4 Night (11 pm - 7 am): 46.3 to 66.5	Day (7 am – 10 pm): 79.8 to 96.5 Night (10 pm - 7 am): 73.8 to 83.4	69.3

Source: Behrens and Associates, Inc. Environmental Noise Study for the Memorial Park Reservoir, May 2010.

Temporary noise impacts due to construction activities could occur as a result of the proposed project. Construction activities for the reservoir, pump station and pipelines will take place over a 16-month period and will be divided into seventeen phases. Noise impact models were created for the excavation, construction/installation, restoration, and pipeline construction activities planned at the site. Table 4 provides the City of Santa Monica's Exterior Noise Standards. The allowable noise levels in Table 5 are reduced by 5 dB for impulsive or simple tone noise, or for noises consisting of speech or music. If the ambient noise level exceeds the standard, then the ambient becomes the standard. The maximum instantaneous sound level may not exceed the noise limits in Table 4 plus 20 dB. The closest sensitive receptors to the project site include the baseball fields and the gym/PAL center which are adjacent to the site.

Table 5 provides the results of noise modeling analysis provided in the project's noise study (Behrens and Associates, Inc., 2010).

The results of modeling analysis performed by Behrens and Associates, Inc. indicate that the maximum noise level of the excavation activities will exceed the existing maximum noise levels by up to 31 dB at the gym/PAL center; by up to 27 dB at the baseball fields; by up to 9 dB at the buildings northeast of 16th Street and by up to 3 dB at the buildings southeast of Olympic Boulevard. These exceedances would be caused during the implementation of the drilled cast-in-place foundations. For construction/installation, restoration and pipeline construction activities, the modeling analysis determined that existing maximum noise levels would be exceeded by up to 21 dB at the gym/PAL center; by up to 20 dB at the baseball fields and by up to 2 dB at the buildings southeast of Olympic Boulevard.

Based on the City of Santa Monica Exterior Noise Standards contained in Table 4, a potentially significant but mitigable impact at the baseball fields and at the gym/PAL center would occur since instantaneous noise levels would exceed the standards by

more than 20 dB. Mitigation measures would be required to reduce impacts associated with construction noise to a less than significant level.

Table 4
Exterior Noise Standards

Noise Zone	Time Interval	Allowable Leq	
		15-Minute Continuous Measurement Period	5-Minute Continuous Measurement Period
I	Monday – Friday		
	10 PM – 7 AM	50 dBA	55 dBA
	7 AM – 10 PM	60 dBA	65 dBA
	Saturday and Sunday		
	10 PM – 8 AM	50 dBA	55 dBA
	8 AM – 10 PM	60 dBA	65 dBA
II	All Days of Week		
	10 PM – 7 AM	60 dBA	65 dBA
	7 AM – 10 PM	65 dBA	70 dBA
III	Anytime	70 dBA	75 dBA

Source: City of Santa Monica Municipal Code §4.12.060(a).

Table 5
Predicted Construction Maximum Noise Levels

Location	Maximum Noise Level (dBA)			
	Mobilization / Excavation	Construction/ Installation	Restoration Phase	Pipeline Construction
City Yard	111	89	96	86
Baseball Fields	100	85	93	79
Gym/Police Activity Center	104	88	94	91
Industrial Building SW of 14th St	105	84	89	96
Buildings SE of Olympic Blvd.	87	68	71	86
Building NE of 16th St.	80	66	69	62
Building NW on Colorado Ave	84	66	69	87
Nearest Residence	72	61	58	56

Source: Behrens and Associates, Inc. Noise Study for the Memorial Park Reservoir, May 2010.

Implementation of mitigation measures CON-1(a-g) would reduce impacts related to traffic (CON-1(a), air quality (CON-1(g), and noise (CON-1(b-f) impacts generated by construction of the proposed project to a less than significant level.

CON-1(a) **Construction Impact Mitigation Plan.** The applicant shall prepare, implement and maintain a Construction Impact Mitigation Plan which shall be designed to:

- *Prevent material traffic impacts on the surrounding roadway network.*
- *Minimize parking impacts both to public parking and access to private parking to the greatest extent practicable.*
- *Ensure safety for both those constructing the project and the surrounding community.*
- *Prevent substantial truck traffic through residential neighborhoods.*
- *Coordinate with the Light Rail Transit (LRT) construction schedule*

The Construction Impact Mitigation Plan shall be subject to review and approval by the following City departments: Public Works, Fire, Planning and Community Development and Police to ensure

that the Plan has been designed in accordance with this Mitigation Measure. This review shall occur prior to commencement of any construction staging for the project. It shall, at a minimum, include the following:

Ongoing Requirements Throughout the Duration of Construction

- *A detailed traffic control plan for work zones shall be maintained. At a minimum, this shall include: parking and travel lane configurations; warning, regulatory, guide and directional signage; and area sidewalks, bicycle lanes and parking lanes. The plan shall include specific information regarding the project's construction activities that may disrupt normal pedestrian and traffic flow and the measures to address these disruptions. Such plans shall be reviewed and approved by the Transportation Management Division prior to commencement of construction and implemented in accordance with this approval.*
- *Work within the public right-of-way shall be performed between 9:00 a.m. and 4:00 p.m. This work includes dirt and demolition material hauling and construction material delivery. Work within the public right-of-way outside of these hours shall only be allowed after the issuance of an after-hours construction permit.*
- *Streets and equipment shall be cleaned in accordance with established Public Works requirements.*
- *Trucks shall only travel on a City-approved construction route. Truck queuing/staging shall not be allowed on Santa Monica streets. Limited queuing may occur on the construction site itself.*
- *Materials and equipment shall be minimally visible to the public; the preferred location for materials is to be onsite, with a minimum amount of materials within a work area in the public right-of-way, subject to a current Use of Public Property Permit.*
- *Any requests for work before or after normal construction hours within the public right-of-way shall be subject to review and approval through the After Hours Permit process administered by the Building and Safety Division.*
- *Provision of off-street parking for construction workers, which may include the use of a remote location with shuttle transport to the site, if determined necessary by the City of Santa Monica.*

Project Coordination Elements That Shall Be Implemented Prior to Commencement of Construction

- *The City shall advise the traveling public of impending construction activities (e.g., information signs, portable message signs, media listing/notification, implementation of an approved traffic control plan).*

- *The City shall obtain a Use of Public Property Permit, Excavation Permit, Sewer Permit or Oversize Load Permit, as well as any Caltrans Permits required, for any construction work requiring encroachment into public rights-of-way, detours or any other work within the public right-of-way.*
- *The City shall provide timely notification of construction schedules to all affected agencies (e.g., Big Blue Bus, Police Department, Fire Department, Public Works Department, and Planning and Community Development Department) and to all owners and residential and commercial tenants of property within a radius of 500 feet.*
- *The City shall coordinate construction work with affected agencies in advance of start of work. Approvals may take up to two weeks per each submittal.*
- *Transportation Management Division approval of any haul routes for earth, concrete or construction materials and equipment hauling shall be obtained.*

CON-1(b) **Diesel Equipment Mufflers.** All diesel equipment shall be operated with closed engine doors and shall be equipped with factory-recommended mufflers.

CON-1(c) **Electrically-Powered Tools.** Electrical powered shall be used to run air compressors and similar power tools.

CON-1(d) **Restrictions on Excavation, Pile Driving and Foundation/Conditioning.** Excavation, pile driving, foundation-laying, and conditioning activities (the noisiest phases of construction) shall be restricted to between the hours of 10:00 a.m. and 3:00 p.m., Monday through Friday, in accordance with Section 4.12.110(d) of the Santa Monica Municipal Code.

Pile driving activities at the site shall not cause a peak particle velocity exceedance of more than 0.05 in/s at the nearby sensitive receptors. This level of vibration may be achieved using equipment that produces a peak particle velocity of less than 0.1 in/s at a distance of 25 feet.

The compaction roller used at the site shall not cause a peak particle velocity exceedance of more than 0.05 in/s at the nearby sensitive receptors. This level of vibration may be achieved using equipment that produces a peak particle velocity of less than 0.1 in/s at a distance of 25 feet.

CON-1(e) **Additional Noise Attenuation Techniques.** For all noise- generating construction activity on the project site, additional noise attenuation techniques shall be employed as necessary to reduce noise levels to City of Santa Monica noise standards. Such techniques may include the use of sound blankets on noise generating equipment and the construction of temporary sound barriers between construction sites and nearby sensitive receptors. This may include the installation of temporary walls or panels,

enclosures and/or sound absorbing and barriering materials to reduce the noise levels experienced at the gym/PAL center and baseball fields.

CON-1(f) **Construction Sign Posting.** In accordance with Municipal Code Section 4.12.120, the project applicant shall post a sign informing all workers and subcontractors of the time restrictions for construction activities. The sign shall also include the City telephone numbers where violations can be reported and complaints associated with construction noise can be submitted.

CON-1(g) **Fugitive Dust Control Measures.** The following shall be implemented during construction to minimize fugitive dust and associated particulate emissions:

- *All material excavated or graded should be sufficiently watered to prevent excessive amounts of dust. Watering should occur at least three times daily with complete coverage, preferably at the start of the day, in the late morning and after work is done for the day*
- *All grading, earth moving or excavation activities shall cease during periods of high winds (i.e., greater than 20 mph measured as instantaneous wind gusts) so as to prevent excessive amounts of dust*
- *All material transported on and off-site should be securely covered to prevent excessive amounts of dust*
- *Soils stockpiles shall be covered*
- *Onsite vehicle speeds shall be limited to 15 mph*
- *All haul roads shall be paved to reduce dust when vehicles and equipment is transported on and off site*
- *Install wheel washers where vehicles enter and exit the construction site onto paved roads or wash off trucks and any equipment leaving the site each trip*
- *All off road grading equipment including graders, rubber tired dozers, tractors/loaders/backhoes, and water trucks shall be installed with a Diesel Particulate Filter (DPF) to reduce diesel particulate matter during grading activities.*
- *Appoint a construction relations officer to act as a community liaison concerning onsite construction activity including resolution of issues related to PM10 generation*
- *Sweep streets at the end of the day using SCAQMD Rule 1186 certified street sweepers or roadway washing trucks if visible soil is carried onto adjacent public paved roads (recommend water sweepers with reclaimed water)*
- *All active portions the construction site shall be sufficiently watered three times a day to prevent excessive amounts of dust.*

As shown in Table 6, implementation of mitigation measure CON-1(g) which requires fugitive dust control measures such as soil stabilizers, paving haul roads, and installation of Diesel Particulate Filters (DPF) on off-road construction equipment, would reduce emissions to below LST thresholds.

Implementation of mitigation measures CON-1 (a-g) would ensure that traffic, air quality, and noise impacts generated by construction of the proposed project would not significantly affect sensitive receptors in the vicinity of the project site, pedestrians and nearby residents. Impacts would be less than significant with mitigation incorporated.

Table 6
Mitigated Peak Construction Emissions (lbs/day)

Pollutant	ROC	NO_x	CO	PM_{10}	$PM_{2.5}$	SO_x
Mitigated Project Emissions	4.49	38.66	23.21	5.77	1.68	0.03
SCAQMD Threshold	75	100	550	150	55	150
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**
Local Significant Thresholds * (LSTs)	n/a	147	827	6	4	n/a
Threshold Exceeded?	**n/a**	**No**	**No**	**No**	**No**	**n/a**

Source: California Air Resources Board's (ARB's) URBEMIS 2007 (Version 9.2.4) computer model. See Appendix A for complete results.
** LSTs are for a two-acre project in SRA-2 within a distance of 25 meters (82 feet) from the site boundary.*

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
VI. CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☒	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature?	☐	☒	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐

a) As part of this analysis, a Historic Resources Report was prepared by San Buenaventura Research Associates (May 2010, see Appendix B). The report was prepared in response to the Feasibility Report prepared by Tetra Tech (September 2008) which identified five structures of potential historic interest that are located in the northern portion of the project site within the confines of the City Yard facility.

Historic designation may be given to a property by National, State, or local authorities. In order for a property or building to qualify for listing in the National Register of Historic Places (NRHP), the California Register of Historical Resources (CRHR), or as a locally significant property in the City of Santa Monica, it must meet one or more identified criteria of significance. The property must also retain sufficient architectural integrity to continue to evoke the sense of place and time with which it is historically associated.

As identified in the Historic Resources Report (May 2010), the project site does not meet any of the criteria for designation as an individual landmark, nor does it appear to be a contributor to any potential historic district. The project site is not listed in the Santa Monica Historic Resources Inventory (San Buenaventura Research Associates, 2010).

None of the existing structures or the project site, including those structures at the City Yard that were identified in the Preliminary Report, appear to be eligible for listing on the National Register of Historic Places, the California Register of Historic Resources, or the City of Santa Monica historic landmarks or districts list (accessed April 2010). Therefore, the property should not be regarded as a significant historical resource for purposes of CEQA and the proposed project would not result in a significant impact to historic resources. **No impact** would occur.

b, d) There is no evidence to suggest presence of either archaeological resources or human remains on the project site. A records search (Native American Heritage Commission Sacred Lands File) indicated that the presence of Native American cultural resources

exist within one-half mile of the project site. Therefore, as part of this environmental study, culturally-affiliated tribes and individuals who may have knowledge of the religious and cultural significance of historic properties in the project area were contacted and consulted (see Appendix C for written consultation). Based on this consultation, it was indicated that throughout Santa Monica there is a potential to discover cultural resources related to Native Americans. However, no cultural resources were determined to be on site. The project site is highly disturbed due to existing development on and around the site. Therefore the likelihood of finding intact significant archaeological resources is low. In addition, Health and Safety Code § 7050.5, Public Resources Code § 5097.98 and § 15064.5 of the California Code of Regulations (CEQA Guidelines) mandate procedures to be followed, including that construction or excavation be stopped in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery until the County coroner or medical examiner can determine whether the remains are those of a Native American. Therefore, the project would have a **less than significant** impact on archaeological resources or disturbance of human remains.

c) Surficial formations at the project site include Quaternary (Holocene to Pliocene) recent alluvium, older alluvium and non-marine coastal terrace deposits primarily derived from the Santa Monica Mountains. These sedimentary deposits overlay upper and lower Pliocene (Tertiary) sedimentary marine deposits known to contain both macro- and micro-fossils include pholads. This formation deposit has been correlated to the San Diego Formation which is rich in invertebrate fossils, such as mollusks, echinoderms, and crustaceans (San Diego Museum of Natural History fossil holding search performed on May 6, 2010). Underlying the Tertiary formation is a series of Cretaceous sandstone and pebbly-conglomerate deposits containing known fossil resources including mollusks and foraminifera.

The Pliocene marine and the Cretaceous deposits are exposed at rivercuts extending from the Santa Monica Mountains to the Pacific. Additionally due to the high number of geologic offsets and the close proximity of the Santa Monica Fault actual depth of fossil-bearing deposits is unknown. Excavation and grading activities has the potential to impact as-yet-discovered paleontological resources. Therefore, the impacts are **potentially significant unless the following mitigation measure is incorporated**.

CR-1 **Paleontological Monitoring.** The following general guidelines for paleontological monitoring set by the Society of Vertebrate Paleontologists (1991) shall be implemented during grading and excavation activities:

- *During an excavation project of greater than 5 feet of depth the project shall retain a qualified project paleontological manager.*
- *In areas of known or potential paleontological resources a qualified paleontological monitor shall be present during excavation of greater than 5 feet of depth into previously undisturbed soil during 100% of the earth-moving activities.*
- *If after 50% of the grading or excavation is completed, it can be demonstrated that the level of monitoring should be reduced, the project paleontological manager may amend the monitoring and mitigation schedule.*
- *A paleontologist who monitors excavation must be qualified and experienced in interpreting geological formations, in salvaging*

fossils and have the authority to temporarily divert equipment while removing fossils.

- *Removal of fossils specimens should be done using the proper equipment and supplies and in such a manner that excavation work can be resumed as quickly as possible.*

Implementation of mitigation measures CR-1 would ensure that potential paleontological resources uncovered during construction activities are not damaged but rather collected and assessed by a certified paleontologist. Impacts would be less than significant with mitigation incorporated.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
VII. 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.	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the 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?	☐	☐	☒	☐
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?	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

a(i, ii) There are no Alquist-Priolo Earthquake Fault Zones within Santa Monica (General Plan Safety Element, 1995). The closest significant fault to the project site is the Newport-Inglewood Fault, which is located about 6 miles to the east of the project site. Consequently, the potential for surface rupture at the project site is considered low. Design and construction of the pump station and reservoir would be required to be engineered to withstand the expected ground acceleration that may occur at the site, pursuant to local building regulations and applicable provisions of the Uniform Building Code (UBC) and the California Building Code (CBC).

Although surface rupture is considered low for the site, like most of Southern California, the project site could be subject to significant ground shaking due to seismic activity of the region. Known regional active and potentially active faults that could produce significant ground shaking at this site include the Santa Monica, Palos Verdes, Malibu Coast, Hollywood, Puente Hills Blind Thrust, Upper Elysian Park Blind Thrust and the San Andreas. The City requires preparation of a design level geotechnical report as part of the building permit review and approval process. A geotechnical report (Leighton Consulting, 2010, please see Appendix D) was prepared for the project to determine the adequacy of the foundation, effects of any possible fault rupture and liquefaction. The report includes recommendations to alleviate the potential for ground shaking including implementation of either 2007 California Building Code site specific seismic parameters, and/or use of a vertical to horizontal acceleration ratio of unity (1) (Leighton, 2010).

The geotechnical report would be reviewed as part of the Building and Safety Permitting Process. Technical review is conducted by appropriately licensed professionals, either a direct City employee or a geotechnical consultant under contract with the City (Guidelines for Geotechnical Reports, City of Santa Monica Building and Safety, July 2005). Recommendations for design including 2007 California Building Code specific seismic parameters and/or use of a vertical to horizontal acceleration ratio of unity (1) to alleviate the potential for adverse effects due to seismic ground shaking would be incorporated subject to the review and approval of the City Building and Safety Division. With implementation of the recommendations contained in the geotechnical report (please see Appendix D) any potential for adverse effects due to ground shaking potential would **not be significant**.

a iii) Liquefaction describes the phenomenon in which groundshaking works less cohesive soil particles into a tighter packing, which induces excess pore pressure. These soils may acquire a high degree of mobility, leading to structurally damaging deformations. Liquefaction begins below the water table, but after liquefaction has developed, the groundwater table rises and causes the overlying soil to mobilize. Liquefaction typically occurs in areas where the groundwater is less than 30 feet from the surface and where the soils are composed of poorly consolidated fine to medium sand.

The proposed project would involve the construction of an underground reservoir and an above ground pump station. According to the City of Santa Monica's Geologic Hazards Map (Geographic Information Systems, 2001), Memorial Park is not located in an area that has potential for liquefaction. Moreover, as discussed in the geotechnical report, groundwater has historically been 40 feet or more below the ground surface in the vicinity, and the site earth materials consist of stiff clay overlying very dense sand. Therefore, liquefaction potential at the site is low (Leighton, 2010). Impacts would **not be significant**.

a(iv) The geologic character of an area determines its potential for landslides. Steep slopes, the extent of erosion, and the rock composition of a hillside all contribute to the potential for slope failure and landslide events. Common triggering mechanisms of slope failure include undercutting slopes by erosion or grading, saturation of marginally stable slopes by rainfall or irrigation, and shaking of marginally stable slopes during earthquakes.

The project site is relatively flat, without significant slopes on or adjacent to the park. The proposed project involves the construction of an underground reservoir and an above

ground pump station. However, the project site does not have potential for landslides according to the City of Santa Monica's Geologic Hazards Map (Geographic Information Systems, 2001). In addition, the project site does not have a potential for seismically induced landslides according to the California Seismic Hazard Zones Map (Department of Conservation, Beverly Hills Quadrangle, 1999). Therefore impacts related to landslides would be **less than significant**.

b) Construction activities would involve excavation at the project site, which would cause disruption and displacement of onsite soils. The construction area would be confined by the surrounding developed area, and would be further confined by fencing; nevertheless, construction activities could result in increased erosion and sedimentation due to soil transport by wind and water. Implementation of standard City-required erosion control techniques and construction Best Management Practices (BMPs) as identified in Urban Runoff Pollution Ordinance (Section 7.10.060 of the Municipal Code) (e.g., the use of silt fencing, and plastic covering) would reduce the potential for soil erosion from water. Impacts would **not be significant**.

c) As describe above liquefaction potential at the site is low (Leighton, 2010) and the project site does not have a potential for landslides.

Lateral spreading is the movement of ground surface down slope or toward an unrestrained open slope face due to liquefaction of the underlying soil layers. Lateral spreading usually develops on ground surface less than three degrees slope and may cause damages to near surface structures. Because the liquefaction potential for the project site is considered low and the site topography is relatively flat, the potential for lateral spreading at the project site is also considered low (Leighton, 2010). The proposed project would not be located on a geologic unit or soil that is unstable. Impacts would **not be significant**.

d) Due to the existing urban environment of the project site and surrounding areas, soils on the project site are likely suitable for construction of the proposed reservoir and pump station. As required by the City, a geotechnical report was prepared to provide recommendations for design and construction of the project based on the existing geologic conditions at the project site. This includes recommendation for earthwork and grading activities, seismic design parameters, foundation design of the tank and vault, and design of the retaining wall. Any potential for adverse effects related to soil stability would be alleviated with adherence to the recommendations contained in the geotechnical report and through the Building and Safety permit and review process. Impacts would **not be significant**.

e) The proposed project involves the construction of an underground reservoir and an above ground pump station. The proposed project would not utilize septic tanks or alternative wastewater disposal systems. **No impact** would occur.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
VIII. GREENHOUSE GAS EMISSIONS. Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

a-b) Gases that trap heat in the atmosphere are often called greenhouse gases (GHG), analogous to the way in which a greenhouse retains heat. Common GHG include water vapor, carbon dioxide (CO2), methane (CH4), nitrous oxides (N2Ox), fluorinated gases, and ozone. GHG are emitted by both natural processes and human activities. Of these gases, CO2 and CH4 are emitted in the greatest quantities from human activities.

The accumulation of GHG in the atmosphere regulates the earth's temperature. However, it is believed that emissions from human activities, particularly the consumption of fossil fuels for electricity production and transportation, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations. The rate of Global Climate Change (GCC) has typically been incremental, with warming or cooling trends occurring over the course of thousands of years. However, scientists have observed an unprecedented acceleration in the rate of warming during the past 150 years likely due to the observed increase in anthropogenic GHG concentrations (United Nations Intergovernmental Panel on Climate Change (IPCC), November 2007).

Current annual anthropogenic GHG emitted from the world, United States, and California is listed in Table 7 below.

Table 7
Annual Anthropogenic GHG Emissions

Worldwide	United States	California
40,000 MM CDE	7,054 MM CDE	492 MM CDE

MM = million metric tons
CDE = carbon dioxide equivalent

Source: IPPC, 2007; USEPA, April 2008; CEC, December 2006

California is the second largest emitter of GHGs among states and, if California were a country, it would be the sixteenth highest emitter among countries (AEP, 2007). Out of the

492 million metric tons of carbon dioxide equivalent (CDE[1]) produced in California (7% of US total), 41% is associated with transportation. Electricity generation is the second largest source, contributing 22% of the state's GHG emissions (CEC, December 2006). Most, 81%, of California's 2004 GHG emissions (in terms of CDE) were CO_2 produced from fossil fuel combustion, with 2.8% from other sources of CO_2, 5.7% from methane, and 6.8% from nitrous oxide (CEC, December 2006).

Local Regulations and CEQA Requirements. GHG emissions and their contribution to GCC have only recently been addressed in CEQA documents, such that CEQA and case law does not provide guidance relative to their assessment. Quantitative significance thresholds have been proposed by CARB. Quantitative significance thresholds have not been adopted by the State of California, or any particular air pollution control district (APCD). Pursuant to the requirements of SB 97, the Resources Agency adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted CEQA Guidelines provide regulatory guidance on the analysis and mitigation of GHG emissions in CEQA documents, while giving lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHG and GCC impacts. In addition, in an effort to guide professional planners, land use officials and CEQA practitioners, OPR prepared *CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA)*. This document offers informal guidance regarding the steps lead agencies should take to address climate change in CEQA documents. This guidance was developed in cooperation with the Resources Agency, Cal EPA, and the ARB.

The City of Santa Monica has developed a Sustainable City Plan (revised 2006). A Sustainable City Progress Report is used to measure the success and performance in achieving the goals set forth in the Sustainable City Plan. The Progress Report uses a range of indicators to measure the City's progress toward a more sustainable city. The City has included a measure of GHG emissions among its indicators because it recognizes the physical and socio-economic disruptions that climate change could cause if unabated. The target for this indicator is to reduce emissions to 30% below 1990 levels by 2015 for City operations and to reduce emissions to 15% below 1990 levels by 2015 for the City as a whole. As part of the Progress Report, beginning in 1990, the City has maintained a GHG emissions inventory (last updated November 2009), which allows the City to measure its progress toward achieving the goals contained in the Sustainable City Plan. According to the 2009 GHG Emissions Report, there was a reduction in GHG emissions from 1990 to 2007. Overall, GHG emissions associated with City operations in 2007 declined by less than 7% as compared to 1990 levels. The majority of the reduction in GHG emissions occurred in the waste sector, in which emissions fell by 48%. In addition, the City's Renewable Energy Portfolio and use of green power energy sources has also reduced community emissions (reduced by 8%) and the corporate emissions (reduced by 36%).

Impact Analysis Methodology. The information provided in this section is based on recently established California goals for reducing GHG emissions, as well as a project-specific emissions inventory developed for the proposed project. How a proposed project

[1] *Carbon dioxide equivalent (CDE or CO_2E) is a quantity that describes, for a given mixture and amount of GHGs, the amount of CO_2 (usually in metric tons; million metric tons [megatonne] = $MMTCO_2E$ = terragram [Tg] CO_2 Eq; 1,000 MMT = gigatonne) that would have the same global warming potential (GWP) when measured over a specified timescale (generally, 100 years).*

might contribute to GCC and the overall effect of an individual project based on that contribution are still being debated. As previously discussed, no statewide thresholds or methodologies for determining the significance of a project's potential cumulative contribution to GCC have been adopted to date. An individual project (unless it is a massive construction project, such as a dam or a new freeway project, or a large fossil-fuel fired power plant) does not generate sufficient GHG emissions to directly influence GCC; therefore, the issue of global climate change typically involves an analysis of whether a project's contribution towards a cumulative impact is cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.

This analysis is based on the methodologies recommended by the California Air Pollution Control Officers Association [CAPCOA] (January 2008) *CEQA and Climate Change* white paper. The basic concepts for the various approaches suggested by CAPCOA are used herein to determine whether or not the proposed project's GHG emissions are "cumulatively considerable." CAPCOA's suggested quantitative thresholds are generally more applicable to development on greenfield sites, where there would be an increase in VMT and associated GHG emissions than to infill development that would generally reduce regional VMT and associated emissions. For this reason, the City has determined that the most conservative (i.e., lowest) thresholds suggested by CAPCOA would not be appropriate for Santa Monica. Consequently, the City has selected a dual threshold methodology that considers the 10,000 tons CDE/year threshold (the second lowest non-zero threshold) as a quantitative benchmark for significance and qualitative consideration of the CalEPA's GHG emissions reduction strategies that were prepared by CalEPA's CAT for projects below 10,000 tons CDE/year. The CAT strategies are recommended to reduce GHG emissions at a statewide level to meet the goals of the Executive Order S-3-05 (www.climatechange.ca.gov). A project's contribution of cumulative impacts to global climate change is considered cumulatively considerable if the project would generate 10,000 tons CDE/year. For projects that would generate fewer than 10,000 tons CDE/year, impacts would be considered cumulatively considerable if the project would be inconsistent with one or more of the CAT's GHG reduction strategies. In addition to CAT strategies, the California Office of Planning and Research (OPR) CEQA guidelines include recommended mitigation strategies to reduce GHG impacts. Project consistency with CAT strategies and OPR guidelines is included in Appendix A.

Calculations of CO_2, CH_4, and N_2O are provided for full disclosure of the magnitude of potential project effects. The analysis focuses on CO_2, N_2O, and CH_4 as GHG emissions that the project would emit in the largest quantities, as compared to other GHGs (such as chlorofluorocarbons [CFCs]). Calculations were based on the methodologies discussed in the CAPCOA white paper (January 2008) and included the use of the California Climate Action Registry General Reporting Protocol (March 2007). This analysis focuses on construction emissions since long term emissions (operational and mobile emissions) as discussed in Section III, *Air Quality*, would generate a minor amount of emissions and would be expected to be more than offset by the energy savings associated with the increased storage capacity and use of reclaimed water and reducing the demand for imported water, the delivery of which generates demand for energy. Therefore only temporary construction emissions are quantified in this analysis.

Construction Emissions. Although construction activity is addressed in this analysis, CAPCOA does not discuss whether any of the suggested threshold approaches

adequately address impacts from temporary construction activity. As stated in the *CEQA and Climate Change* white paper, "more study is needed to make this assessment or to develop separate thresholds for construction activity" (CAPCOA, 2008). GHG emissions associated with construction activity for the proposed project are quantified and reported in the analysis. However, it should be noted that construction emissions would be temporary in nature (approximately 16 months).

Construction of the proposed project would generate temporary GHG emissions primarily due to the operation of construction equipment and truck trips. The estimated amount of excavation for the project is 26,000 cubic yards of material that will need to be removed. A portion of the material (about 16,500 cubic yards) will need to be brought back to the site to backfill and restore the park to the original condition. Site excavation typically generates the greatest amount of emissions due to the use of grading equipment and soil hauling. Project construction is assumed to be completed within approximately 16 months. The proposed Construction Schedule (Tetra Tech April 2010) used for this analysis proposes that construction would commence in March of 2012 and be completed in July of 2013 (approximately 345 work days). Emissions associated with the worst-case day of construction were estimated using the California Air Resources Board's URBEMIS 2007 (Version 9.2.4) computer model, based on the projected maximum amount of equipment that would be used onsite at one time. Complete URBEMIS results and assumptions can be viewed in the Appendix A.

Based on the URBEMIS output the worst-case day of construction would generate approximately 5,127 pounds of CO_2 which would occur during the building and paving phase of project construction. Assuming this worst-case day of construction occurred for the entire construction period (345 work days), the construction activity for proposed project would generate an estimated 806 metric tons of CDE units (as shown in Table 8).

Table 8
Estimated Construction Emissions of Greenhouse Gases

Emission Source	**Annual Emissions**	
	Emissions	*Carbon Dioxide Equivalent (CDE)*
Carbon Dioxide (CO_2)[1]	884 (short tons, US)	802 metric tons
Methane (CH_4) [2]	0.0135	0.28 metric tons
Nitrous Oxide (N_2O) [2]	0.013	4.48 metric tons
	Total	**806 metric tons**

[1] *See Appendix A for calculations.*
[2] *California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 2.2,March 2007, page 30-35.*
See Appendix A for GHG emission factor assumptions.

Although the proposed project would contribute GHG emissions as a result of construction activity, construction emissions would be temporary in nature (approximately 16 months) and would not contribute to long term emissions. In addition, the estimated construction emissions of greenhouse gases (approximately 806 metric tons CDE) would not exceed the 10,000 metric ton threshold. Further, as shown in Appendix A (page 22), the project would also be consistent with CAT strategies and OPR guidelines. As discussed in Section III, *Air Quality*, the proposed project would generate a minor amount of emissions and would be expected to be more than offset by the energy savings associated with the increased storage capacity and use of reclaimed water and reducing the demand for imported water, the delivery of which generates demand for energy. Therefore, the contribution of onsite development to cumulative global climate change impacts would be **less than significant.**

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
IX. 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?	☐	☐	☒	☐
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?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☒	☐
e) For a project located within an airport land use plan area or, where such a plan has not been adopted, within two miles of a public airport or a public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
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?	☐	☐	☐	☒
g) Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
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?	☐	☐	☐	☒

a) The proposed project involves the construction of an underground reservoir and an above ground pump station. Neither the construction nor the operation of the

underground reservoir and above ground pump station would involve the routine transport, use or disposal of hazardous substances, other than minor amounts typically used for maintenance. Thus, the project would have a **less than significant** impact and no mitigation is necessary.

b, d) A site reconnaissance of the project site was conducted by Rincon Consultants, Inc. to observe existing site conditions and to obtain information indicating the possible presence of recognized environmental conditions in connection with the property. The site reconnaissance did not produce any evidence of environmental concerns for the property (Rincon Consultants, Inc., 2010). In addition, Environmental Data Resources, Inc. (EDR) was contracted to provide a database search of public lists of sites that generate, store, treat or dispose of hazardous materials or sites for which a release or incident has occurred. The project site does not appear on any hazardous material site list compiled pursuant to Government Code Section 65962.5. The following databases were checked (May 7, 2010) for known hazardous materials contamination at the project site:

- *Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database;*
- *Geotracker search for leaking underground fuel tanks;*
- *Investigations- Cleanups (SLIC) and Landfill sites, Cortese list of Hazardous Waste and Substances Sites; and*
- *The Department of Toxic Substances Control's Site Mitigation and Brownfields Database.*

The project site does not appear on any of the above lists. As part of the EDR database search, the subject property was listed as a HAZNET site in the databases searched by EDR. According to the EDR report, 33.71 tons of organic solids were disposed from the site by the City of Santa Monica. The disposal method was not listed. However, based on the nature of the environmental listing for the project site (non-release, spill or leak), the HAZNET listing does not appear to pose an environmental concern (Rincon Consultants, Inc., May, 2010).

One adjacent property was listed as a release site (LUST) in the databases searched by EDR. The adjacent property to the south across the intersection of Olympic Boulevard and 14th Street (Snyder & Diamond-1399 Olympic Boulevard) was listed as a leaking UST site in the databases searched by EDR. According to the EDR report, a release from a UST or USTs on this adjacent property potentially impacted soil and groundwater on the adjacent property with hydrocarbons. The case is currently open and in the site assessment phase. Based on the reported distance of the adjacent property to the project site and the reported groundwater flow direction beneath the site to the southwest, south, or southeast, the adjacent property does not appear to pose an environmental concern to the project site.

One adjacent property was listed as a UST site in the databases searched by EDR. The adjacent property to the northeast across 16th Street (Santa Monica-Malibu Unified School District-1651 16th Street) was listed as a UST site in the database searched by EDR. However, this listing is not indicative of a hazardous materials release.

There are no records or evidence of the presence of underground storage tank installation or removal on the project site. Presence of leaking underground storage tanks, or other potentially known and unknown impacted sites and hazardous waste

generators within a one-mile radius of the project site do not appear to pose a significant environmental concern or liability because of their distance, the direction of groundwater flow and their status (Rincon Consultants, Inc., 2010).

Therefore, the proposed project would result in a **less than significant** impact and no mitigation is necessary.

c) The nearest school to the project site is PS #1 Elementary School (.25 miles northwest). As there is no evidence that the project would emit, release, or upset hazardous material or handle hazardous materials, there would be **no impacts** with respect to hazardous materials near schools.

e, f) The project site is located more than a mile northwest of Santa Monica Municipal Airport. The project site is not within an area covered by an airport land use plan, nor is it located in the vicinity of a private air strip (City of Santa Monica, Map Catalog, Airport Influence Area). The project would not create any airport-related safety hazards. There would be **no impact**.

g) The proposed project involves the construction of an underground reservoir and an above ground pump station. The proposed project would not conflict with an adopted emergency response plan or emergency evacuation plan. Impacts would be **less than significant.**

h) The project site is located in a developed area in Santa Monica with both retail/commercial, industrial and residential uses in the immediate site vicinity. The project site and surrounding area are entirely urbanized. The proposed project would not expose persons or structures to wildfire hazard risks. **No impact** would occur.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
X. HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
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 land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltuation on- or off-site?	☐	☐	☒	☐
d) 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 that would result in flooding on- or off-site?	☐	☐	☒	☐
e) 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?	☐	☐	☒	☐
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐
g) 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?	☐	☐	☒	☐
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	☐	☐	☒	☐
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of a failure of a levee or dam?	☐	☐	☒	☐

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
j) Inundation by seiche, tsunami or mudflow?	☐	☐	☒	☐

a, f) Construction for the proposed project would involve removal of the existing tennis courts and parking lot and approximately 26,000 cubic yards of excavation for the underground reservoir. This, in conjunction with other onsite construction activities, has the potential to result in temporary water quality impacts. The City of Santa Monica's Urban Runoff Pollution Ordinance (Municipal Code Section 7.10.060) requires implementation of Best Management Practices (BMPs) for all construction sites in the City. Such BMPs include, but are not limited to, use of plastic coverings on unprotected areas to eliminate erosion; removal of any sediments tracked offsite by construction vehicles; and use of temporary sediment barriers where necessary. Pursuant to the ordinance, polluted runoff (runoff containing sediments and/or construction wastes) from construction sites shall not leave the site. The ordinance requiring these standard construction and erosion control practices would reduce the potential for significant water quality impacts from excavation and general construction. Impacts related to water quality standards and waste discharge requirements would be **less than significant**.

b) The proposed project would temporarily remove the existing tennis courts and parking lot and would haul the asphalt debris from these two areas during construction activities. However, after the proposed underground reservoir and above ground pump station have been installed, the tennis courts and parking lots would be repaved in a similar manner as currently exists with the same overall amount of impervious surface area as currently exists. The proposed project would not increase the amount of impervious surface area at the site. Therefore, the proposed project would not substantially interfere with groundwater recharge. Therefore, impacts would be **less than significant**.

c) The project site is in an urbanized area of Santa Monica. The project site is currently developed as a recreational park. No streams or rivers are present on the project site. The proposed project involves the construction of an underground reservoir and an above ground pump station. Temporary sedimentation impacts could occur if bare ground is exposed during winter rains. The City of Santa Monica's Urban Runoff Pollution Ordinance (Municipal Code § 7.10) requires implementation of Best Management Practices (BMPs) for all construction sites in the City. Such BMPs include use of plastic coverings on unprotected areas to eliminate erosion; removal of any sediments tracked offsite by construction vehicles; and use of temporary sediment barriers where necessary. These standard construction and erosion control practices would reduce the potential for significant water quality impacts from grading and other construction activities to a **less than significant** level.

d, e) The City of Santa Monica has an Urban Runoff Pollution Ordinance that requires applicants for all new development proposals to submit an Urban Runoff Pollution Plan to the Public Works Department for approval (Municipal Code § 7.10.050). This plan would include design elements that would infiltrate or treat project-generated runoff by an amount equal to or greater than the volume of runoff produced by a 0.75-inch storm event. The design elements must meet one or more of the following goals:

1) *Maximize permeable areas to allow for more percolation of runoff into the ground;*
2) *Maximize the amount of runoff directed to permeable areas and/or maximize stormwater storage for reuse or infiltration; or*
3) *Remove pollutants through installation of treatment control BMPs.*

Examples of design elements that could be incorporated into the project to achieve these goals include the following: biofilters, swales, and green strips; orienting roof runoff to permeable areas; grading the site to divert runoff to permeable areas; and using cisterns or other retention structures to capture runoff for reuse. The plan must also include steps for ongoing maintenance of BMPs throughout the life of the project.

Although it is anticipated that the proposed project would have a similar drainage patterns as currently exists onsite, as discussed above, in accordance with the City's Ordinance, the proposed project would need to include engineering design measures to ensure that stormwater runoff would be contained on site for a 0.75-inch storm event. If such design measures are infeasible at this site, an in lieu fee would be charged. As the proposed project would be required to meet the 0.75 inch reduction goal (or pay an in lieu fee), impacts to the City storm drain system would be **less than significant**.

g-j) According to the Federal Emergency Management Agency (FEMA), the project site is located in Zone "X," defined as "other flood area." Other flood areas include areas of 0.2% annual chance of floods; areas of 1% annual chance of flood with average depths of less than one foot or with drainage areas less than one square mile; and areas protected by levees from 1% annual chance of flood (FEMA, 2008). The project site is not located in an inundation area. No dams or levees are located in the vicinity of Santa Monica; thus, the potential for flooding due to dam failure is low. Santa Monica is not located near any major enclosed bodies of surface water; therefore, impacts from seiches are not expected. The site is not located near any steep hillsides, and therefore impacts from mudflows are not expected. In addition, the project site is located approximately 113 feet above sea level (Google Earth, 2010) and therefore is not located in a tsunami hazard zone. Impacts would be **less than significant**.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XI. LAND USE AND PLANNING. Would the project:				
a) Physically divide an established 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?	☐	☐	☒	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

a) The project site is located in an urbanized area of Santa Monica. The proposed project involves the construction of an underground reservoir and an above ground pump station. Post-construction the park amenities and parking areas would be restored to their existing use. Implementation of the project would not physically divide an established community. There would be **no impact**.

b) The proposed project site has a General Plan Land Use Designation of Parks and Open Space and zoning designation of Designated Park (DG). The proposed project involves the construction of an underground reservoir and an above ground pump station. After construction of the reservoir and pump station, all park amenities including the tennis courts and parking lot for the proposed project would be rebuilt similar to existing conditions. The project is intended to fit within the goals and strategy framework of the City's Land Use and Circulation Element (LUCE). The project would be consistent with LUCE policy S6.6 which states that the City should "continue to explore and expand additional potential water conservation measures for the community, such as expanding reclaimed water access and availability" (Santa Monica LUCE, 2010). In addition the project would be consistent with policy S6.7 which states that the City should "increase the use of groundwater consistent with the safe yield of the Santa Monica Groundwater Basin and reduce reliance on imported surface water supplies from the Metropolitan Water District". And, "as necessary, implement conservation measures as identified in the City's Water Shortage Response Plan to insure that adequate water supplies are available to the City" (Santa Monica LUCE, 2010). The proposed reservoir project is intended to preserve the uses in the existing park and fit within planned new uses while enhancing the reliability of the City's water supply. The project would be consistent with applicable land use designations and zoning. Impacts would be **less than significant**.

c) The project site is located in an entirely urbanized area of Santa Monica. There are no natural communities or habitats at the project site, and no habitat conservation or natural community plans apply to the site. Therefore, the project would not conflict with any habitat/natural communities conservation plans. In addition, as described above in

Section IV, Biological Resources, no areas within Santa Monica are included within any natural community conservation plans or other habitat conservation plans (California Department of Fish and Game Homepage "Habitat Conservation Programs", 2010). Therefore, the project would not conflict with any habitat/natural community conservation plans. **No impact** would occur.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XII. 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?	☐	☐	☐	☒
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?	☐	☐	☐	☒

a-b) The project site is located in the City of Santa Monica, which is a developed urban area that does not provide any mineral resource value (U.S. Geological Survey, 2010). As such, the proposed project would not result in the loss of the availability of a known mineral resource or mineral recovery site that would be of value locally, regionally, or to the State. **No impact** to mineral resources would occur.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIII. NEIGHBORHOOD EFFECTS. Would the project:				
a) Have considerable effects on the project neighborhood?	☐	☐	☒	☐

a) Construction of the proposed project would create temporary air quality, noise and traffic impacts. As described in Section V, Construction Effects, construction activities would increase the emissions related to particulate matter beyond LST thresholds. In addition, construction equipment could increase the noise level on the project site and traffic generated as a result of construction could temporarily disrupt traffic patterns in the area and could decrease parking and/or access temporarily. However, mitigation measures CON-1(a-g) identified in Section V, Construction Effects, would mitigate neighborhood impacts to a less than significant level. In addition, the proposed project would not result in long-term noise, air quality, or traffic impacts that could have significant effects on the surrounding neighborhood since construction effects would only be temporary and the park amenities would be returned to existing conditions post-construction of the underground reservoir and the above ground pump station. Impacts would be **less than significant**.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIV. 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 of applicable standards of other agencies?	☐	☐	☒	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e) For a project located within an airport land use plan area or, where such a plan has not been adopted, within two miles of a public airport or a public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) 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?	☐	☐	☐	☒

a, c) The proposed project involves the construction of an underground reservoir and an above ground pump station. As discussed in Section XX, *Traffic*, the proposed project would not result in an increase in traffic volumes, and therefore noise on the project site would be expected to be similar to existing conditions. The only new noise source as a result of the project would be associated with the above ground pump station. The pump station would include separate rooms for various pieces of equipment and would be enclosed in a block masonry building. The equipment to be installed within the station includes three 40 horse-power (HP) variable speed pumps, a 2 HP jockey pump, two chemical feed pumps and two 10 HP submersible pumps. The architectural drawings for the station indicate that the rooms containing the pumps would not have significant penetrations outside the masonry building. Masonry block walls (approximately 4 inches thick) have an estimated Sound Transmission Class (STC) rating of 44 (STC for masonry block walls available at http://www.stcratings.com/masonry.html). With a maximum noise level inside the pump station estimated at 69.5 dBA (Behrens and Associates, Inc., 2010), the estimated noise at approximately 50 feet from the pump station would be 25 dBA. With implementation of masonry walls containing the pumps and other noise sources associated with the pump station, noise impacts generated by the project would

not significantly affect sensitive receptors in the vicinity of the project site, including visitors at the park and the gym/PAL center since 25 dBA would not exceed any of the noise standards contained in Table 4 above. Therefore, impacts would be **less than significant**.

b) The proposed project involves the construction of an underground reservoir and an above ground pump station. Operation of the project would not increase groundborne vibration or groundborne noise on the project site above existing conditions. Construction of the proposed project could potentially increase groundborne vibration or noise on the project site, but construction effects would be temporary. In addition, mitigation measure CON-1(d) would require vibration reduction techniques during pile driving and compact rolling activities that would reduce grounborne vibration. Therefore, impacts would be **less than significant**.

d) Construction noise impacts are discussed in Section V, *Construction*. Impacts related to noise generated by the proposed project during construction would be **less than significant with mitigation incorporated**.

e-f) The closest airport is Santa Monica Municipal Airport, located approximately 1.5 miles southeast of the project site. The project site is located in an urban area of Santa Monica. The project site is not within the aircraft takeoff and landing flight paths (City of Santa Monica, Airport Influence Area Map, 2003). In addition, minimum altitude over any congested area of a city, town, or settlement, or over any open air assembly of persons, is an altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft (http://santa-monica.org/airport/n_flight_paths.aspx). Because the project site is not within the normal take off and landing paths and because the minimum altitude is 1,000 feet above the highest obstacle in the vicinity of the project site, air traffic associated with the Santa Monica Municipal Airport would not expose workers during construction to excessive noise from air traffic. In addition, the project is outside of the 65 CNEL Airport Land Use Plan Noise Contour (City of Santa Monica, Airport Influence Area Map, 2003). There would be **no impact**.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XV. POPULATION AND HOUSING. Would the project:				
a) Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

a-c) The proposed project involves the construction of an underground reservoir and an above ground pump station. The proposed project would not include construction of residential units. As such, the project would not substantially induce population growth. In addition, since no housing exists on the project site, the project would not displace existing housing, or displace existing residents. There would be **no impact** related to population and housing.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVI. PUBLIC SERVICES. 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:				
a) Fire protection?	☐	☐	☐	☒
b) Police protection?	☐	☐	☐	☒
c) Schools?	☐	☐	☐	☒
d) Parks?	☐	☐	☐	☒
e) Other public facilities?	☐	☐	☐	☒

a(i) The City of Santa Monica Fire Department provides fire protection services in the City of Santa Monica and maintains an Automatic Aid Agreement with the City of Los Angeles Fire Department, as well as a Mutual Aid Agreement with other fire departments in the region. Memorial Park is located within approximate one-half mile of Fire Station 3, located at 1302 19th Street. Fire Station 3 has two paramedic engines, a hazardous materials response vehicle, and one reserve engine.

The proposed project involves the construction of an underground reservoir and an above ground pump station. The park amenities and parking areas would be returned to existing conditions post-construction of the underground reservoir and above ground pump station. Therefore, the proposed project would not increase the demand for fire protection services, and would not result in the need to construct new or altered fire protection facilities. There would be **no impact**.

a (ii) The City of Santa Monica Police Department (SMPD) provides police protection services in the City and maintains mutual assistance programs with the Los Angeles County Sheriff's Department and the City of Los Angeles Police Department. The SMPD is located at 333 Olympic Drive, approximately 0.8-miles southwest of the project site. The project site is in Beat A-4.

The proposed project involves the construction of an underground reservoir and an above ground pump station. The project would not increase the population or increase the demand for police services. Therefore, the proposed project would not result in the need to construct new police facilities. There would be **no impact**.

a (iii) The Santa Monica-Malibu Unified School District (SMMUSD) provides primary and secondary public education services to students living in Santa Monica. In the District, there are currently 10 elementary schools, two middle schools, two high schools, one alternative school, one continuation school, and a community day school. The District

has a total enrollment (2008-2009) of about 11,591 students (California Department of Education from 2008-2009 School Year).

The proposed project would not involve residential development that would generate new students. Therefore, the proposed project would not result in the need for new or altered public schools. There would be **no impact**.

a (iv) The City of Santa Monica contains 26 public park facilities located throughout the city providing a variety of recreational opportunities for residents and visitors (City of Santa Monica Homepage, May 2010). The proposed project would not involve the construction of residences; therefore, the project would not increase the demand for parks in the City. As described in Section V, *Construction Effects*, the proposed project would temporarily remove existing park amenities. For the proposed project, although all other areas of the park would remain open, the existing tennis courts and parking lots would be removed during construction of the underground reservoir and the above ground pump station. However, these impacts would be temporary in nature (approximately 16 months) as the park amenities and parking areas would be restored to existing conditions post-construction. Therefore, the proposed project would not result in the need for new or altered parks. There would be no impact. (See Section XVIII, *Recreation,* for further discussion of this issue.)

a (v) The proposed project would be intended to improve the City's non-potable water supply systems. **No significant impacts** to other public facilities would occur with project implementation.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVII. 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?	☐	☐	☒	☐
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?	☐	☐	☒	☐

a, b) As discussed in Section V, *Construction Effects*, project-related construction activity would involve temporary disruption of certain activities at Memorial Park. However, the affected facilities for the proposed project (tennis courts and surface parking lots) would be returned to their current condition. As such, the proposed reservoir and ancillary facilities would not increase the use of existing parks or require the expansion of recreational facilities. Impacts would be **less than significant**.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVIII. SHADOWS. Would the project:				
a) Produce extensive shadows affecting adjacent uses or property?	☐	☐	☐	☒

a) The proposed project involves the construction of an underground reservoir and an above ground pump station. The underground reservoir would not create any shadows. The above ground pump station may create some shadows. However, the pump station (approximately 14 feet tall) would be located in an area currently used as a surface parking lot. There are no shadow-sensitive uses adjacent to the proposed pump station location. Therefore, the pump station would not produce shadows that would affect adjacent uses or property. **No impact** would occur.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIX. TRANSPORTATION/TRAFFIC. Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☒	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐
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?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
e) Result in inadequate emergency access?	☐	☐	☒	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒

a, b) The proposed project involves the construction of an underground reservoir and an above ground pump station. Once the underground reservoir and pump station are fully operational, the proposed project would have the same traffic volume compared to existing conditions. However, traffic volumes on surrounding streets may be impacted during construction activities. As described in Section V, *Construction Effects*, construction activity for the proposed project may temporarily re-route traffic on 14th Street and/or Olympic Boulevard. During construction, the temporary removal of the existing parking lots and the storage of construction equipment may require the use of alternate street parking and temporary closure of a portion of the abovementioned streets.

However, there is metered parking available on the street as well as free parking available at the old Fisher Lumber site that is approximately 350' from the existing parking lot. In addition, implementation of CON-1(a) would require the applicant to prepare, implement and maintain a Construction Impact Mitigation Plan which would be designed to prevent material traffic impacts on the surrounding roadway network and prevent substantial truck traffic through residential neighborhoods. With implementation of a Construction Impact Mitigation Plan as required by mitigation measure CON-1(a), impacts would be **less than significant**.

c) The proposed project would not affect air traffic patterns. **No impact** would occur.

d) The proposed project would not include any design features that could present traffic hazards. As described in Section V, *Construction Effects*, construction activity for the proposed project may result in the temporary closure of sidewalks adjacent to the site, disrupting pedestrian activity in the area. However, these impacts would be temporary in nature and would be reduced to a less than significant level with the implementation of mitigation measure CON-1(a) which would require a Construction Impact Mitigation Plan to ensure safety for both those constructing the project and the surrounding community. With implementation of CON-1(a), impacts would be **less than significant**.

e) Construction activity may require the temporary closure of a portion of the streets surrounding Memorial Park, potentially disrupting emergency access and affecting access for other properties and parcels. In addition, the temporary removal of the existing parking lots and the storage of construction equipment may require the use of alternate street parking and would cause construction site workers to temporarily compete with other users for parking facilities, temporarily reducing the available supply of public parking. However, these impacts would be temporary in nature and would be reduced to a less than significant level with the implementation of mitigation measure CON-1(a) which would require a Construction Impact Mitigation Plan. The Mitigation Plan would include a provision of off-street parking for construction workers, minimize parking impacts both to public parking and access to private parking to the greatest extent practicable, and ensure safety for both those constructing the project and the surrounding community. It should also be noted that some replacement parking would be available during construction activity at the Fisher Lumber property. With implementation of CON-1(a), impacts would be **less than significant**.

f) The Santa Monica Big Blue Bus lines provide public transportation throughout Santa Monica. In addition, bike routes/lanes are located throughout the City (City of Santa Monica Information Systems Division, 2007). The proposed project would not conflict with any programs, policies or plans supporting alternative transportation. There would be **no impact**.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XX. UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Exceed wastewater treatment requirements of the applicable 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?	☐	☐	☒	☐
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?	☐	☐	☒	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination by the wastewater treatment provider that 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?	☐	☐	☒	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state and local statutes and regulations related to solid waste?	☐	☐	☒	☐

a, b, e) The local sewer collection system is owned by the City of Santa Monica and is managed, operated, and maintained by the Water Resources Division of the City's Public Works Management Department. Sewer flow is treated at the City of Los Angeles' Hyperion Treatment Plant located approximately seven miles southeast of Santa Monica, along the Santa Monica Bay coastline. Wastewater in Santa Monica flows primarily by gravity in a southerly direction, and is delivered to the treatment plant via the Coastal Interceptor Sewer. The City has an agreement with the City of Los Angeles for wastewater disposal services and pays fees to Los Angeles based on monthly effluent flows to the treatment plant (City of Santa Monica Official Homepage, 2010; RAND Corporation Headquarters EIR, 2000).

The proposed project involves the construction of an underground reservoir and an above ground pump station. The proposed project would not involve any new buildings or development that would be occupied by people and, therefore, would not cause an increase in the amount of wastewater generated onsite. The reservoir's main drain line would connect to the City's 30 inch sewer line located on Colorado Boulevard. However, the amount of wastewater from the drain line discharge would not be expected to significantly affect the City's wastewater conveyance system. Impacts related to wastewater conveyance and treatment would be **less than significant**.

c) The proposed project involves the construction of an underground reservoir and an above ground pump station. As described above in Section XI, *Hydrology and Water Quality,* although it is anticipated that the proposed project would have a similar drainage patterns as currently exists onsite, in accordance with the City's Urban Runoff Pollution Ordinance, the proposed project would need to include engineering design measures to ensure that stormwater runoff would be contained on site for a 0.75-inch storm event. If such design measures are infeasible at this site, an in lieu fee would be charged. As the proposed project would be required to meet the 0.75 inch reduction goal (or pay an in lieu fee), impacts to stormwater quality conveyance facilities would be **less than significant**.

d) Water for the Santa Monica service area is supplied from both groundwater and imported sources. Presently, the City owns and operates 11 water wells. Six wells are in the Santa Monica Subbasin, and the remaining five wells are in the Charnock Subbasin. The Metropolitan Water District (MWD) of Southern California delivers imported water from the Colorado River and State Water Project to the City.

The proposed project consists of a 1-million gallon MG non-potable water reservoir, a non-potable water pumping station, and supporting pipelines at a site within Memorial Park and immediately adjacent to the park on the western most portion of the Fisher Lumber property. The project would not require the use of potable water at the site and would not increase the demand for potable water supplies. Therefore, the project would have sufficient water supplies and would not require new or expanded entitlements. Although no permits are required, as part of the design process for the non-potable water system, all plans using non-potable would be reviewed by Los Angeles County Heath Cross Connection Control. The project would actually benefit the City's water supplies by providing more reliability for the City's non-potable water supply systems which would conserve water and would also minimize energy consumption associated with transporting water for use within Santa Monica. There would be **no impact** to water supplies.

f, g) The City of Santa Monica provides refuse collection service. The Solid Waste Management Division of the Public Works Department operates the solid waste management system. Solid waste from Santa Monica is disposed at the following facilities on a regular basis: Puente Hills Landfill, Sunshine Canyon Landfill, Simi Valley Landfill, and City of Commerce's Waste to Energy Incinerator. In addition, the City recycles electronics equipment through Electronics Partners Corporation (ePC) and recycles tires through CRM Co. LLC (City of Santa Monica Official Website). Table 9 summarizes the permitted throughput, estimated capacity, and estimated closure date for these facilities.

While the proposed project would not generate waste during the operational phase, during construction activities, approximately 9,500 cubic yards of cut material and

approximately 178,902 cubic yards of demolition debris (pavement and asphalt from the existing tennis courts and parking lots) would be removed from the project site.

Table 9
Solid Waste Disposal Facilities

Facility	Permitted Daily Throughput (tons/day)	Estimated Remaining Capacity (CY)*	Estimated Closure Date
Puente Hills Landfill	13,200	49,348,500	2013
Sunshine Canyon SLF County Extension	12,100	111,200,000	2037
Simi Valley Landfill and Recycling Center	3,000	23,201,173	2033
Commerce Refuse-to-Energy Facility	1,000	---	---

Source: California Integrated Waste Management Board Website, http://www.ciwmb.ca.gov/swis/Search.asp, accessed on May 10, 2010.
** Remaining capacity estimates are based on reported estimated closure date minus the annual average throughput since date of reported remaining capacity.*
cy=cubic yards

The City has completed a comprehensive waste reduction and recycling plan in compliance with State Law AB 939, which required every city in California to reduce the waste it sends to landfills by 50% by the year 2000. As of 2006, the City was recycling or otherwise diverting 68% of its solid waste, thereby complying with the standards established by AB 939 (Santa Monica Waste Stream Profile, CIWMB, 2010). The City has also set a goal of increasing the amount of solid waste diverted from landfills to 70% by the year 2010 (City of Santa Monica Sustainable City Plan, 2003).

The project would be required to complete a Waste Management Plan (WMP) in accordance with Municipal Code Section 8.108.130. The WMP would require that at least 65% of all construction and demolition material generated by the project will be diverted or an exemption has been approved pursuant to Section 8.108.170. With implementation of a WMP, the proposed project would divert approximately 122,786 cubic yards of cut and asphalt/pavement debris and would generate 66,116 cubic yards of waste that would be sent to a landfill. 66,116 cubic yards of construction waste represents 0.13% of the remaining capacity at the Puente Hills Landfill, 0.06% of the remaining capacity at the Sunshine Canyon landfill, and 0.28% of the remaining capacity at the Simi Valley Landfill and Recycling Center. Therefore, the project would be served by landfills with sufficient capacity to accommodate the project's solid waste disposal needs. Impacts to the City's solid waste collection and disposal system would be **less than significant**.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XXI. 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 wild-life population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of rare or endangered plants or animals, 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 that will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

a) As discussed in Section VI, *Cultural Resources*, although there are numerous historic resources located throughout Santa Monica, the proposed underground reservoir and above ground pump station would not involve any demolition, destruction, relocation, or alteration of historical resources. While the proposed project would involve ground-disturbing activities such as excavation and grading activities, with adherence to Section 9.04.16.01.030(p) of the Santa Monica Municipal Code, Health and Safety Code § 7050.5, Public Resources Code § 5097.98 and § 15064.5 of the California Code of Regulations (CEQA Guidelines), the project would have a less than significant impact upon archaeological resources and human remains. In addition, with implementation of mitigation measure CR-1, the proposed project would not destroy unique paleontological or geological features. Therefore, the project would have a **less than significant** impact on cultural resources.

As discussed in Section IV, *Biological Resources*, Santa Monica is an urbanized area and generally lacks sensitive animal species or associated habitat. Although the Pacific Ocean is located adjacent to the city, the lack of large-scale contiguous native habitats and the ease of public access to the shoreline have resulted in little opportunity for sensitive plant and animal species to remain in the City of Santa Monica. The limited wildlife that exists in the area has adapted to the urban environment and there are no

known migratory wildlife corridors. The project does not involve development in a federally protected wetland and does not involve improvements that would impair or interrupt hydrological flow into a wetland. The limited wildlife that exists in the area has adapted to the urban environment and there are no known migratory wildlife corridors. With implementation of mitigation measures BIO-1 and BIO-2, impacts related to nesting birds and removal of trees onsite would be reduced to a less than significant level. As such, impacts to biological resources would be **less than significant**.

b) The proposed project could result in cumulative impacts to biological resources, construction effects, cultural resources, and noise. However, mitigation measures BIO-1 and BIO-2 contained in Section IV, *Biological Resources*, mitigation measures CON-1(a-g) in Section V, *Construction Effects*, and Mitigation Measure CR-1 contained in Section VI, *Cultural Resources*, would reduce impacts, including cumulative impacts, to a l**ess than significant** level.

c) As discussed in Section V, *Construction Effects*, the proposed project may cause temporary air quality, traffic, and noise impacts that may affect sensitive receptors located in the vicinity of Memorial Park. However, implementation of mitigation measures CON-1(a-g) would reduce potential adverse affects to human safety to a **less than significant** level.

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Appendix A

Air Quality:URBEMIS Results
GHG Calculaton Worksheets

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Urbemis 2007 Version 9.2.4

Summary Report for Summer Emissions (Pounds/Day)

File Name: C:\Documents and Settings\MMaddox\Application Data\Urbemis\Version9a\Projects\Memorial Park Reservoir.urb924

Project Name: Memorial Park

Project Location: Los Angeles County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012 TOTALS (lbs/day unmitigated)	4.49	38.66	23.21	0.03	96.80	1.89	98.55	20.23	1.73	21.84	5,126.57
2012 TOTALS (lbs/day mitigated)	4.49	38.66	23.21	0.03	5.09	0.89	5.77	1.06	0.82	1.68	5,126.57
2013 TOTALS (lbs/day unmitigated)	4.20	34.87	22.08	0.02	4.47	1.70	6.17	0.94	1.56	2.50	4,941.22
2013 TOTALS (lbs/day mitigated)	4.20	29.17	22.08	0.02	0.36	0.79	1.15	0.08	0.72	0.81	4,941.22

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.12	0.02	1.55	0.00	0.01	0.01	2.81

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.03	0.03	0.24	0.00	0.04	0.01	26.34

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SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.15	0.05	1.79	0.00	0.05	0.02	29.15

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Unmitigated Emissions (Pounds/Day)

File Name: C:\Documents and Settings\MMaddox\Application Data\Urbemis\Version9a\Projects\Memorial Park Reservoir.urb924

Project Name: Memorial Park

Project Location: Los Angeles County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 3/5/2012-3/30/2012 Active Days: 20	1.37	11.11	7.17	0.01	5.09	0.67	5.77	1.06	0.62	1.68	1,534.17
Demolition 03/05/2012-03/30/2012	1.37	11.11	7.17	0.01	5.09	0.67	5.77	1.06	0.62	1.68	1,534.17
Fugitive Dust	0.00	0.00	0.00	0.00	5.06	0.00	5.06	1.05	0.00	1.05	0.00
Demo Off Road Diesel	0.98	6.77	4.49	0.00	0.00	0.49	0.49	0.00	0.45	0.45	700.30
Demo On Road Diesel	0.36	4.29	1.74	0.01	0.02	0.18	0.20	0.01	0.16	0.17	709.58
Demo Worker Trips	0.03	0.05	0.95	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.29
Time Slice 4/2/2012-5/25/2012 Active Days: 40	4.12	**38.66**	19.20	**0.03**	**96.80**	1.76	**98.55**	**20.23**	1.61	**21.84**	**5,126.57**
Mass Grading 04/02/2012-05/25/2012	4.12	38.66	19.20	0.03	96.80	1.76	98.55	20.23	1.61	21.84	5,126.57
Mass Grading Dust	0.00	0.00	0.00	0.00	96.70	0.00	96.70	20.19	0.00	20.19	0.00
Mass Grading Off Road Diesel	2.69	21.95	11.51	0.00	0.00	1.07	1.07	0.00	0.99	0.99	2,247.32
Mass Grading On Road Diesel	1.40	16.66	6.74	0.03	0.09	0.68	0.77	0.03	0.63	0.66	2,754.96
Mass Grading Worker Trips	0.03	0.05	0.95	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.29
Time Slice 5/28/2012-7/6/2012 Active Days: 30	1.83	15.30	8.96	0.00	0.01	0.74	0.74	0.00	0.68	0.68	1,838.93
Trenching 05/28/2012-07/06/2012	1.83	15.30	8.96	0.00	0.01	0.74	0.74	0.00	0.68	0.68	1,838.93
Trenching Off Road Diesel	1.80	15.24	8.01	0.00	0.00	0.73	0.73	0.00	0.67	0.67	1,714.64
Trenching Worker Trips	0.03	0.05	0.95	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.29

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Time Slice 7/9/2012-11/23/2012 Active Days: 100	1.21	9.01	8.03	0.01	0.02	0.53	0.56	0.01	0.49	0.50	1,455.83
Building 07/09/2012-05/24/2013	1.13	8.05	7.64	0.00	0.02	0.50	0.52	0.01	0.46	0.46	1,298.16
Building Off Road Diesel	1.03	7.87	4.56	0.00	0.00	0.49	0.49	0.00	0.45	0.45	893.39
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.09	0.18	3.08	0.00	0.02	0.01	0.03	0.01	0.01	0.02	404.77
Fine Grading 07/09/2012-11/23/2012	0.08	0.95	0.39	0.00	0.01	0.04	0.04	0.00	0.04	0.04	157.67
Fine Grading Dust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading On Road Diesel	0.08	0.95	0.39	0.00	0.01	0.04	0.04	0.00	0.04	0.04	157.67
Fine Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 11/26/2012-12/31/2012 Active Days: 26	**4.49**	37.74	**23.21**	0.02	4.47	**1.89**	6.35	0.94	**1.73**	2.68	4,941.29
Building 07/09/2012-05/24/2013	1.13	8.05	7.64	0.00	0.02	0.50	0.52	0.01	0.46	0.46	1,298.16
Building Off Road Diesel	1.03	7.87	4.56	0.00	0.00	0.49	0.49	0.00	0.45	0.45	893.39
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.09	0.18	3.08	0.00	0.02	0.01	0.03	0.01	0.01	0.02	404.77
Fine Grading 11/26/2012-02/08/2013	3.37	29.69	15.57	0.01	4.45	1.39	5.84	0.93	1.28	2.21	3,643.13
Fine Grading Dust	0.00	0.00	0.00	0.00	4.40	0.00	4.40	0.92	0.00	0.92	0.00
Fine Grading Off Road Diesel	2.69	21.95	11.51	0.00	0.00	1.07	1.07	0.00	0.99	0.99	2,247.32
Fine Grading On Road Diesel	0.65	7.69	3.11	0.01	0.04	0.31	0.36	0.01	0.29	0.30	1,271.52
Fine Grading Worker Trips	0.03	0.05	0.95	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.29

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Time Slice 1/1/2013-2/8/2013 Active Days: 29	4.20	34.87	22.08	0.02	4.47	1.70	6.17	0.94	1.56	2.50	4,941.22
Building 07/09/2012-05/24/2013	1.04	7.45	7.34	0.00	0.02	0.44	0.46	0.01	0.40	0.41	1,298.11
Building Off Road Diesel	0.95	7.29	4.48	0.00	0.00	0.43	0.43	0.00	0.39	0.39	893.39
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.09	0.16	2.87	0.00	0.02	0.01	0.03	0.01	0.01	0.02	404.72
Fine Grading 11/26/2012-02/08/2013	3.16	27.42	14.74	0.01	4.45	1.26	5.71	0.93	1.16	2.10	3,643.12
Fine Grading Dust	0.00	0.00	0.00	0.00	4.40	0.00	4.40	0.92	0.00	0.92	0.00
Fine Grading Off Road Diesel	2.55	20.56	11.10	0.00	0.00	0.99	0.99	0.00	0.91	0.91	2,247.32
Fine Grading On Road Diesel	0.59	6.81	2.76	0.01	0.04	0.27	0.31	0.01	0.25	0.26	1,271.52
Fine Grading Worker Trips	0.03	0.05	0.88	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.28
Time Slice 2/11/2013-4/26/2013 Active Days: 55	3.39	21.42	18.13	0.01	0.03	1.60	1.63	0.01	1.47	1.48	2,867.94
Asphalt 02/11/2013-04/26/2013	2.35	13.96	10.78	0.00	0.01	1.16	1.18	0.00	1.07	1.07	1,569.83
Paving Off-Gas	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.19	13.60	8.91	0.00	0.00	1.15	1.15	0.00	1.05	1.05	1,272.04
Paving On Road Diesel	0.02	0.26	0.11	0.00	0.00	0.01	0.01	0.00	0.01	0.01	49.24
Paving Worker Trips	0.05	0.10	1.76	0.00	0.01	0.01	0.02	0.00	0.01	0.01	248.56
Building 07/09/2012-05/24/2013	1.04	7.45	7.34	0.00	0.02	0.44	0.46	0.01	0.40	0.41	1,298.11
Building Off Road Diesel	0.95	7.29	4.48	0.00	0.00	0.43	0.43	0.00	0.39	0.39	893.39
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.09	0.16	2.87	0.00	0.02	0.01	0.03	0.01	0.01	0.02	404.72
Time Slice 4/29/2013-5/24/2013 Active Days: 20	1.04	7.45	7.34	0.00	0.02	0.44	0.46	0.01	0.40	0.41	1,298.11
Building 07/09/2012-05/24/2013	1.04	7.45	7.34	0.00	0.02	0.44	0.46	0.01	0.40	0.41	1,298.11
Building Off Road Diesel	0.95	7.29	4.48	0.00	0.00	0.43	0.43	0.00	0.39	0.39	893.39
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.09	0.16	2.87	0.00	0.02	0.01	0.03	0.01	0.01	0.02	404.72

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Time Slice 5/27/2013-6/28/2013 Active Days: 25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating 05/27/2013-06/28/2013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Phase Assumptions

Phase: Demolition 3/5/2012 - 3/30/2012 - Clear Site Preparation

Building Volume Total (cubic feet): 232470

Building Volume Daily (cubic feet): 12054

On Road Truck Travel (VMT): 167.42

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Fine Grading 7/9/2012 - 11/23/2012 - Concrete Hauling for Tank and Pump Building

Total Acres Disturbed: 0

Maximum Daily Acreage Disturbed: 0

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 37.2

Off-Road Equipment:

Phase: Fine Grading 11/26/2012 - 2/8/2013 - Backfill around Tank and Pump Station

Total Acres Disturbed: 1.78

Maximum Daily Acreage Disturbed: 0.44

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 0 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

On Road Truck Travel (VMT): 300

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

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1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 4/2/2012 - 5/25/2012 - Excavate Site for reservoir and Pump Station

Total Acres Disturbed: 2

Maximum Daily Acreage Disturbed: 2

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 650 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

On Road Truck Travel (VMT): 650

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 5/28/2012 - 7/6/2012 - Shoring

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Paving 2/11/2013 - 4/26/2013 - Restore and Install Site Improvements-Tennis courts and Parking Lot

Acres to be Paved: 1.78

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 7/9/2012 - 5/24/2013 - Install Tank, Pump Building, Piping, Pumps, Motors, Electrical, Controls, Instrumentation, Piping System

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

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Phase: Architectural Coating 5/27/2013 - 6/28/2013 - Type Your Description Here

Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Mitigated Emissions (Pounds/Day)

File Name: C:\Documents and Settings\MMaddox\Application Data\Urbemis\Version9a\Projects\Memorial Park Reservoir.urb924

Project Name: Memorial Park

Project Location: Los Angeles County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Mitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 3/5/2012-3/30/2012 Active Days: 20	1.37	11.11	7.17	0.01	5.09	0.67	5.77	1.06	0.62	1.68	1,534.17
Demolition 03/05/2012-03/30/2012	1.37	11.11	7.17	0.01	5.09	0.67	5.77	1.06	0.62	1.68	1,534.17
Fugitive Dust	0.00	0.00	0.00	0.00	5.06	0.00	5.06	1.05	0.00	1.05	0.00
Demo Off Road Diesel	0.98	6.77	4.49	0.00	0.00	0.49	0.49	0.00	0.45	0.45	700.30
Demo On Road Diesel	0.36	4.29	1.74	0.01	0.02	0.18	0.20	0.01	0.16	0.17	709.58
Demo Worker Trips	0.03	0.05	0.95	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.29
Time Slice 4/2/2012-5/25/2012 Active Days: 40	4.12	**38.66**	19.20	**0.03**	1.62	0.84	2.46	0.35	0.78	1.13	**5,126.57**
Mass Grading 04/02/2012-05/25/2012	4.12	38.66	19.20	0.03	1.62	0.84	2.46	0.35	0.78	1.13	5,126.57
Mass Grading Dust	0.00	0.00	0.00	0.00	1.52	0.00	1.52	0.32	0.00	0.32	0.00
Mass Grading Off Road Diesel	2.69	21.95	11.51	0.00	0.00	0.16	0.16	0.00	0.15	0.15	2,247.32
Mass Grading On Road Diesel	1.40	16.66	6.74	0.03	0.09	0.68	0.77	0.03	0.63	0.66	2,754.96
Mass Grading Worker Trips	0.03	0.05	0.95	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.29
Time Slice 5/28/2012-7/6/2012 Active Days: 30	1.83	15.30	8.96	0.00	0.01	0.74	0.74	0.00	0.68	0.68	1,838.93
Trenching 05/28/2012-07/06/2012	1.83	15.30	8.96	0.00	0.01	0.74	0.74	0.00	0.68	0.68	1,838.93
Trenching Off Road Diesel	1.80	15.24	8.01	0.00	0.00	0.73	0.73	0.00	0.67	0.67	1,714.64
Trenching Worker Trips	0.03	0.05	0.95	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.29

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Time Slice 7/9/2012-11/23/2012 Active Days: 100	1.21	9.01	8.03	0.01	0.02	0.53	0.56	0.01	0.49	0.50	1,455.83
Building 07/09/2012-05/24/2013	1.13	8.05	7.64	0.00	0.02	0.50	0.52	0.01	0.46	0.46	1,298.16
Building Off Road Diesel	1.03	7.87	4.56	0.00	0.00	0.49	0.49	0.00	0.45	0.45	893.39
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.09	0.18	3.08	0.00	0.02	0.01	0.03	0.01	0.01	0.02	404.77
Fine Grading 07/09/2012-11/23/2012	0.08	0.95	0.39	0.00	0.01	0.04	0.04	0.00	0.04	0.04	157.67
Fine Grading Dust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading On Road Diesel	0.08	0.95	0.39	0.00	0.01	0.04	0.04	0.00	0.04	0.04	157.67
Fine Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 11/26/2012-12/31/2012 Active Days: 26	**4.49**	31.65	**23.21**	0.02	0.36	0.89	1.26	0.08	0.82	0.91	4,941.29
Building 07/09/2012-05/24/2013	1.13	8.05	7.64	0.00	0.02	0.50	0.52	0.01	0.46	0.46	1,298.16
Building Off Road Diesel	1.03	7.87	4.56	0.00	0.00	0.49	0.49	0.00	0.45	0.45	893.39
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.09	0.18	3.08	0.00	0.02	0.01	0.03	0.01	0.01	0.02	404.77
Fine Grading 11/26/2012-02/08/2013	3.37	23.60	15.57	0.01	0.34	0.40	0.74	0.08	0.37	0.44	3,643.13
Fine Grading Dust	0.00	0.00	0.00	0.00	0.30	0.00	0.30	0.06	0.00	0.06	0.00
Fine Grading Off Road Diesel	2.69	15.86	11.51	0.00	0.00	0.08	0.08	0.00	0.07	0.07	2,247.32
Fine Grading On Road Diesel	0.65	7.69	3.11	0.01	0.04	0.31	0.36	0.01	0.29	0.30	1,271.52
Fine Grading Worker Trips	0.03	0.05	0.95	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.29

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Time Slice 1/1/2013-2/8/2013 Active Days: 29	4.20	29.17	22.08	0.02	0.36	0.79	1.15	0.08	0.72	0.81	4,941.22
Building 07/09/2012-05/24/2013	1.04	7.45	7.34	0.00	0.02	0.44	0.46	0.01	0.40	0.41	1,298.11
Building Off Road Diesel	0.95	7.29	4.48	0.00	0.00	0.43	0.43	0.00	0.39	0.39	893.39
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.09	0.16	2.87	0.00	0.02	0.01	0.03	0.01	0.01	0.02	404.72
Fine Grading 11/26/2012-02/08/2013	3.16	21.71	14.74	0.01	0.34	0.35	0.69	0.08	0.32	0.40	3,643.12
Fine Grading Dust	0.00	0.00	0.00	0.00	0.30	0.00	0.30	0.06	0.00	0.06	0.00
Fine Grading Off Road Diesel	2.55	14.86	11.10	0.00	0.00	0.07	0.07	0.00	0.07	0.07	2,247.32
Fine Grading On Road Diesel	0.59	6.81	2.76	0.01	0.04	0.27	0.31	0.01	0.25	0.26	1,271.52
Fine Grading Worker Trips	0.03	0.05	0.88	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.28
Time Slice 2/11/2013-4/26/2013 Active Days: 55	3.39	17.64	18.13	0.01	0.03	0.54	0.57	0.01	0.50	0.51	2,867.94
Asphalt 02/11/2013-04/26/2013	2.35	10.19	10.78	0.00	0.01	0.10	0.12	0.00	0.09	0.10	1,569.83
Paving Off-Gas	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.19	9.83	8.91	0.00	0.00	0.09	0.09	0.00	0.08	0.08	1,272.04
Paving On Road Diesel	0.02	0.26	0.11	0.00	0.00	0.01	0.01	0.00	0.01	0.01	49.24
Paving Worker Trips	0.05	0.10	1.76	0.00	0.01	0.01	0.02	0.00	0.01	0.01	248.56
Building 07/09/2012-05/24/2013	1.04	7.45	7.34	0.00	0.02	0.44	0.46	0.01	0.40	0.41	1,298.11
Building Off Road Diesel	0.95	7.29	4.48	0.00	0.00	0.43	0.43	0.00	0.39	0.39	893.39
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.09	0.16	2.87	0.00	0.02	0.01	0.03	0.01	0.01	0.02	404.72
Time Slice 4/29/2013-5/24/2013 Active Days: 20	1.04	7.45	7.34	0.00	0.02	0.44	0.46	0.01	0.40	0.41	1,298.11
Building 07/09/2012-05/24/2013	1.04	7.45	7.34	0.00	0.02	0.44	0.46	0.01	0.40	0.41	1,298.11
Building Off Road Diesel	0.95	7.29	4.48	0.00	0.00	0.43	0.43	0.00	0.39	0.39	893.39
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.09	0.16	2.87	0.00	0.02	0.01	0.03	0.01	0.01	0.02	404.72

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Time Slice 5/27/2013-6/28/2013 Active Days: 25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating 05/27/2013-06/28/2013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 11/26/2012 - 2/8/2013 - Backfill around Tank and Pump Station

For Soil Stablizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

For Soil Stablizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:

PM10: 5% PM25: 5%

For Soil Stablizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 69% PM25: 69%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Graders, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Graders, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Graders, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Rubber Tired Dozers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Rubber Tired Dozers, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Rubber Tired Dozers, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

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For Tractors/Loaders/Backhoes, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Tractors/Loaders/Backhoes, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Water Trucks, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Water Trucks, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Water Trucks, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

The following mitigation measures apply to Phase: Mass Grading 4/2/2012 - 5/25/2012 - Excavate Site for reservoir and Pump Station

For Soil Stablizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

For Soil Stablizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:

PM10: 5% PM25: 5%

For Soil Stablizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 69% PM25: 69%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust Pave all haul roads mitigation reduces emissions by:

PM10: 99% PM25: 99%

For Graders, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Rubber Tired Dozers, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Tractors/Loaders/Backhoes, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Water Trucks, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

The following mitigation measures apply to Phase: Paving 2/11/2013 - 4/26/2013 - Restore and Install Site Improvements-Tennis courts and Parking Lot

For Cement and Mortar Mixers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

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For Cement and Mortar Mixers, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%
For Cement and Mortar Mixers, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:
NOX: 15%
For Pavers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:
NOX: 15% PM10: 50% PM25: 50%
For Pavers, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%
For Pavers, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:
NOX: 15%
For Rollers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:
NOX: 15% PM10: 50% PM25: 50%
For Rollers, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%
For Rollers, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:
NOX: 15%
For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:
NOX: 15% PM10: 50% PM25: 50%
For Tractors/Loaders/Backhoes, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%
For Tractors/Loaders/Backhoes, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:
NOX: 15%
For Paving Equipment, the Use Aqueous Diesel Fuel mitigation reduces emissions by:
NOX: 15% PM10: 50% PM25: 50%
For Paving Equipment, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:
PM10: 85% PM25: 85%
For Paving Equipment, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:
NOX: 15%

Phase Assumptions

Phase: Demolition 3/5/2012 - 3/30/2012 - Clear Site Preparation
Building Volume Total (cubic feet): 232470
Building Volume Daily (cubic feet): 12054
On Road Truck Travel (VMT): 167.42
Off-Road Equipment:

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1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day
2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Fine Grading 7/9/2012 - 11/23/2012 - Concrete Hauling for Tank and Pump Building
Total Acres Disturbed: 0
Maximum Daily Acreage Disturbed: 0
Fugitive Dust Level of Detail: Default
20 lbs per acre-day
On Road Truck Travel (VMT): 37.2
Off-Road Equipment:

Phase: Fine Grading 11/26/2012 - 2/8/2013 - Backfill around Tank and Pump Station
Total Acres Disturbed: 1.78
Maximum Daily Acreage Disturbed: 0.44
Fugitive Dust Level of Detail: Low
Onsite Cut/Fill: 0 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day
On Road Truck Travel (VMT): 300
Off-Road Equipment:
1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 4/2/2012 - 5/25/2012 - Excavate Site for reservoir and Pump Station
Total Acres Disturbed: 2
Maximum Daily Acreage Disturbed: 2
Fugitive Dust Level of Detail: Low
Onsite Cut/Fill: 650 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day
On Road Truck Travel (VMT): 650
Off-Road Equipment:
1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

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Phase: Trenching 5/28/2012 - 7/6/2012 - Shoring

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Paving 2/11/2013 - 4/26/2013 - Restore and Install Site Improvements-Tennis courts and Parking Lot

Acres to be Paved: 1.78

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 7/9/2012 - 5/24/2013 - Install Tank, Pump Building, Piping, Pumps, Motors, Electrical, Controls, Instrumentation, Piping System

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 5/27/2013 - 6/28/2013 - Type Your Description Here

Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Area Source Unmitigated Emissions (Pounds/Day)

File Name: C:\Documents and Settings\MMaddox\Application Data\Urbemis\Version9a\Projects\Memorial Park Reservoir.urb924

Project Name: Memorial Park

Project Location: Los Angeles County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

AREA SOURCE EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth - No Summer Emissions							
Landscape	0.12	0.02	1.55	0.00	0.01	0.01	2.81
Consumer Products	0.00						
Architectural Coatings	0.00						
TOTALS (lbs/day, unmitigated)	0.12	0.02	1.55	0.00	0.01	0.01	2.81

Area Source Changes to Defaults

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Operational Unmitigated Emissions (Pounds/Day)

File Name: C:\Documents and Settings\MMaddox\Application Data\Urbemis\Version9a\Projects\Memorial Park Reservoir.urb924

Project Name: Memorial Park

Project Location: Los Angeles County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
City park	0.03	0.03	0.24	0.00	0.04	0.01	26.34
TOTALS (lbs/day, unmitigated)	0.03	0.03	0.24	0.00	0.04	0.01	26.34

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2011 Temperature (F): 80 Season: Summer

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
City park		1.59	acres	1.78	2.83	25.71
					2.83	25.71

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	53.5	0.7	99.1	0.2
Light Truck < 3750 lbs	6.8	2.9	94.2	2.9

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Truck 3751-5750 lbs	22.9	0.4	99.6	0.0
Med Truck 5751-8500 lbs	10.0	1.0	99.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	1.5	0.0	86.7	13.3
Lite-Heavy Truck 10,001-14,000 lbs	0.5	0.0	60.0	40.0
Med-Heavy Truck 14,001-33,000 lbs	0.9	0.0	22.2	77.8
Heavy-Heavy Truck 33,001-60,000 lbs	0.5	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	2.3	65.2	34.8	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	0.8	0.0	87.5	12.5

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9
Rural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
Trip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
City park				5.0	2.5	92.5

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Operational Changes to Defaults

Greenhouse Gas Emission Worksheet
Construction Emissions Memorial Park Reservoir

From URBEMIS 2007 Vehicle Fleet Mix Output:

Daily Vehicle Miles Traveled (VMT):	650	(Net: Proposed - Existing)
Construction VMT (345 Days):	224,250	

Vehicle Type	Percent Type	CH4 Emission Factor (g/mile)*	CH4 Emission (g/mile)**	N2O Emission Factor (g/mile)*	N2O Emission (g/mile)**
Light Auto	0.0%	0.04	0	0.04	0
Light Truck < 3750 lbs	0.0%	0.05	0	0.06	0
Light Truck 3751-5750 lbs	0.0%	0.05	0	0.06	0
Med Truck 5751-8500 lbs	0.0%	0.12	0	0.2	0
Lite-Heavy Truck 8501-10,000 lbs	0.0%	0.12	0	0.2	0
Lite-Heavy Truck 10,001-14,000 lbs	0.0%	0.09	0	0.125	0
Med-Heavy Truck 14,001-33,000 lbs	0.0%	0.06	0	0.05	0
Heavy-Heavy Truck 33,001-60,000 lbs	100.0%	0.06	0.06	0.05	0.05
Other Bus	0.0%	0.06	0	0.05	0
Urban Bus	0.0%	0.06	0	0.05	0
Motorcycle	0.0%	0.09	0	0.01	0
School Bus	0.0%	0.06	0	0.05	0
Motor Home	0.0%	0.09	0	0.125	0
Total			**0.06**		**0.05**

Total Emissions (metric tons) =
Emission Factor by Vehicle Mix (g/mi) x Annual VMT(mi) x 0.000001 metric tons/g

Conversion to Carbon Dioxide Equivalency (CO2e) Units based on Global Warming Potential (GWP)

CH4	21	GWP
N2O	310	GWP
1 ton (short, US) =	0.90718474	metric ton

Construction Emissions (345 Days):

	Total Emissions		Total CO2e units	
CO2 Emissions***:	884.33	tons CO2	**802**	metric tons CO2e
CH4 Emissions:	0.0135	metric tons CH4	**0.28**	metric tons CO2e
N20 Emissions:	0.0112	metric tons N2O	**3.48**	metric tons CO2e
		Project Total:	***806***	***metric tons CO2e***

References

* from Table C.4: Methane and Nitrous Oxide Emission Factors for Mobile Sources by Vehicle and Fuel Type (g/mile).
in California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, January 2009.
Assume Model year 2000-present, gasoline fueled.
** Source: California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, January 2009.
*** From URBEMIS 2007 results for mobile sources

Project Consistency with 2006 CAT Report
Greenhouse Gas Emission Reduction Strategies

Strategy	Project Consistency
California Air Resources Board	
Vehicle Climate Change Standards AB 143 (Pavley) required the state to develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of climate change emissions emitted by passenger vehicles and light duty trucks. Regulations were adopted by the ARB I September 2004.	**Consistent** The vehicles that travel to and from the project site on public roadways would be in compliance with ARB vehicle standards that are in effect at the time of vehicle purchase.
Diesel Anti-Idling In July 2004, the ARB adopted a measure to limit diesel-fueled commercial motor vehicle idling	**Consistent** Current state law restricts diesel truck idling to five minutes or less. Diesel trucks traveling to the project site, including construction vehicles, would be subject to this state-wide law.
Hydrofluorocarbon Reduction 1) Ban retail sale of HFC in small cans. 2) Require that only low GWP refrigerants be used in new vehicular systems. 3) Adopt specifications for new commercial refrigeration. 4) Add refrigerant leak-tightness to the pass criteria for vehicular inspection and maintenance programs. 5) Enforce federal ban on releasing HFCs.	**Consistent** This strategy applies to consumer products. All applicable products would comply with the regulations that are in effect at the time of manufacture.
Alternative Fuels: Biodiesel Blends ARB would develop regulations to require the use of 1 to 4 percent biodiesel displacement of California diesel fuel.	**Consistent** The ARB is in the process of developing regulations that would increase the use of biodiesel for transportation uses. Currently, it is unknown when such regulations would be implemented; however, it is expected that upon implementation of such a regulation that would require increase biodiesel blends, the diesel fuel used vehicles that travel to and from the project site, including construction vehicles, would be correspondingly displaced by biodiesel.
Alternative Fuels: Ethanol Increased use of E-85 fuel.	**Consistent** As data becomes available on the impacts of fuel specifications on the current and future vehicle fleets, the ARB will review and update motor vehicle fuel specifications as appropriate. In reviewing the specifications, the ARB will consider the emissions performance, fuel supply consequences, potential greenhouse gas reduction benefits, and cost issues surrounding E85. Construction vehicles and service vehicles traveling to and from the pump station could purchase flex-fuel vehicles and utilize this fuel, once it is commercially available in the region and local vicinity.
Heavy-Duty Vehicle Emission Reduction Measures Increased efficiency in the design of heavy duty vehicles and an education program for the heavy-duty vehicle sector.	**Consistent** The heavy-duty vehicles that travel to and from the project site on public roadways would be subject to all applicable ARB efficiency standards that are in effect at the time of vehicle manufacture.
Achieving 50% Statewide Recycling Goal Achieving the State's 50% waste reduction mandate as established by the Integrated Waste Management Act of 1989, (AB 939, Sher, Chapter 1095, Statutes of 1989), will reduce climate change emissions, associated with energy intensive material extraction and production, as well as methane emission from landfills. A diversion rate of 48% has been achieved on a statewide basis. Therefore, a 2% additional reduction is needed.	**Consistent** The City has completed a comprehensive waste reduction and recycling plan in compliance with State Law AB 939, which required every city in California to reduce the waste it sends to landfills by 50% by the year 2000. As of 2000, the City was recycling 55% of its solid waste, thereby complying with the standards established by AB 939. Currently, the City requires that 65% of all solid waste, including construction/demolition waste, be diverted from landfills, which is higher than the State mandate of 50%. (City of Santa Monica Sustainable City Plan, 2003).
Zero Waste – High Recycling Efforts to exceed the 50% goal would allow for additional reductions in climate change emissions	**Consistent** As discussed above, as of 2000 the City was recycling 55% of its solid waste, thereby exceeding the State's 50% goal.

Project Consistency with 2006 CAT Report
Greenhouse Gas Emission Reduction Strategies

Strategy	Project Consistency
	Currently, the City requires that 65% of all solid waste, including construction/demolition waste, be diverted from landfills.
Department of Forestry	
Urban Forestry A new statewide goal of planning 5 million trees in urban areas by 2020 would be achieved through the expansion of local urban forestry programs.	**Consistent** The landscaping proposed for the project would include retaining trees and planting trees on the project site.
Department of Water Resources	
Water Use Efficiency Approximately 19 percent of all electricity, 30 percent of all natural gas, and 88 million gallons of diesel are used to convey, treat, distribute and use water and wastewater. Increasing the efficiency of water transport and reducing water use would reduce greenhouse gas emissions.	**Consistent** The proposed reservoir project is intended to preserve the uses in the existing park and fit within planned new uses while enhancing the reliability of the City's reclaimed water supply. The overall public benefit of this project will be to provide more reliability for the City's non-potable water supply systems. The City's non-potable water supply system would be provided with more flexibility and reliability. Currently, the City has a greater need for additional recycled water storage than for potable water storage. Providing additional storage for non-potable water will make it possible to more efficiently serve existing and new customers in Santa Monica.
Energy Commission (CEC)	
Building Energy Efficiency Standards in Place and in Progress Public Resources Code 25402 authorizes the CEC to adopt and periodically update its building energy efficiency standards (that apply to newly constructed buildings and alterations to existing buildings).	**Consistent** The City requires new development, including the proposed project, to be constructed such that the standards of Title 24 that are in effect at the time of development are exceeded by 10%. While the only proposed structure would be the enclosed masonry building containing the pump station, the associated lighting and energy fixtures would be consistent with Title 24 standards.
Appliance Energy Efficiency Standards in Place and in Progress Public Resources Code 25402 authorizes the Energy Commission to adopt and periodically update its appliance energy efficiency standards (that apply to devices and equipment using energy that are sold or offered for sale in California).	**Consistent** Under State law, appliances that are purchased for the project – both pre- and post-development – would be consistent with energy efficiency standards that are in effect at the time of manufacture. Section 8.108.060 of the Santa Monica Municipal Code requires that projects (including the proposed project) use appliances, heating systems, lighting and other energy-using devices, which meet specific energy efficiency factors.
Business, Transportation and Housing	
Measures to Improve Transportation Energy Efficiency Builds on current efforts to provide a framework for expanded and new initiatives including incentives, tools and information that advance cleaner transportation and reduce climate change emissions.	**Consistent** The project would provide more reliability for the City's non-potable water supply systems. This would reduce the overall amount of water use in the City and therefore incrementally reduce climate change emissions associated with water use.

In addition to CAT strategies, the California Office of Planning and Research (OPR) CEQA guidelines include recommended mitigation strategies to reduce GHG impacts. According to this document, mitigation measures may include:

1. *Potential measures to reduce wasteful, inefficient and unnecessary consumption of energy during construction, operation, maintenance and/or removal.*

2. *The potential of siting, orientation, and design to minimize energy consumption, including transportation energy, water conservation and solid-waste reduction.*

3. *The potential for reducing peak energy demand.*

4. *Alternative fuels (particularly renewable ones) or energy systems.*

5. *Energy conservation which could result from recycling efforts.*

The proposed project's approximately 1,488 square foot masonry block building that would house the pump station would be required to be designed to comply with requirements of Part 6, Title 24 of the California Building Standards Code – California Energy Code. In addition, the proposed reservoir would provide more reliability for the City's non-potable water supply systems which would conserve water and would also minimize energy consumption associated with transporting water for use within Santa Monica. As such the project would be consistent with the mitigation strategies recommended in the OPR CEQA Guidelines.

Appendix B

Historic Resources Report

Historic Resources Report
Santa Monica Memorial Park
Santa Monica, CA

7 May 2010

Prepared by:

SAN BUENAVENTURA
RESEARCH ASSOCIATES
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Prepared for:

Rincon Consultants, Inc.

790 East Santa Clara Street

Ventura, CA 93001

Executive Summary

This report was prepared for the purpose of assisting the City of Santa Monica in their compliance with the California Environmental Quality Act (CEQA) as it relates to historic resources, in connection with the proposed construction of a one million gallon water reservoir, a pumping station, a back-up standby generator power supply, and supporting pipelines. All of the facilities will be located underground within Santa Monica Memorial Park, located on the city block bounded by Colorado Avenue, Olympic Boulevard, 14th and 16th streets. [Figure 1]

This report assesses the historical and architectural significance of potentially significant historic properties in accordance with the National Register of Historic Places (NRHP), the California Register of Historical Resources (CRHR) Criteria for Evaluation, and City of Santa Monica criteria. A determination will be made as to whether adverse environmental impacts on historic resources, as defined by CEQA and the CEQA Guidelines, may occur as a consequence of the proposed project, and recommend the adoption of mitigation measures, as appropriate.

This report was prepared by San Buenaventura Research Associates of Santa Paula, California, Judy Triem, Historian; and Mitch Stone, Preservation Planner, for Rincon Consultants, Inc., and is based on a field investigation and research conducted in May 2010. The conclusions contained herein represent the professional opinions of San Buenaventura Research Associates, and are based on the factual data available at the time of its preparation, the application of the appropriate local, state and federal regulations, and best professional practices.

Summary of Findings

The property evaluated in this report was found to be ineligible for listing on the NRHP and CRHR and ineligible for designation as a City of Santa Monica landmark. Consequently, the property was found to not be a historic resource for purposes of CEQA. Consequently, the proposed project will have no potential adverse impacts on historic resources.

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   Site-Specific Context
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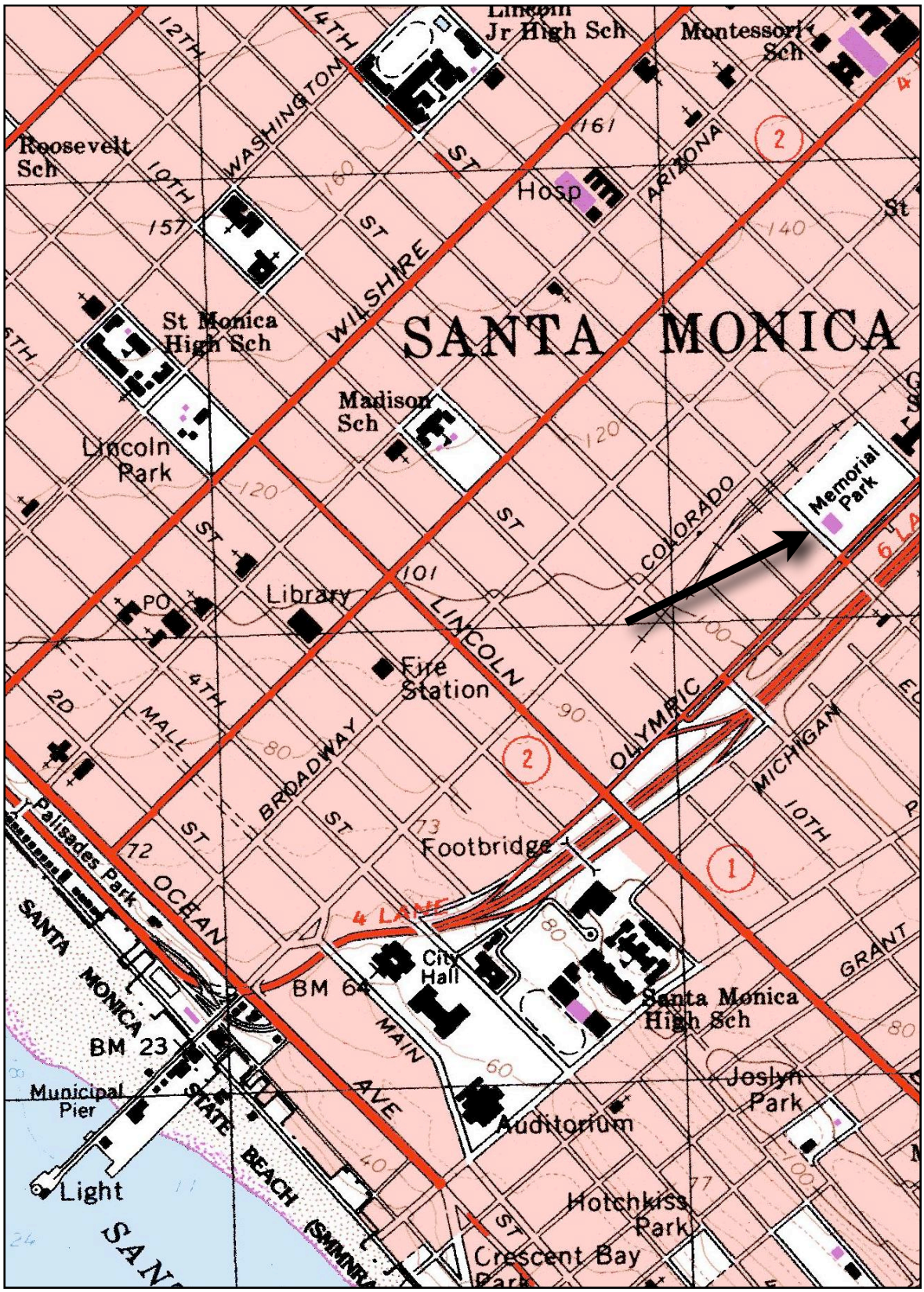

Figure 1. Project Location [Source: USGS 7.5' Quadrangle, Beverly Hills, 1995]

1. Administrative Setting

The California Environmental Quality Act (CEQA) requires evaluation of project impacts on historic resources, including properties "listed in, or determined eligible for listing in, the California Register of Historical Resources [or] included in a local register of historical resources." A resource is eligible for listing on the California Register of Historical Resources if it meets any of the criteria for listing, which are:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. Is associated with the lives of persons important in our past;
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
4. Has yielded, or may be likely to yield, information important in prehistory or history. (PRC §5024.1(c))

By definition, the California Register of Historical Resources also includes all "properties formally determined eligible for, or listed in, the National Register of Historic Places," and certain specified State Historical Landmarks. The majority of "formal determinations" of NRHP eligibility occur when properties are evaluated by the State Office of Historic Preservation in connection with federal environmental review procedures (Section 106 of the National Historic Preservation Act of 1966). Formal determinations of eligibility also occur when properties are nominated to the NRHP, but are not listed due to a lack of owner consent.

The criteria for determining eligibility for listing on the National Register of Historic Places (NRHP) have been developed by the National Park Service. Eligible properties include districts, sites, buildings and structures,

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
B. That are associated with the lives of persons significant in our past; or
C. That embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
D. That have yielded, or may be likely to yield, information important in prehistory or history.

According to the NRHP standards, in order for a property which is found to significant under one or more of the criteria to be considered eligible for listing, the "essential physical features" which define the property's significance must be present. The standard for determining if a property's essential physical features exist is known as *integrity*, which is defined as "the ability of a property to convey its significance." The integrity evaluation is broken down into seven "aspects."

The seven aspects of integrity are: *Location* (the place where the historic property was constructed or the place where the historic event occurred); *Design* (the combination of elements that create the form, plan, space, structure, and style of a property); *Setting* (the physical environment of a historic property); *Materials* (the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property); *Workmanship* (the physical evidence of the crafts of a particular culture or people during any given period of history or prehistory); *Feeling* (a property's expression of the aesthetic or historic sense of a particular period of time), and; *Association* (the direct link between an important historic event or person and a historic property).

The relevant aspects of integrity depend upon the NRHP criteria applied to a property. For example, a property nominated under Criterion A (events), would be likely to convey its significance primarily through integrity of

location, setting and association. A property nominated solely under Criterion C (design) would usually rely primarily upon integrity of design, materials and workmanship. The California Register regulations include similar language with regard to integrity, but also state that "it is possible that historical resources may not retain sufficient integrity to meet the criteria for listing in the National Register, but they may still be eligible for listing in the California Register." Further, according to the NRHP guidelines, the integrity of a property must be evaluated at the time the evaluation of eligibility is conducted. Integrity assessments cannot be based on speculation with respect to historic fabric and architectural elements which may exist but are not visible to the evaluator, or on restorations which are theoretically possible but which have not occurred. (CCR §4852 (c))

The minimum age criterion for the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR) is 50 years. Properties less than 50 years old may be eligible for listing on the NRHP if they can be regarded as "exceptional," as defined by the NRHP procedures, or in terms of the CRHR, "if it can be demonstrated that sufficient time has passed to understand its historical importance" (Chapter 11, Title 14, §4842(d)(2))

Historic resources as defined by CEQA also includes properties listed in "local registers" of historic properties. A "local register of historic resources" is broadly defined in §5020.1 (k) of the Public Resources Code, as "a list of properties officially designated or recognized as historically significant by a local government pursuant to a local ordinance or resolution." Local registers of historic properties come essentially in two forms: (1) surveys of historic resources conducted by a local agency in accordance with Office of Historic Preservation procedures and standards, adopted by the local agency and maintained as current, and (2) landmarks designated under local ordinances or resolutions. These properties are "presumed to be historically or culturally significant... unless the preponderance of the evidence demonstrates that the resource is not historically or culturally significant." (PRC §§ 5024.1, 21804.1, 15064.5)

According to Section 9.36.100 of the Santa Monica City Code, Landmark or Historic District designation criteria, (a) ... the Landmarks Commission may approve the landmark designation of a structure, improvement, natural feature or an object if it finds that it meets one or more of the following criteria:

1. It exemplifies, symbolizes, or manifests elements of the cultural, social, economic, political or architectural history of the City.
2. It has aesthetic or artistic interest or value, or other noteworthy interest or value.
3. It is identified with historic personages or with important events in local, state or national history.
4. It embodies distinguishing architectural characteristics valuable to a study of a period, style, method of construction, or the use of indigenous materials or craftsmanship, or is a unique or rare example of an architectural design, detail or historical type valuable to such a study.
5. It is a significant or representative example of the work or product of a notable builder, designer or architect.
6. It has a unique location, a singular physical characteristic, or is an established and familiar visual feature of a neighborhood, community or the City.

(b) ... a geographic area or a noncontiguous grouping of thematically related properties may be designated a Historic District if the City Council finds that such area meets one of the following criteria:

1. Any of the criteria identified in Section 9.36.100(a) 1 through 6.

2. It is a noncontiguous grouping of thematically related properties or a definable area possessing a concentration of historic, scenic or thematic sites, which contribute to each other and are unified aesthetically by plan, physical development or architectural quality.
3. It reflects significant geographical patterns, including those associated with different eras of settlement and growth, particular transportation modes, or distinctive examples of park or community planning.
4. It has unique location, a singular physical characteristic, or is an established and familiar visual feature of a neighborhood, community or the City.

2. Impact Thresholds and Mitigation

According to the Public Resources Code, "a project that may cause a substantial change in the significance of an historical resource is a project that may have a significant effect on the environment." The Public Resources Code broadly defines a threshold for determining if the impacts of a project on an historic property will be significant and adverse. By definition, a substantial adverse change means, "demolition, destruction, relocation, or alterations," such that the significance of an historical resource would be impaired. For purposes of NRHP eligibility, reductions in a property's integrity (the ability of the property to convey its significance) should be regarded as potentially adverse impacts. (PRC §21084.1, §5020.1(6))

Further, according to the CEQA Guidelines, "an historical resource is materially impaired when a project... [d]emolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register of Historical Resources [or] that account for its inclusion in a local register of historical resources pursuant to section 5020.1(k) of the Public Resources Code or its identification in an historical resources survey meeting the requirements of section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant."

The lead agency is responsible for the identification of "potentially feasible measures to mitigate significant adverse changes in the significance of an historical resource." The specified methodology for determining if impacts are mitigated to less than significant levels are the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings and the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings* (1995), publications of the National Park Service. (PRC §15064.5(b)(3-4))

3. Historical Setting

General Historical Context

The area which is now the City of Santa Monica was originally a part of the Rancho San Vicente, a land grant given to Francisco Sepulveda in 1828 for his services as a soldier for the Mexican government and confirmed in 1839 by Governor Alvarado. Sepulveda built three houses on his rancho which also contained an orchard and 500 head of cattle, along with 50 head of sheep. He died in 1853 having willed his rancho to his wife, Ramona.

Prior to the establishment of Santa Monica, a trail crossed the site of what would eventually become Santa Monica to the foot of what is now Colorado Avenue. This trail was used by teams of oxen hauling brea from Hancock Ranch tar pits to a small wharf extending into Santa Monica Bay.

In 1872 Colonel R.S. Baker of San Francisco, a "forty-niner," purchased Rancho San Vicente from the Sepulveda heirs for $55,000 in order to establish a sheep ranch. He later purchased adjoining property to the northwest and southeast which he stocked with sheep.

A wealthy Nevada senator, John P. Jones, purchased two-thirds interest in the Baker ranch in 1875 and the construction of a wharf and a railroad to Los Angeles were initiated. The town of Santa Monica was laid out and recorded on July 10, 1875, bounded on the northwest by Montana Avenue, on the southeast by Railroad Avenue (now Colorado) on the northeast by 26th Street and on the southwest by the Pacific Ocean.

A lively auction of lots followed. The *Santa Monica Outlook* began publication in November of 1875 announcing that "Santa Monica continues to advance. We now have a wharf... two hotels, one handsome clubhouse... two private schools." Jones completed the Los Angeles and Independence railroad from Santa Monica to Los Angeles, raising expectations.

Santa Monica, residents believed, was destined to become a great port city, but events in 1876 dashed those hopes, when the Southern Pacific Railroad was completed to Los Angeles. Awarded the Los Angeles to San Pedro narrow gauge railroad as a bonus, the much larger Southern Pacific began a rate war that resulted in the sale of Jones' Santa Monica-Los Angeles railroad to the Southern Pacific, which immediately increased rates and diverted business to San Pedro.

Following this loss, Santa Monica experienced further difficulties, including a smallpox epidemic and a severe drought that brought an end to the local sheep industry. Baker and Jones attempted to stem the tide of a dwindling population by encouraging tourism and transforming Santa Monica into a resort community. These first efforts were a failure, to the extent that by 1880, lots that once brought hundreds of dollars were selling for as little as ten cents down.

The boom of the late 1880s in Southern California had a revitalizing effect on Santa Monica, sparking a revival in home and hotel construction. In 1890-91, Collis P. Huntington, the president of the Southern Pacific Railroad, attempted once again to transform Santa Monica into a regional port city, building a large new wharf for the purpose and aggressively lobbying the U.S. Congress for improvement funding. Ultimately, however, the City of Los Angeles prevailed in the long battle, and the federal port improvement funds went to San Pedro.

Santa Monica fell back on tourism, beginning a campaign advertising itself as a residential and resort community. In 1892 an amusement park was built at Ocean Park, known as South Santa Monica, along the beach, and the Santa Fe and Santa Monica Railroad built a line and station to encourage tourists to visit "the Coney Island of the Pacific." Visitors were also attracted to the new golf courses, and race tracks which staged automobile races between 1909 and 1916. Santa Monica incorporated as a charter city in 1907.

Although Santa Monica had been growing steadily since the late 1880s, the regional boom of the 1920s marked the period of greatest growth, as Santa Monica's mild climate and graceful residential areas were successfully marketed to buyers in the East and Midwest. Within easy commuting distance of Hollywood, Santa Monica also became a favorite among entertainment industry figures, many of whom built elaborate summer homes on the beach.

Also during the 1920s, Donald W. Douglas began a fledgling aircraft company which eventually became the Douglas Aircraft Company, one of the world's largest aircraft manufacturers during the 1940s and 1950s. The main plant was located on eighteen acres on Ocean Avenue. Other manufacturing plants were built in Santa Monica during this time period, some on land outside of the original city boundaries.

Site-Specific Context

The project site, currently known as Santa Monica Memorial Park, covers most of the block bounded by Colorado Avenue, Olympic Boulevard, 14th and 16th streets. In 1918 this block was nearly entirely vacant except for a few single family residences located on eight parcels on 15th and 16th streets, near Olympic Boulevard (then called Pennsylvania Avenue). Along the northern edge of the block near Colorado Avenue was the right-of-way of the Pacific Electric Railway "Air Line" route, one of several which connected Los Angeles to Santa Monica and Venice. By 1950 the northern end of the block between the Pacific Electric line and Colorado Avenue was the location of the John W. Fisher Lumber Company, consisting of an office building and three lumber sheds dating from circa 1923.

During the 1930s, Santa Monica Municipal Stadium was established on the portion of the block near Olympic Boulevard. A large modified u-shaped grandstand was built. Behind it was a trailer park. A wide variety of entertainment events were held at the stadium. During the mid-1930s, it served as a baseball stadium for minor league teams of the Pacific Coast League and the California Winter League. A rodeo was also held on the site in 1936. Fans could also watch midget auto and motorcycle racing on a square track at the stadium, from 1936 through the mid-1940s. (*Santa Monica Outlook,* 1-22-1940; Sanborn Maps 1918 and 1918 updated to 1950)

Between 1950 and 1952 the City of Santa Monica established Memorial Park on the site, and the grandstands were demolished. The eight residential lots near Olympic Boulevard were acquired and absorbed into the park. In 1953 service on the Pacific Electric line was discontinued, which permitted the lumber yard to expand onto the former right-of-way. Historic photos from the 1950s show a recreation building located at the corner of Olympic Boulevard and 14th Street and a little league baseball field with wood bleachers. (Santa Monica Public Library Image Archives)

None of these earlier improvements appear to remain on the park site. A search in the index of the Santa Monica newspapers suggests some of the dates when the current buildings were constructed in Memorial Park. A new community building costing $168,000 was proposed in 1968. In 1971 a new gym at Memorial Park opened. In 1974 Stanley Borbals was hired as the park project architect apparently to design an addition to the 14th Street side of the gym. In 1976 a new Cultural Arts building opened and the Recreation unit was ready. (*Evening Outlook,* 3-29-1968; 6-4-1971; 8-12-1974; 8-25-1974; 11-7-1974; 4-1-1976)

It appears that the original recreation building constructed between 1950 and 1952 was demolished to make way for the newer buildings constructed from 1968 through 1976. Other structures and uses in the park include baseball fields, tennis courts, and a children's play area. In 2005 a new skatepark was constructed in the park.

4. Eligibility of Historic Resources

None of the improvements, buildings or structures currently located in Memorial Park appear to be of sufficient age to be regarded as eligible for the NRHP or CRHR.

Properties Less Than 50 Years of Age

Properties less than 50 years of age may be eligible if they can be found to be "exceptional." While no hard and fast definition for "exceptional" is provided in the NRHP literature, the special language developed to support nominating these properties was clearly intended to accommodate properties which demonstrate a level of importance such that their historical significance can be understood without the passage of time. In

general, according to NRHP literature, eligible "exceptional" properties may include, "resources so fragile that survivors of any age are unusual. [Exceptionalness] may be a function of the relative age of a community and its perceptions of old and new. It may be represented by a building or structure whose developmental or design value is quickly recognized as historically significant by the architectural or engineering profession [or] it may be reflected in a range of resources for which the community has an unusually strong associative attachment." The CRHR provides for a somewhat less rigorous test for establishing the eligibility of properties less than 50 years of age, "if it can be demonstrated that sufficient time has passed to understand its historical importance." No buildings or structures in the study area appear to rise to the exceptional level by either definition.

Local Significance and Eligibility

Neither Santa Monica Memorial Park or any improvements within the park appear to be eligible for designation as a Santa Monica City Landmark. It does not appear that any of the improvements within the park or the park as a whole "exemplifies, symbolizes, or manifests elements of the cultural, social, economic, political or architectural history of the City" (Criterion 1); or, "has aesthetic or artistic interest or value, or other noteworthy interest or value" (Criterion 2); or "is identified with historic personages or with important events in local, state or national history" (Criterion 3); or "embodies distinguishing architectural characteristics valuable to a study of a period, style, method of construction, or the use of indigenous materials or craftsmanship, or is "a unique or rare example of an architectural design, detail or historical type valuable to such a study" (Criterion 4); or "is a significant or representative example of the work or product of a notable builder, designer or architect" (Criterion 5); or "has a unique location, a singular physical characteristic, or is an established and familiar visual feature of a neighborhood, community or the City" (Criterion 6).

This property is not listed in the *City of Santa Monica Historic Resources Inventory* (June 2009).

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Santa Monica Evening Outlook, 3-29-1968; 6-4-1971; 8-12-1974; 8-25-1974; 11-7-1974; 4-1-1976.

Santa Monica Outlook, 1-22-1940.

Photo 1. Gym and recreation buildings, viewed from west.

Photo 2. Gym and recreation buildings, viewed from northwest (14th Street on right).

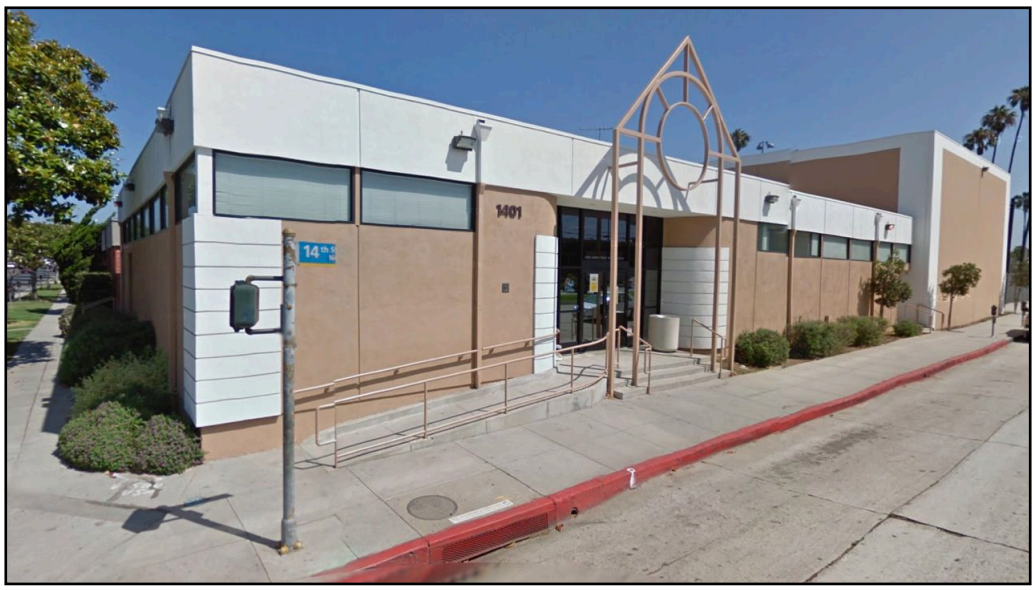

Photo 3. Gym and recreation buildings, viewed from south (corner 14th Street and Olympic Boulevard).

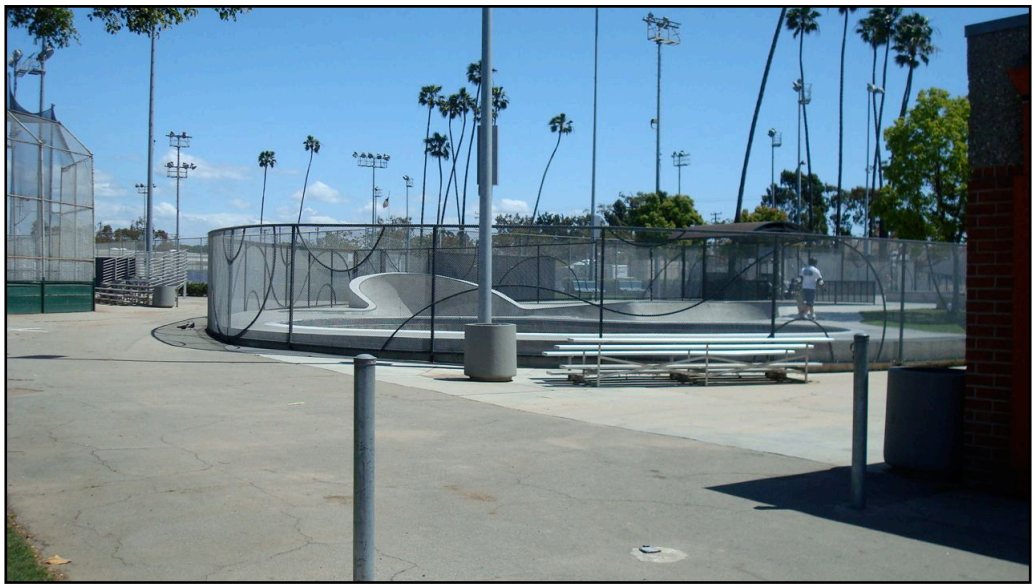

Photo 4. Skate park, viewed from west.

Photo 5. Children's play area, viewed from south.

Photo 6. Parking lot and tennis courts, viewed from southeast.

Appendix C

Native American Consultation

STATE OF CALIFORNIA Arnold Schwarzenegger, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
ds_nahc@pacbell.net

September 30, 2010

Mr. Joe Power
RINCON CONSULTANTS, INC.
180 N. Ashwood Avenue
Ventura, CA 93003

Sent by FAX to: 805-644-4240
No. of Pages: 4

Re: Request for a Sacred Lands File Search and Native American Contacts list for the "**Memorial Park Reservoir Project**" located west of downtown Los Angeles; Los Angeles County, California

Dear Mr. Power:

The Native American Heritage Commission (NAHC), the State of California 'Trustee Agency' for the protection and preservation of Native American cultural resources. The NAHC SLF search, **did Indicate** the presence of Native American cultural resources within one-half mile of the proposed project site (APE).

Also, this letter includes state and federal statutes relating to Native American historic properties of religious and cultural significance to American Indian tribes and interested Native American individuals as 'consulting parties' under both state and federal law. State law also addresses the freedom of Native American Religious Expression in Public Resources Code §5097.9.

The California Environmental Quality Act (CEQA – CA Public Resources Code 21000-21177, amendments effective 3/18/2010) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the CEQA Guidelines defines a significant impact on the environment as 'a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ...objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE), and if so, to mitigate that effect.

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. Culturally-affiliated tribes and individuals may have knowledge of the religious and cultural significance of the historic properties in the project area (e.g. APE). We strongly recommend that you contact persons on the attached list of Native American contacts to see if there are any updated contacts and to determine if the proposed project may harm a cultural resource.

Furthermore we suggest that you contact the California Historic Resources Information System (CHRIS) for pertinent archaeological data within or near the APE, at the Office of

Historic Preservation Coordinator's office (at 916-653-7278, for referral to the nearest Information Center of which there are 10.

Consultation with tribes and interested Native American consulting parties, on the NAHC list, should be conducted in compliance with the requirements of federal NEPA (42 U.S.C 4321-43351) and Section 106 and 4(f) of federal NHPA (16 U.S.C. 470 *et seq*), 36 CFR Part 800.3 (f) (2), the President's Council on Environmental Quality (CSQ, 42 U.S.C 4371 *et seq.* and NAGPRA (25 U.S.C. 3001-3013) as appropriate. The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes.

Also, Public Resources Code Section 5097.98 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery'.

To be effective, consultation on specific projects must be the result of an ongoing relationship between Native American tribes and lead agencies, project proponents and their contractors, in the opinion of the NAHC. Regarding tribal consultation, a relationship built around regular meetings and informal involvement with local tribes will lead to more qualitative consultation tribal input on specific projects. Also, the 2006 SB 1059 the state enabling legislation to the Federal Energy Policy Act of 2005, does mandate tribal consultation for the 'electric transmission corridors. This is codified in the California Public Resources Code, Chapter 4.3, and §25330 to Division 15, requires consultation with California Native American tribes, and identifies both federally recognized and non-federally recognized on a list maintained by the NAHC. Consultation with Native American communities is also a matter of environmental justice as defined by California Government Code §65040.12(e).

The response to this search for Native American cultural resources is conducted in the NAHC Sacred Lands Inventory, established by the California Legislature (CA Public Resources Code 5097.94(a) and is exempt from the CA Public Records Act (c.f. California Government Code 6254.10) although Native Americans on the attached contact list may wish to reveal the nature of identified cultural resources/historic properties. Confidentiality of "historic properties of religious and cultural significance" may also be protected under Section 304 of he NHA or at the Secretary of the Interior discretion if not eligible for listing on the National Register of Historic Places. The Secretary may also be advised by the federal Indian Religious Freedom Act (cf. 42 U.S.C., 1996) in issuing a decision on whether or not to disclose items of religious and/or cultural significance identified in or near the APE and possibility threatened by proposed project activity.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton
Program Analyst

Attachment: Native American Contact List

Native American Contacts
Los Angeles County
September 30, 2010

LA City/County Native American Indian Comm
Ron Andrade, Director
3175 West 6th Street, Rm.
Los Angeles , CA 90020
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(213) 351-5324
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This list is only applicable for contacting local Native Americans for consultation purposes with regard to cultural resources impact by the proposed Memorial Park Reservoir Project; located between 14th and 16th Streets and between Olympic Boulevard and Colorado Avenue; City of Los Angeles; Los Angeles County, California for which a Sacred Lands File search and Native American Contacts were requested.

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Los Angeles County
September 30, 2010

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This list is only applicable for contacting local Native Americans for consultation purposes with regard to cultural resources impact by the proposed Memorial Park Reservoir Project; located between 14th and 16th Streets and between Olympic Boulevard and Colorado Avenue; City of Los Angeles; Los Angeles County, California for which a Sacred Lands File search and Native American Contacts were requested.

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Mathew Maddox
Associate Environmental Planner
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Ventura, California 93003

Sent via email to: Mathew Maddox at: mmaddox@rinconconsultants.com

October 5, 2010

Dear Mathew:

It was a pleasure to speak with you this morning. Thank you for contacting me regarding the Memorial Park excavation in Santa Monica, CA.

As I discussed with you in our phone conversation, I was born in Santa Monica, lived on 12th Street at Olympic and my parents and siblings are buried in the little cemetery on 14th so I know the area well. There are so many parts of the city that have signs of prehistory occupation just under the soil level, showing it was a great place to live then as it is now. It has been disheartening over the years to enter someone's home and see a mano sitting on their mantle, something found in their back yard and of course, not reported to anyone so the history is lost.

While I cannot recollect finding shell or artifacts at the location of the park, due to native human remains being uncovered within one half mile of the project, it will be necessary for the project to retain native monitoring throughout all phases of soil disturbances as well as any locations that may show up during grading that uncovers any cultural material. I would very much appreciate the opportunity to work with you on this project.

Thank you for your consideration and either way, I hope you will keep me informed of what conclusions you may develop during this process.

Sincerely,

Robert F. Dorame
Tribal Chair
Cultural Consultant

Appendix D

Geotechnical Study

GEOTECHNICAL EXPLORATION
CITY OF SANTA MONICA WATER RESOURCE DIVISION
PROPOSED 1.0 MG BURIED NON-POTABLE WATER TANK
MEMORIAL PARK
1401 OLYMPIC BOULEVARD
SANTA MONICA, CALIFORNIA
TETRA TECH JOB # 10111-0001-00-1000

Prepared for:

TETRA TECH, INC.
16241 Laguna Canyon Road, Suite 200
Irvine, California 92618-3618

Project No. 601795-001

April 30, 2010

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

April 30, 2010

Project No. 601795-001

Tetra Tech, Inc.
Infrastructure Services Group
16241 Laguna Canyon Road, Suite 200
Irvine, California 92618-3618

Attention: Mr. Scott E. Szymborski, P.E.
Project Manager

Subject: **Geotechnical Exploration**
City of Santa Monica Water Resource Division
Proposed 1.0 MG Buried Non-Potable Water Tank
Memorial Park
1410 Olympic Boulevard
Santa Monica, California
Tetra Tech Job # 10111-0001-1000

In accordance with our November 9, 2006 proposal authorized on October 19, 2007, and your March 16, 2010 notice-to-proceed for this second and final phase of geotechnical design services for this project; Leighton Consulting, Inc. is pleased to present this geotechnical exploration report for a proposed one million-gallon (MG) buried prestressed concrete non-potable water tank to be constructed within Memorial Park in Santa Monica.

This proposed tank site is **not** located either within a currently designated Alquist-Priolo Special Studies Zone for surface faulting or a seismic hazard zone for liquefaction. However, the Newport-Inglewood Fault is less than 6 miles east of the site, and therefore, as is the case for most of Southern California, severe ground shaking has occurred and should be expected at this site.

Encountered in our subsurface exploration was young alluvial deposits comprising of up to 30 feet of mostly clayey soils overlying very dense sand to the maximum depth of exploration of 51½-feet. A perched groundwater zone was encountered at depths between 15 and 25 feet below ground surface, perched atop a clay layer. Since the planned invert depths of both the tank and the pump station are expected to be 22 feet below existing grade, within the anticipated perched groundwater zone, dewatering during construction and stabilizing the subgrade soils under the

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proposed tank and the pump station will be required during construction. Buried tank walls should also be designed to permanently resist exterior hydrostatic pressures or designed with a permanent dewatering system, based on groundwater 15 feet below existing grade, possibly shallower seasonally. Assuming the subgrade is not disturbed during construction, this tank and pumpstation can bear on undisturbed native alluvial soils, presumably at least 20 feet below existing grade.

Presented in this report are recommendations related to site earthwork, seismic, foundations and retaining walls design, and construction consideration for this proposed buried tank and pumpstation.

As always, we appreciate the opportunity to be of additional service to Tetra Tech. If you have any questions or if we can be of further service, please contact us at your convenience at our Los Angeles office at (213) 892-1530; specifically at the phone extensions and e-mail addresses listed below.

Respectfully submitted,

LEIGHTON CONSULTING, INC.

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Leighton

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1.0 INTRODUCTION

1.1 Site Location and Description

As depicted on Figure 1, *Site Location Map*, and Figure 2, *Regional Geology Map*, a proposed one million-gallon (MG) buried prestressed concrete non-potable water tank and pump station will be constructed within the western portion of existing Memorial Park in Santa Monica, California. The park site is located at the intersection of 14th Street and Olympic Boulevard northerly of Interstate (1) 10. This proposed tank and pumpstation will be constructed under an existing asphalt parking lot and tennis courts at the northwest quadrant of this park. The site topography is relative flat with a gradient sloping slightly to southwest from elevations approximately 112 feet to 108 feet above mean sea level (msl). The northern half of the tank site is currently used as tennis courts while the southern half is primary used as asphalt parking at grade for autos. A baseball field is immediately east of the proposed tank site. Access to this portion of the park is via 14th. Street, which is the southwestern boundary of this site and Memorial Park.

1.2 Proposed 1.0 MG Concrete Tank and Pumpstation

As depicted on Figure 3, *Boring Location Map*, the majority of the proposed tank footprint will be located under the existing tennis courts, while the proposed pumpstation will be constructed under the existing asphalt parking lot at grade. These two buried structures are described as follows:

- **1.0 MG Non-Potable Water Tank**: This proposed buried prestressed concrete tank will be 116 feet in diameter, with a height of 22 feet for a bottom-of-tank approximately at elevation 88 feet above mean sea level. Proposed water depth at the center of the tank will be approximately 16 feet and increases to 17 feet at the perimeter. Typical earth cover will be 24 inches above the roof with finish grade at the center of the tank at elevation of 110.8 feet above mean sea level. A minimum of 3 feet free board will be provided within the tank.

- **Non-Potable Pumpstation Vault**: A 12.3-feet high buried conventionally reinforced concrete vault will house non-potable water pumps, with a floor elevation at 93.87 feet. Pump "cans" within and primarily extending below the vault will be 17½ feet tall. Typical earth cover will be 24 inches above the roof of the vault with finish grade at the center of the vault at elevation of 109.2 feet above mean sea level.

1.3 Purpose and Scope of Work

Our services for this project were provided in accordance with our November 9, 2006 proposal, authorized on October 19, 2007. A reconnaissance level geotechnical study

was previously performed by us in February 2008 (Leighton 2008). The feasibility study was the preceding phase of this project in which preliminary recommendations were provided to assist in selecting the tank location and to identify potential high geotechnical risk factors. No field exploration was performed for the previous feasibility study.

This current final design geotechnical-exploration phase was authorized with a notice-to-proceed on March 16, 2010. Purposes of our current exploration were to (1) explore subsurface conditions at this proposed tank site, (2) evaluate earth material characteristics in the vicinity of this tank site and (3) provide geotechnical recommendations for design and construction of the proposed tank and its appurtenant structures. This report does not address the potential for encountering hazardous materials. Our scope of work for this exploration has included the following tasks:

- **Review** – We reviewed relevant geotechnical literature, reports and aerial photographs for this tank site. We also reviewed information provided by Tetra Tech, which included the project feasibility report (Tetra Tech 2010), the tank site layout-plan (base map for Figure 3) and schematic cross-sections of this proposed tank and pump station. Pertinent documents reviewed for this project are referenced at the end of this report.

- **Field Exploration** – Prior to drilling, we marked proposed boring locations for coordination with Underground Service Alert (USA) for clearance of registered/participating underground utilities prior to exploration, and for coordination with the City to facilitate limited access within the active parking lot. As an extra precautionary measure, a utility locator was also used to clear underground utilities at each boring location prior to drilling. We then drilled and sampled two borings to 21½-feet and one boring to 51½-feet deep with a truck-mounted hollow-stem drill rig on March 29, 2010. A Leighton Consulting, Inc. representative was onsite logging these soil cuttings and collecting soil samples in conformance with the Unified Soil Classification System (USCS). A description of our field exploration and borings logs are included in Appendix A, *Field Exploration*. The approximate boring locations are shown on Figure 3, Boring Location Map.

- **Geotechnical Laboratory Testing** - Geotechnical laboratory tests were performed at our in-house laboratory on selected soil samples obtained from our borings. This laboratory-testing program was designed to evaluate general physical and engineering characteristics of sampled soils at the proposed tank and pumpstation site. Test procedures and results are presented in Appendix B, *Geotechnical Laboratory Testing*.

- **Engineering Analysis** - Data obtained from our background review, field exploration and geotechnical laboratory testing was evaluated to develop conclusions and

recommendations presented in this report for the tank and pumpstation. We also performed a site-specific probabilistic seismic hazard analyses (PSHA) and developed site-specific response spectra based on this analyses, for design-level ground motions to be used by the tank designer(s).

- **Report Preparation** - Results of our exploration have been summarized in this report to address geotechnical conditions at the proposed tank and pumpstation site, including our findings, conclusions and recommendations for tank design and construction.

2.0 FINDINGS

2.1 Regional Geology

As depicted on Figure 2, *Regional Geology Map*, Memorial Park is located within a regionally mapped zone of alluvium (Qa), "derived mostly from Santa Monica Mountains" to the north. Based on the California Division of Mines and Geology (CDMG, currently known as the California Geological Survey) Seismic Hazard Zone Report for the Beverly Hills Quadrangle (Seismic Hazard Zone Report 023, updated 2001), the site is underlain by young alluvial fan deposits (Qya_2) consisting of alternating layers of clay, silt and sandy soils. Regional groundwater data also shows that historically highest groundwater level in the vicinity of this site was approximately 40 feet or deeper.

2.2 Subsurface Soil Conditions

Soils encountered in our March 29, 2010 borings consisted of predominately clay laminated with various beds of silt, sand, and sandy clay in the upper 20 to 30 feet of the site. Atterberg limits and Expansion Index (EI) tests demonstrated that tested clay was moderately plastic (LL=32) with a low expansion potential (EI=42). A consolidation test did show sampled clay had some slight expansion when wetted, and sampled clay was relatively stiff at a depth of 25 feet. A layer of wet clay was encountered in all three borings at depths between 15 and 25 feet.

Underlying the clays to the maximum depth of exploration of 50 feet was dense to very dense sand and gravely sand. This sand was generally slightly moist with moisture content varying between 4 to 6 percent. Standard Penetration Test (SPT) blow counts (N-values) at depths of 30 feet or more were greater-than-or-equal-to (≥) 40, indicative of very dense cohesionless soils.

2.3 Groundwater

Free groundwater was encountered in two of our three March 29, 2010 borings (Borings B-1 and B-2) at a depth of 15 feet; and the clay soil sample from our third boring (B-3) at a depth of 15 feet was saturated.. Since the site is blanketed with 20 to 30 feet of clay and the underlying sandy soil is generally far from saturation, it is likely that the groundwater is perched groundwater embedded in the clay.

California Geological Survey (CGS) reports historic highest groundwater level recorded in the area was on the order of 40 feet or more below the ground surface (CGS, 2001). It should be expected the groundwater depth at the site will fluctuate seasonably and vary between our borings due to the perched groundwater condition.

2.4 Primary Seismic Hazards

Primary seismic hazards in Southern California could include strong ground shaking and fault rupture. This closest fault to the site is the Newport-Inglewood Fault located approximately 6 miles east of the site. However, this site and vicinity is **not** located within a currently-designated Alquist-Priolo Special Studies Zone for surface fault-rupture hazard. Therefore, fault studies are not mandated for this site.

Nevertheless, as is the case for most of Southern California, strong ground shaking has and will occur at this site. Known regional active and potentially active faults that could produce significant ground shaking at this site include the Santa Monica, Palos Verdes, Malibu Coast, Hollywood, Puente Hills Blind Thrust, Upper Elysian Park Blind Thrust and the San Andreas. Site-specific probabilistic seismic hazard analyses (PSHA) design-level ground motions are presented in Section 3.2, later in this report, as seismic design recommendations.

2.5 Secondary Seismic Hazards

In general, secondary seismic hazards for sites in this region could include soil liquefaction, earthquake-induced settlement, lateral spreading, landsliding, seiches and tsunamis. The potential for secondary seismic hazards at the site is discussed below.

2.5.1 Liquefaction Potential: Liquefaction is the loss of soil strength due to a buildup of excess pore-water pressure during strong ground shaking. Liquefaction is associated primarily with loose (low density), saturated, relatively uniform fine- to medium-grained, clean cohesionless soils. As shaking action of an earthquake progresses, soil granules are rearranged and the soil densifies within a short period. This rapid densification of soil results in a buildup of pore-water pressure. When the pore-water pressure approaches total overburden pressure, then soil reduces greatly in strength and temporarily behaves similarly to a fluid. For liquefaction to occur there must be:

(1) loose granular soils,

(2) shallow groundwater, and

(3) strong ground shaking

all occurring or existing simultaneously. If one component is missing, then liquefaction will not occur. Effects of liquefaction can include sand boils, settlement and bearing capacity failures below structural foundations.

As shown on the March 25, 1999 *Official Map of Seismic Hazard Zones* for the Beverly Hills Quadrangle, this proposed site is not regionally mapped within a potential liquefaction-hazard zone. Reportedly, groundwater has historically been 40 feet or more below the ground surface in the vicinity, and the site earth materials consist of stiff clay overlying very dense sand. Therefore, it is our professional opinion that the liquefaction potential at the site is low.

2.5.2 **Seismically Induced Settlement:** Seismically induced settlement consists of dry dynamic settlement (above groundwater) and liquefaction-induced settlement (below groundwater). During a strong seismic event, seismically induced settlement can occur within loose to moderately dense sandy soil due to reduction in volume during and shortly after an earthquake event. Settlement caused by ground shaking is often non-uniformly distributed, which can result in differential settlement.

Based on the blow counts (N-values) in the sandy soils during exploratory borings ($N \geq 40$), and considering that all proposed structures will be constructed below existing grade, seismic settlement is not considered a geotechnical constraint to this project.

2.5.3 **Lateral Spreading:** Lateral spreading is the movements of ground surface down slope or toward an unrestrained open slope face due to liquefaction of the underlying soil layers. Lateral spreading usually develops on ground surface less than three degrees slope and may cause damages to near-surface structures. Since the liquefaction potential for the site is considered low and site topography is relatively flat, the potential for lateral spreading developing at the site is remote.

2.5.4 **Seismically Induced Landslides:** This site is relative flat, without significant slopes on or adjacent to the park. This site is not mapped as a potential "earthquake-induced landslide" zone as shown on the March 25, 1999 *Official Map of Seismic Hazard Zones* for the Beverly Hills Quadrangle. Therefore, earthquake-induced land slide is not a hazard to the site.

2.5.5 **Seiches and Tsunamis:** Seiches are large waves generated in enclosed bodies of water in response to ground shaking. Tsunamis are waves generated in large bodies of water (e.g. Pacific Ocean) by fault displacement or major ground movement. There are no bodies of water adjacent to this site; therefore, there is no seiche risk at

this site. The site's inland location more than 100 feet above mean sea level makes the risk of inundation from tsunamis negligible. This site is **not** within a potential inundation zone as depicted on CGS's March 1, 2009 *Tsunami Inundation Map* for the Beverly Hills Quadrangle. Therefore, seiches and tsunamis are not a hazard to this site.

3.0 CONCLUSIONS AND RECOMMENDATIONS

The proposed reservoir site is **not** located either within a designated Alquist-Priolo Special Studies Zone for surface faulting or a seismic hazard zone for liquefaction. However, strong ground shaking from earthquakes generated from the nearby Newport-Inglewood Fault and other regional faults is expected at the site.

Encountered in our subsurface exploration was young alluvial deposits comprising of up to 30 feet of mostly clayey soils overlying very dense sand to the maximum depth of exploration of 51½-feet. A perched groundwater zone was encountered at depths between 15 and 25 feet below ground surface, perched atop a clay layer. Since the planned invert depths of both the tank and the pump station are expected to be 22 feet below existing grade, within the anticipated perched groundwater zone, dewatering during construction and stabilizing the subgrade soils under the proposed tank and the pump station will be required during construction. Buried tank walls should also be designed to permanently resist exterior hydrostatic pressures or designed with a permanent dewatering system, based on groundwater 15 feet below existing grade, possibly shallower seasonally. Assuming the subgrade is not disturbed during construction, this tank and pumpstation can bear on undisturbed native alluvial soils, presumably at least 20 feet below existing grade.

Presented in this report are recommendations related to site earthwork, seismic, foundations and retaining walls design, and construction consideration for this proposed buried tank and pumpstation.

3.1 Earthwork

All earthwork should be performed in accordance with the *Earthwork and Grading Guide Specifications* presented in Appendix C, unless specifically revised or amended below. Site-specific earthwork recommendations are provided in the following subsections:

3.1.1 Site Preparation: It is anticipated that the existing tennis courts and the parking lots will be demolished for the construction of the tank and pump station. Efforts should be made to locate any existing or abandoned utility lines in the area that are in conflicts with the planned improvements. Those lines should be removed or rerouted where interfering with proposed construction, and resulting cavities should be

properly backfilled and compacted. Utility lines which cannot be relocated should be properly protected in-place to preserve intended function and may require shoring or bracing of the excavation to prevent lateral displacement or undermining of existing utility conduits to be protected in place. The contractor should take extra precautions not to disturb existing improvements to remain during construction.

3.1.2 **Subgrade Preparation:** Planned invert depth of the tank and the pump station bottoms will be on the order of 22 feet below both existing and finish grade. Based on the results of our March 29, 2010 borings, we expect that a wet or pumping subgrade will be encountered during excavation due to the perched groundwater condition in clay at the site. To provide a workable surface for construction, the contractor will likely have to dewater the excavation and stabilize the subgrade as discussed as a construction consideration in Sections 4.3 and 4.4, later in this report. Means and methods of subgrade installation are at the discretion of the contractor.

In areas where a firm and unyielding subgrade is exposed, the exposed surface should be scarified to a depth of six inches, moisture-condition to approximately three percent above optimum moisture, and compacted to a minimum of 90 percent relative compaction relative to the modified Proctor (ASTM D 1557-07) laboratory maximum density.

We recommended that prepared subgrades be immediately backfilled or other construction completed over the subgrade as soon as possible to confine and protect the subgrade from deterioration/disturbance. Our above recommendation for subgrade scarification also applied to prepared subgrades that have been exposed for a prolonged time and/or have been exposed to rain or water, or otherwise found to no longer be stable.

3.1.3 **Fill Placement and Compaction:** Excavated onsite soils free of organics and debris may be reused as fill. However, the soils within the planned depth of the excavation consist mostly of wet clayey soil with moderate plasticity. Moisture of some of these clayey soils may be above optimum moisture content, and will have to be dried back or otherwise managed by the earthwork contractor. Therefore, additional efforts to moisture-condition excavated soils will be required when replacing these soils as fill. Fill soils should be placed in loose lifts not to exceed 8 inches, moisture-conditioned to approximately 3 percent above optimum moisture, and compacted to a minimum of 90 percent relative compaction in accordance with ASTM D 1557-07 (modified Proctor) laboratory maximum density.

3.1.4 **Utility Trench Backfill:** Utility trenches should be backfilled with compacted fill in accordance with Sections 306-1.2 and 306-1.3 of the Standard Specifications for Public Works Construction, ("Greenbook"), 2009 Edition. Utility trenches can be backfilled with the onsite soils free of debris, organic and oversized material up to 6-inches in largest dimension. Prior to backfilling trenches, pipes should be bedded in and covered with either:

(1) **Soil:** A uniform, granular material that has a Sand Equivalent (SE) of 30 or greater and a maximum particle size of ¾-inches (or as specified by the pipe manufacturer), water densified in place, or

(2) **CLSM:** Controlled Low Strength Material (CLSM) conforming to Section 201-6 of the *Standard Specifications for Public Works Construction,* ("Greenbook"), 2009 Edition'

Pipe bedding should extend at least 4-inches below the pipeline invert and at least 12 inches over the top of the pipeline. Native soils can be used as backfill over the pipe bedding zone, and should be placed in thin lifts, moisture-conditioned to approximately two percent above optimum, and mechanically compacted to at least 90 percent relative compaction in accordance with ASTM D 1557-07. Jetting or flooding of the pipe bedding and trench backfill is **not** allowed at this clayey site.

3.1.5 Surface Drainage: Surface drainage should be designed to direct water away from foundations and toward approved drainage devices. Irrigation of landscaping (if any) should be controlled to maintain, as much as possible, consistent moisture content sufficient to provide healthy plant growth without over watering. We recommend that irrigation be avoided within 30 feet of the proposed tank and pump station. Water should not be allowed to flow uncontrolled over slopes or pond on the pad.

3.2 Seismic Design Parameters

Seismic parameters presented in this report should be considered during tank design. At the discretion of the Structural Engineer, either 2007 California Building Code site-specific seismic parameters, and/or results of our site-specific probabilistic seismic hazard analyses can be used, as described in the following subsections.

3.2.1 2007 California Building Code Site-Specific Seismic Parameters: To accommodate effects of ground shaking produced by regional seismic events, seismic design can, at the discretion of the designing Structural Engineer, be performed in accordance with the 2007 edition of the California Building Code (CBC). Site-specific seismic design parameters are tabulated below, based on the 2007 CBC methodology, which is based on ASCE/SEI 7-05 and the 2006 International Building Code (IBC) seismic design procedures.

Table 1. 2007 CBC Site-Specific Seismic Parameters

2007 CBC Seismic Design Parameters	Value
Site Longitude (decimal degrees)	-118.4814
Site Latitude (decimal degrees)	34.0209
Site Class Definition (Table 1613.5.2)	D
Mapped Spectral Response Acceleration at 0.2s Period, S_s (Figure 1613.5(3))	1.801
Mapped Spectral Response Acceleration at 1s Period, S_1 (Figure 1613.5(4))	0.604
Short Period Site Coefficient at 0.2s Period, F_a (Table 1613.5.3(1))	1.0
Long Period Site Coefficient at 1s Period, F_v (Table 1613.5.3(2)	1.5
Adjusted Spectral Response Acceleration at 0.2s Period, S_{MS} (Eq. 16-37)	1.801
Adjusted Spectral Response Acceleration at 1s Period, S_{M1} (Eq. 16-38)	0.906
Design Spectral Response Acceleration at 0.2s Period, S_{DS} (Eq. 16-39)	1.201
Design Spectral Response Acceleration at 1s Period, S_{D1} (Eq. 16-40)	0.604
Long Period Transition Period T_L (seconds), (ASCE 7-05 Figure 22-16)	8

3.2.2 **Site-Specific Probabilistic Seismic Hazard Analysis:** A probabilistic seismic hazard analysis was performed using the computer program EZ-FRISK (Risk Engineering, 2006), licensed to Leighton, to estimate peak horizontal ground acceleration (PHGA) that could occur at the site, and to develop design response spectra. Various probabilistic density functions were used in this analysis to assess uncertainty inherent in these calculations with respect to magnitude, distance and ground motion. An averaging of the following four next-generation attenuation relationships (NGAs) was used with equal weights to calculate site-specific PHGA and spectra:

- Abrahamson and Silva (2008),
- Boore-Atkinson (2008),
- Campbell-Bozorgnia (2008), and
- Chiou-Youngs (2008).

Probabilistic design level events are defined in the table below, along with calculated PHGA for each design-level and reference to figures with tripartite plots of response spectra for each of these three design levels.

Table 2. Probabilistic Seismic Hazard Analyses

Design Level	Return Period (years)	Definition	Peak Horizontal Ground Acceleration (g)	Response Spectra Figure
DBE	475	10% probability of exceedance in 50 years	0.45	4
UBE	950	10% probability of exceedance in 100 years	0.57	5
MCE	2475	2% probability of exceedance in 50 years	0.76	6

Considering the various blind-thrust faults in the region and proximity to the Newport-Inglewood Fault to the east, a vertical to horizontal acceleration ratio of unity (1) should be considered in design.

Probabilistic seismic hazard analysis acceleration-values and probabilities should only be considered reasonable best estimates. All of the influences affecting attenuation and occurrence rates are not yet known. Furthermore, there are uncertainties in every parameter used to obtain such results. At the present time, there is no test available to verify the validity of the acceleration and probability data. Therefore, significant deviations from the indicated values are possible due to geotechnical and geological uncertainties and other site-specific conditions.

3.2.3 **Next Generation Attenuation (NGA) Site-Specific Response Spectra:** Site-specific response spectra for this project were developed based on a uniform-hazard approach. The uniform-hazard approach assumes that the same level of hazard is uniformly applied to the entire response spectra. Spectral values for the DBE, UBE, and MCE events were computed using the same probabilistic analysis approach described in previous section. Near-source and directivity effects were included using techniques proposed by Sommerville et al. (1997) and Abrahamson (2000). Response spectra values were calculated for 5% damping using the EZ-FRISK program, and modified for other damping factors (½%, 2%, and 10%) using the damping/spectral amplification equations of Newmark and Hall (1982). Calculated site-specific response spectra for DBE, UBE, and MCE events are graphically shown on tripartite plots as follows:

Figure 4: *Design Basis Earthquake (DBE) Response Spectra*,

Figure 5: *Upper Bound Earthquake (UBE) Response Spectra*, and

Figure 6: *Maximum Considered Earthquake (MCE) Response Spectra*.

3.3 Tank and Vault Foundations

3.3.1 **Minimum Embedment and Width:** Conventional shallow spread and continuous footings bearing on undisturbed (or scarified and recompacted) native alluvium at least 15 feet below existing grade may be used to support this proposed buried tank and the pump station. Tank footings should be embedded at least 12-inch below lowest adjacent grade, with a minimum width of 12-inch. Exposed foundation bearing surfaces should be dewatered and stabilized as necessary, at the time concrete is placed.

3.3.2 **Allowable Bearing Pressure:** An allowable bearing pressure of 3,000 pounds-per-square-foot (psf) may be used for static and sustained live loads, based on the minimum embedment depth and widths of the foundations described above. This allowable bearing value may be increased by 600 psf for each additional foot of

width, up to a maximum allowable bearing pressure of 6,000 psf. These allowable bearing pressures are for total dead loads and sustained live loads, and can be increased by one-third for short duration seismic loads. Weight of the tank structure, water in the tank and overlying backfill must be considered as a sustained load for foundation design. All continuous footings should be reinforced with top and bottom steel to provide structural continuity and to permit spanning of local irregularities.

3.3.3 **Lateral Load Resistance:** Lateral (horizontal) loads on foundations may be resisted by both frictional resistance along the base of the footing and the passive resistance in properly compacted fill against the sides of footings. Frictional resistance between the base of footings poured (cast) on properly prepared subgrade may be computed using a coefficient of friction of 0.3. Passive resistance may be computed using an equivalent fluid pressure of 350 pounds-per-cubic-foot (pcf) for undisturbed alluvium and/or new compacted fill. Passive pressure should not exceed 3,000 psf. These values may be increased by one third when considering seismic forces. Both friction and passive values have already been reduced by a factor-of-safety of 1.5, and can be used in combination.

3.3.4 **Settlement Estimates:** We understand that this tank will have a maximum water depth of 17 feet along the perimeter. This corresponds to a maximum hydrostatic pressure of approximately 1,060 psf. Considering this hydrostatic pressure plus 2 feet of compacted fill cover overburden, post-construction settlement of the tank is estimated to be on the order of ½-inch or less (≤) at the center and increases slightly toward the perimeter to (≤) ¾-inch. For design purposes, tank differential settlement may be assumed to be ¼-inch between the center and perimeter of the tank. Most of this settlement is expect to occur during initial filling of the tank. During subsequent filling and refilling, the settlement is expected to be less if not negligible.

Settlement of the buried pump vault is expected to be negligible if bearing solely on undisturbed native soil. Increased settlement will occur if the vault overlies backfill (for the tank or anything else), as a function of underlying fill thickness below the bottom of the vault.

3.3.5 **Uplift Resistance:** There will be times when the tank is empty, and should be designed to resist uplift forces at the bottom of the tank due to collected perched groundwater around and under the tank. Uplift pressures on the order of 500 psf should be considered for the bottom of the tank, based on the assumption that a permanent dewatering system will be in place to prevent groundwater levels from rising above elevation 95 feet (roughly 15 feet below grade).

3.4 Retaining Wall Design

3.4.1 **Design Earth Pressures:** Site clay should **not** be used to backfill retaining walls. Imported granular soils should be imported to backfill behind tank and pump station vault retaining walls. For wall constructed with a backdrain in accordance with

recommendations provided on Figure 7, *Retaining Wall Backfill and Subdrain Detail,* the following parameters may be used for retaining wall design, for walls with level backfill and with 2:1 (horizontal:vertical) backfill:

Table 3. Retaining Wall Design Earth Pressures (Level Backfill)

Retaining Wall Condition	Equivalent Fluid Pressure (pounds-per-cubic-foot)
Active (cantilever)	30
At-Rest (braced)	45
Level Toe Passive Resistance (new fill)	350

*horizontal:vertical

Cantilever walls that are designed to yield at least 0.001H, where H is equal to the wall height, may be designed using the active condition. Rigid walls and walls braced at the top should be designed using the at-rest condition, which is expected to be the case for the tank and pumpstation vault. Passive pressure is used to compute soil resistance to lateral structural movement.

For the portions of these structures extending below elevation 95 feet, to eliminate the need for continuous dewatering, we recommend that exterior hydrostatic earth pressures be included in wall design, based on a fresh water unit weight of 62.4 pcf.

Total depth of retained earth for design of walls and for uplift resistance should be measured as the vertical height of the stem below the ground surface at the wall face for stem design, or measured at the heel of the footing for overturning and sliding. A total unit weight of 125 pounds-per-cubic-foot (pcf) may be assumed for calculating the actual weight of the soil over the wall footing, if drained, or 62 pcf if submerged.

3.4.2 **Retaining Wall Surcharges:** In addition to the above lateral forces due to retained earth, surcharge due to above grade loads on the wall backfill, such as traffic, should be considered in design of the retaining wall. Vertical surcharge loads behind the retaining wall on or in the backfill within a 1:1 (horizontal:vertical) plane projection up and out from the retaining wall toe, should be considered as lateral and vertical surcharge. Unrestrained (cantilever) retaining walls should be designed to resist one-third of these surcharge loads applied as a uniform horizontal pressure on the wall. Braced walls should also be designed to resist an additional uniform horizontal-pressure equivalent to one-half of uniform vertical surcharge-loads.

In areas where autos and pickup trucks will drive, we suggest assuming a uniform vertical surcharge of 300 psf, which would result in active and at-rest horizontal surcharges of 100 psf and 150 psf, respectively. This should be doubled in areas of heavy construction traffic (such as concrete trucks, heavy equipment delivery-trucks, etc.). If crane outrigger loads or other point load sources are applied as wall

surcharge, this will require additional analyses based on load source and location relative to the wall.

3.4.3 Incremental Seismic Loads On Retaining Walls: For retaining walls less-than 12 feet in height, incremental seismic loads need not be considered. However, for wall more than 12 feet in height, an incremental seismic load as follows can be used for retaining wall design:

Table 4. Retaining Wall Design Incremental Seismic Loads

Seismic Design Event	Inverted Equivalent Fluid Pressure (pounds-per-cubic-foot)
Design Basis Earthquake (DBE)	10
Upper Bound Earthquake (UBE)	15
Maximum Considered Earthquake (MCE)	25

*horizontal:vertical

These equivalent fluid pressures (triangular pressure distribution) should be applied as inverted triangles with the maximum lateral earth pressure at the top and zero pressure at the bottom. Therefore, the resultant of this pressure, as force per horizontal-foot of wall, may be assumed to be acting at 0.6 times the wall height measured from the bottom of the wall. These pressures are in addition to the static earth pressure presented in Section 3.4.1, above.

4.0 CONSTRUCTION CONSIDERATIONS

4.1 Temporary Excavations

The site soil within the excavation depth for the construction of the tank and its pump station is predominately clay conforming to Type B soils as defined in the *California Construction Safety Orders*. The temporary cut slopes for the construction of the tank and its appurtenant structure should be cut back at least at 1:1 (horizontal:vertical). Heavy equipment or stockpiles should not be placed within 15 feet of the edge of the excavation. If perched groundwater and/or unfavorable soil conditions encountered during excavation that will adversely affect the stability of the temporary cut slope, the cut slope should be laid back to at least 1.5:1 (horizontal:vertical) or shoring be used to support the excavation. Since a prolonged construction period is anticipated, erosion control for the excavation should be provided during construction.

To protect workers entering excavations, excavations should be performed in accordance with Occupational Safety and Health Administration (OSHA) and California-OSHA (Cal-OSHA) requirements, and the current edition of the *California Construction Safety*

Orders, see:

http://www.dir.ca.gov/title8/sb4a6.html

During construction, soil conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor shall be responsible for providing the "competent person" required by OSHA standards to evaluate soil conditions. Close coordination between the competent person and Leighton Consulting, Inc. should be maintained to facilitate construction while providing safe excavations.

4.2 Temporary Shoring

Vertical cuts may be supported by several methods including cross-braced hydraulic shoring, conventional shields, sheet piles, soldier piles and wood lagging. The choice should be left to the contractor's judgment since economic considerations and/or the individual contractor's construction experience may determine which method is more economical and/or appropriate. Shoring systems should be designed by a California licensed civil or structural engineer. The contractor and shoring designer may perform additional geotechnical studies as necessary to refine means and methods of shoring construction. The contractor should forward temporary excavation support system plans to us for pre-construction review.

Support of all adjacent existing structures and infrastructure without distress is the contractor's responsibility. Excavations that extend below an imaginary plane inclined at 45 degrees below the edge of any adjacent existing site foundation should be properly shored to maintain support of the adjacent structure. In addition, it should be the contractor's responsibility to undertake a pre-construction survey including (1) establishing surface survey monuments adjacent to existing sensitive structures and infrastructure to measure ground movement adjacent to excavations, and (2) photographing and otherwise documenting adjacent property conditions prior to excavation. Surface monuments should be established and read by a California licensed Professional Land Surveyor (PLS), with an accuracy on the order of 0.1 inch.

As preliminary guidelines, the following geotechnical parameters can be used for shoring design:

- **Supported Earth Pressures**: An active equivalent fluid earth pressure of 38 pounds-per-cubic-foot (pcf) should be used for deflecting cantilever shoring, or 60 pcf as an at-rest pressure for shoring for supporting deflection sensitive structures, only for drained shoring above groundwater with level backfill. Braced shoring can also be

designed using a trapezoidal soil pressure distribution with a maximum pressure of 35H psf, where H is equal to the depth of the excavation being shored, in feet. The maximum pressure should be applied along the mid-50 percent section of the excavation. Braces should be installed and pre-loaded as the excavation progresses to reduce shoring deflections. Determination of appropriate design conditions (active or at-rest) depends on shoring flexibility. If the shoring system is allow to deflect at least 0.001H at the top, active pressure conditions apply; otherwise, at-rest condition governs.

- **Surcharge Loads**: Surcharge loads (dead or live) should be added to the indicated lateral earth pressures and should be applied uniformly, if such loads are within a horizontal distance that is less-than the exposed shoring height. The corresponding lateral earth pressure will approximately be 33-percent of the vertical surcharge for active conditions, and 50-percent for at-rest conditions. Surcharge pressures from concentrated loads should be evaluated after geometric constraints and loading conditions are determined on individual basis.

- **Passive Resistance**: Passive pressures of 375 pcf and 750 pcf may be used for sheet piles or soldier piles spaced at-least 2.5 diameters on-center, respectively. Earth pressures provided are ultimate values without consideration of allowable deflection, and safety factor should be applied as appropriate. The above pressure should be reduced to 180 pcf and 360 pcf if soils providing passive resistance are submerged or saturated. Top 3 feet of soil immediately below the lowest anticipated excavation line should be discounted for passive resistance for the shoring system.

- **Rakers**: Rakers bearing in undisturbed native clay, with a concrete bearing pad embedment of 24-inches and at least 24-inches wide, can be designed using an allowable vertical bearing pressure of 3,000 psf, with a sliding friction resistance of 0.35 for sustained loads on cast-in-place bearing pads. An allowable passive pressure of 375 pcf, not to exceed 3,000 psf can also be used for design.

- **Tie-back Anchors**: Actual anchor capacity should be verified by testing all anchors to 150 percent of the design load. Tie-back testing procedures are presented in Appendix D, *Tie-Back Testing Procedures*. At least one anchor on each wall, but not more than 150 feet apart along the perimeter of the shoring (in plan view), should be tested up to 200 percent of the design load for 24 hours. Anchor deflection after slack is removed from threadbars or strands should not exceed 0.1 and 0.25 inches for 150% and 200% load tests, respectively. Testing jack calibration must be provided to Leighton Consulting, Inc., and must be no-more-than one month old. As preliminary design guidelines, we present the following supplemental geotechnical parameters for temporary-shoring tie-back design. For temporary shoring design purposes, skin friction on tie-back anchors may be assumed to be 30H pounds-per-square-foot (psf), where H is the average depth of the tie-back anchor portion (excluding the active wedge), in feet, not to exceed 500 psf, for gravity filled tie-backs. Skin friction

values can be increased for pressure-injected (grouted) anchors based on empirical test results on site.

- **Monitoring**: Shoring should be monitored weekly for line and grade, surveyed by a California licensed Professional Land Surveyor (PLS). Typically, top of soldier piles are surveyed at the intersection of the steel beam web and compression flange; although any location at the top, which the surveyor prefers, can be used as long as the chosen location is consistently the same and can be consistently accessed while the excavation is open. Survey results must be sent to Leighton Consulting, Inc., weekly, preferably by e-mail. If total horizontal deflection inward (towards the excavation) exceeds one-inch, then excavation adjacent to excessively-deflecting soldier pile(s) should be halted immediately, and the shoring design at that location should reevaluated by the shoring designer, owner and Leighton Consulting, Inc.. Any movement more than one inch will require remedial shoring at the location of excessive deflection, to prevent additional movement prior to further construction in that area.

4.3 Dewatering

Excavation below an encountered perched groundwater zone is anticipated, between 15 and 25 feet below existing grade. Therefore, removing groundwater during excavation for the construction of the tank will be required. Dewatering is a means and methods of construction issue, to be implemented at the discretion of the contractor. Due to the predominantly clayey nature of these water bearing soils, high groundwater recharge rate during excavation and construction of the tank is not anticipated, especially during dry summer months. Therefore, a groundwater removal system consisting of sufficient numbers of intercepting drains and collection sumps **may** possibly be adequate to remove groundwater flowing into the excavation during excavation and construction of the tank. It is recommended that the contractor's groundwater removal system be designed and installed by a specialty contractor.

4.4 Subgrade Stabilization

If and where site earthwork if performed during or shortly after wet weather, or if and where excavations extend to wet soils, then these soils may be significantly over optimum moisture. Wet soils over optimum moisture will be difficult to adequately compact for support of the buried tank and pump vault. If and where significant pumping, rutting and yielding occurs when compaction is attempted, then wet weather mitigation measures should be implemented as cost-effectively as deemed prudent by the earthwork contractor. Such measures may include but not necessarily be limited to:

- Mixing wet soils with dryer granular soils either on-site and/or imported,

- Disking, aerating and/or otherwise drying back wet subgrade soils,
- Importing crushed rock and/or aggregate base to stabilize a wet subgrade,
- Stabilizing the subgrade with either a geogrid or geotextile covered with crushed rock or aggregate base, and/or
- Lime stabilization in clays, only.

The contractor should consult with Leighton Consulting, Inc. to pick the best alternative based on actual exposed conditions and moisture content, considering experience and preference of the contractor, availability of chosen materials, cost effectiveness and the project schedule. Consideration should also be given to subsequent utility installation and other construction. Intent of these stabilization methods is to provide a firm subgrade so that overlying fill can be properly compacted. Any imported base should be compacted to 95 percent relative compaction, relative to the ASTM D 1557-07 laboratory maximum density.

4.5 Geotechnical Services During Construction

Our recommendations presented in this report are based on subsurface conditions as interpreted from limited subsurface explorations and limited laboratory testing. The may change as plans are developed and additional exploration and analysis may be required based on final development plans. Leighton Consulting, Inc. should review the site, grading, foundation and shoring plans when available and comment further on geotechnical aspects of this project and check to see general conformance of final project plans to recommendations presented in this report.

Geotechnical observation and testing should be conducted during excavation and all phases of earthwork. Our conclusions and recommendations should be reviewed and verified by us during construction and revised accordingly if geotechnical conditions encountered vary from our findings and interpretations. Geotechnical observation and testing should be provided:

- During shoring installation
- During subgrade stabilization for the tank and the pump station,
- During compaction of all fill materials,
- After excavation of all footings and prior to placement of concrete,
- During utility trench backfilling and compaction,
- During pavement subgrade and base preparation (if any), and/or
- When any unusual geotechnical conditions are encountered.

5.0 LIMITATIONS

This report was based in part on data obtained from a limited number of observations, site visits, soil excavations, samples and tests. Such information is, by necessity, incomplete. The nature of many sites is such that differing soil or geologic conditions can be present within small distances and under varying climatic conditions. Changes in subsurface conditions can and do occur over time. Therefore, our findings, conclusions and recommendations presented in this report are based on the assumption that Leighton Consulting, Inc. will provide geotechnical observation and testing during construction.

Environmental services were not included as part of this study. This report was prepared for the sole use of Tetra Tech Inc. for application to the design of the proposed 1.0 MG non-potable water buried prestressed concrete tank project in accordance with generally accepted geotechnical engineering practices at this time in Los Angeles County.

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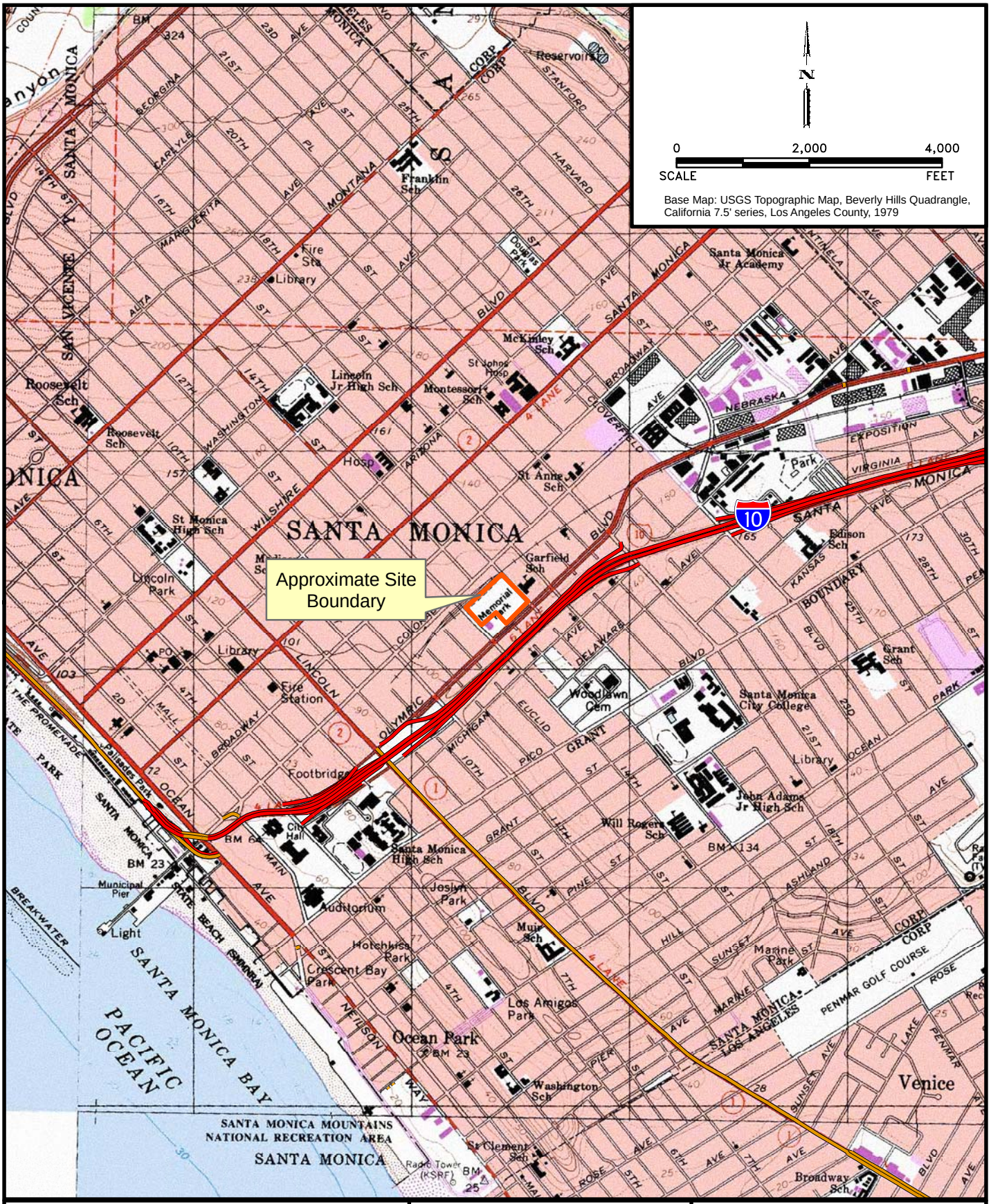


Proposed Memorial Park Water Reservoir Santa Monica, California

SITE LOCATION MAP

Project No.
601795-001

Date
February 2008

Figure 1

\\GIS\Administration\ArcGISTemplates\NEW_GDT_SiteLocationMap.mxd

EXPLANATION OF SYMBOLS

Qa	Alluvial gravel, sand, and silt-clay, derived mostly from Santa Monica Mountains; includes gravel and sand of stream channels
Qoa	Older alluvium of gray to light brown pebble-gravel, sand and silt-clay derived from Santa Monica Mountains, slightly consolidated
Qom	Marine deposits of Hoots 1931: light gray to light brown sand, pebbly sand gravel and silt; probably in part non-marine alluvium

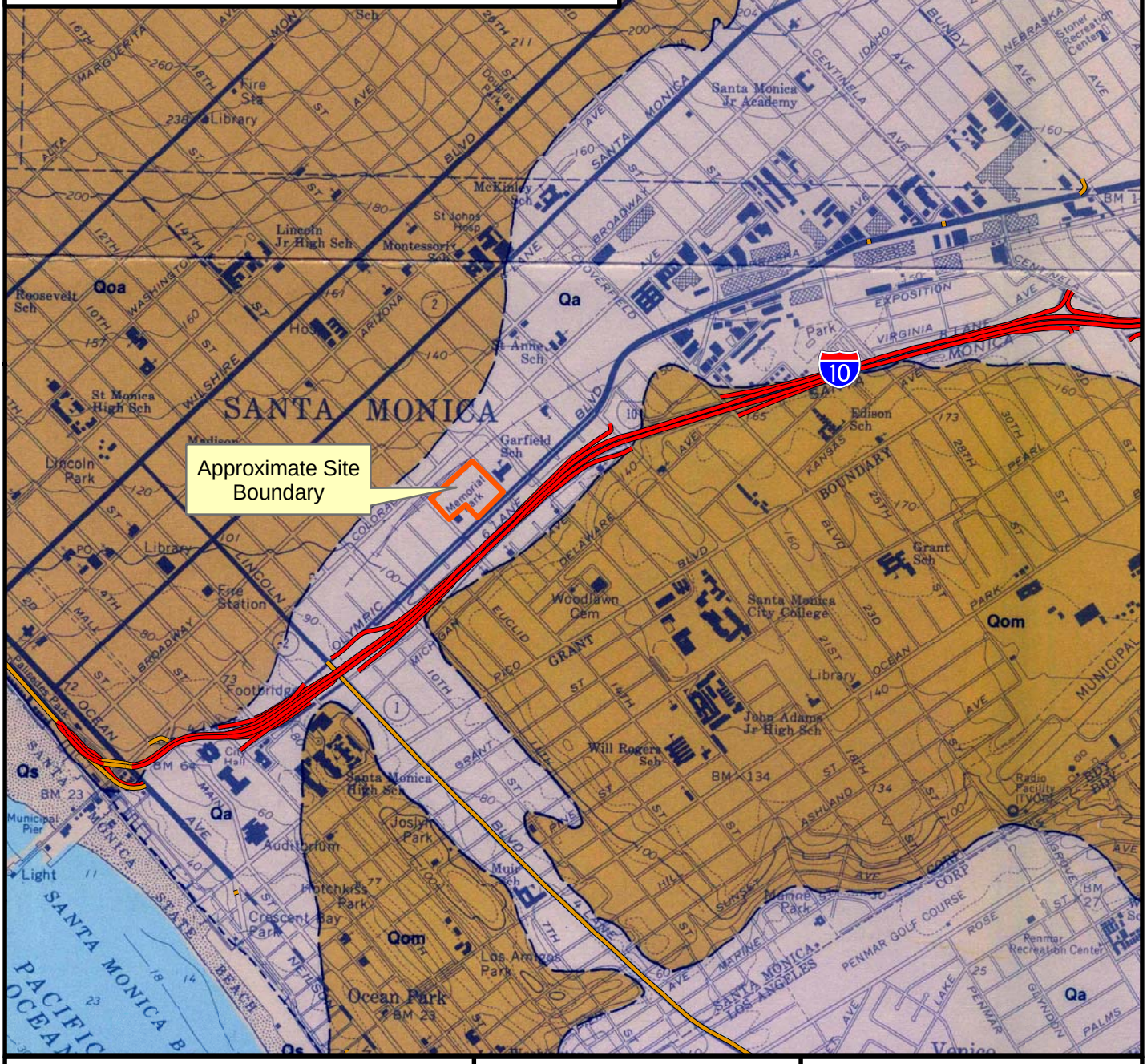
Ref: GEOLOGIC MAP OF THE BEVERLT HILLS AND VAN NUYS (SOUTH ½) QUADRANGLES, LOS ANGELES COUNTY, CALIFORNIA, BY THOMAS W. DIBBLEE, JR., 1991

N

0 2,000 4,000

SCALE FEET

Base Map: USGS Topographic Map, Beverly Hills Quadrangle, California 7.5' series, Los Angeles County, 1979



Proposed Memorial Park Water Reservoir Santa Monica, California

REGIONAL GEOLOGY MAP

Project No.
601795-001

Date
February 2008

Figure 2

\\GIS\Administration\ArcGISTemplates\NEW_GDT_SiteLocationMap.mxd

TOP OF SLOPE

TOE OF SLOPE

EDGE OF BURIED TANK 112 FT DIA

B-1 T.D.21.5'

TOE OF SLOPE

TOP OF SLOPE

6"W

10"RW

B-3 T.D.21.5'

SL

10"RW

PUMP STATION

B-2 T.D.51.5'

10"RW

TOE OF SLOPE

8" D

SL

10"RW

TOP OF SLOPE

WORK STAGING AREA

ACCESS RAMP 15%

SHORING LINE (SL)

14TH STREET

N

0 40 80

SCALE FEET

LEGEND

B-3 T.D.21.5'

APPROXIMATE LOCATION OF LEIGHTON CONSULTING, INC. HOLLOW - STEM BORINGS (MARCH 2010) SHOWING TOTAL DEPTH IN FEET (TD)

BASE MAP REFERENCE: TETRA TECH

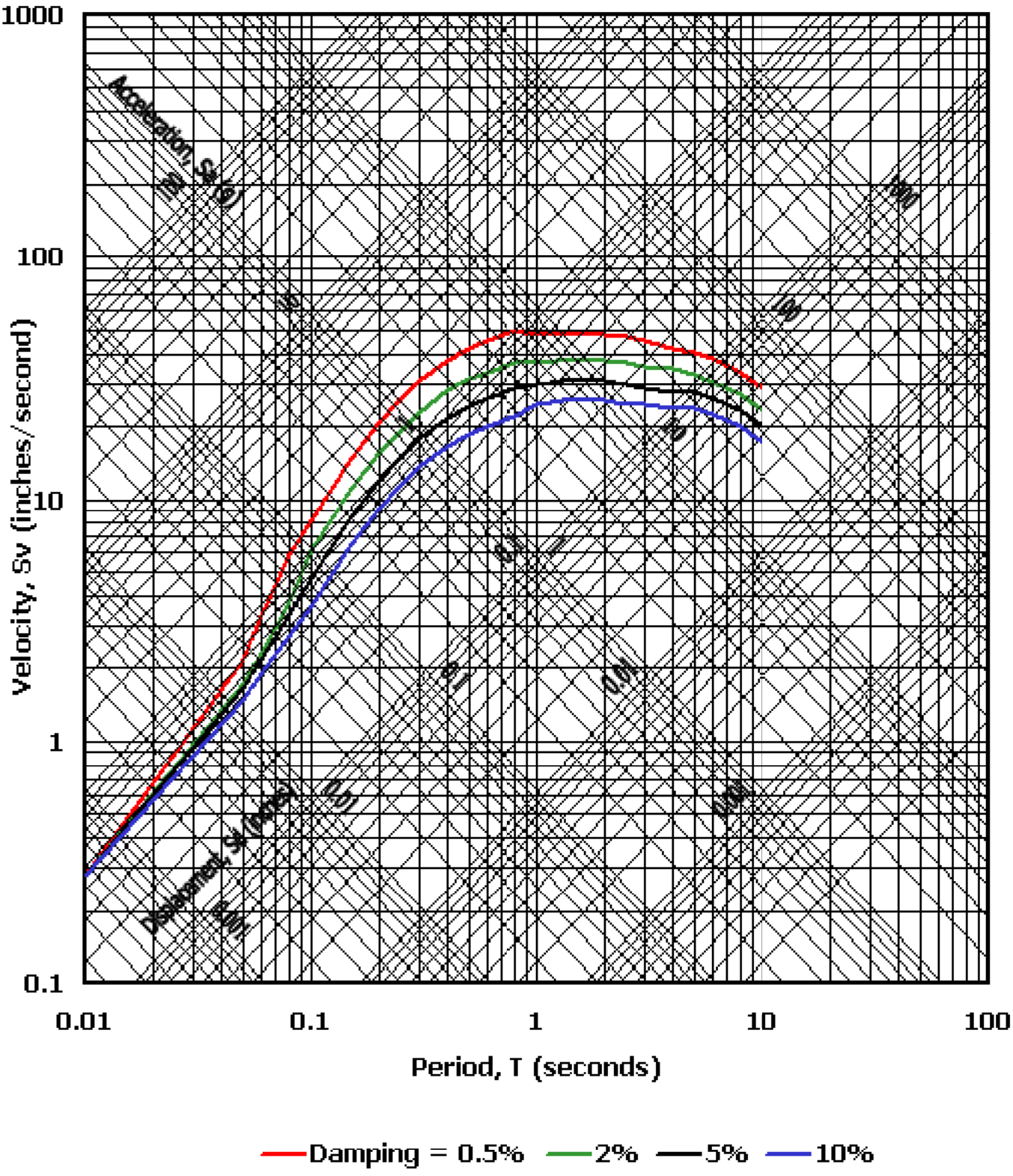
Proj: 601795-001	Eng/Geol: TCB/VPI	
Scale: 1"=40'	Date: 4/10	
Drafted By: BQT	Checked By: BQT	P:\DRAFTING\601795\001\OF_2010-04-20\FIGURE3.DWG (04-21-10 9:08:07AM) Plotted by: btran

BORING LOCATION MAP

PROPOSED 1.0 MG BURIED PRESTRESSED CONCRETE NON-POTABLE WATER TANK
MEMORIAL PARK
SANTA MONICA, CALIFORNIA

FIGURE 3

Leighton



Leighton

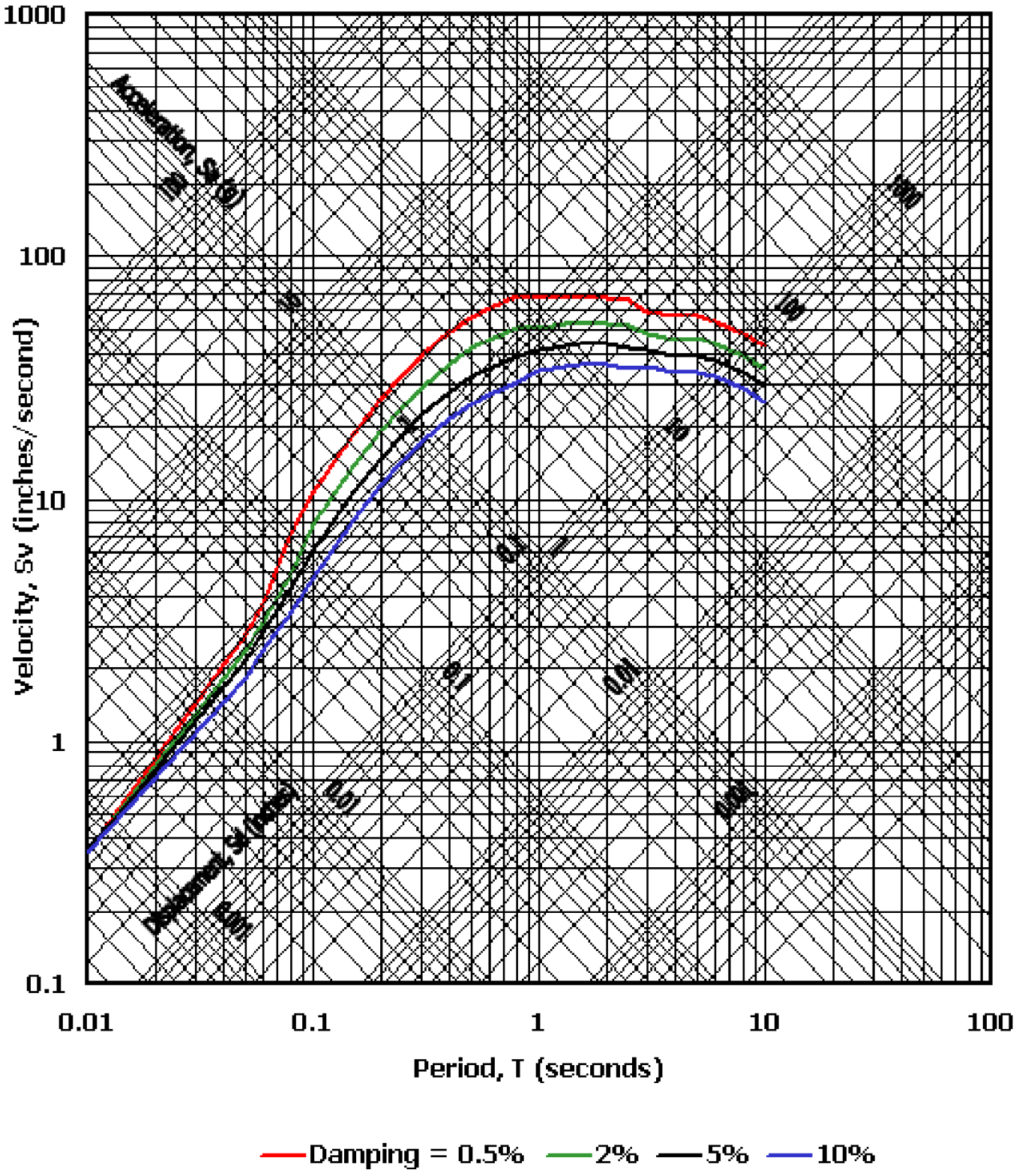
Design Basis Earthquake (DBE) Response Spectra

Proposed Memorial Park Water Reservoir
Santa Monica, California

PROJECT NO.
601795-001

DATE
April, 2010

Figure 4



Leighton

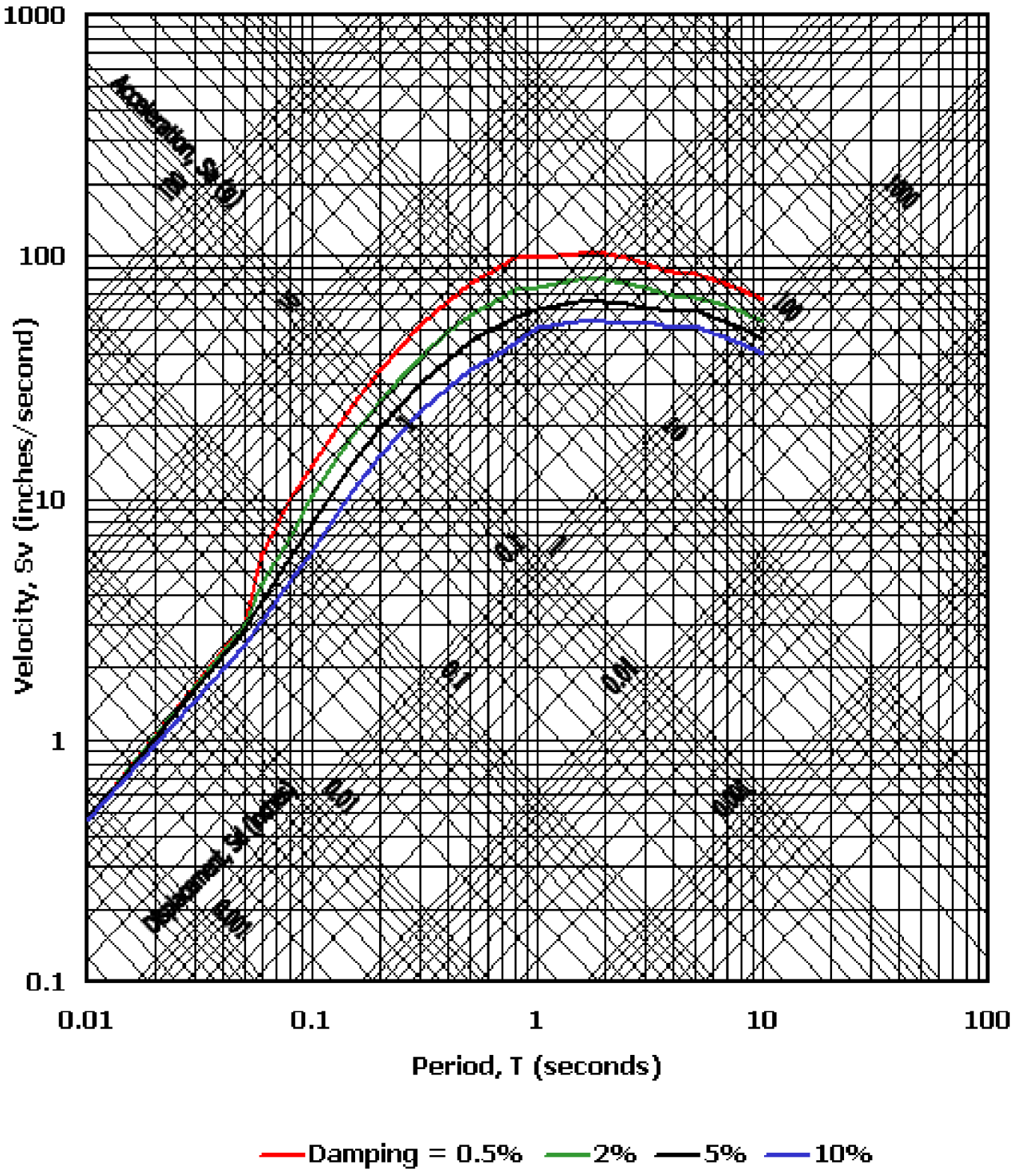
Upper Bound Earthquake (UBE) Response Spectra

Proposed Memorial Park Water Reservoir
Santa Monica, California

PROJECT NO.
601795-001

DATE
April, 2010

Figure 5



Leighton

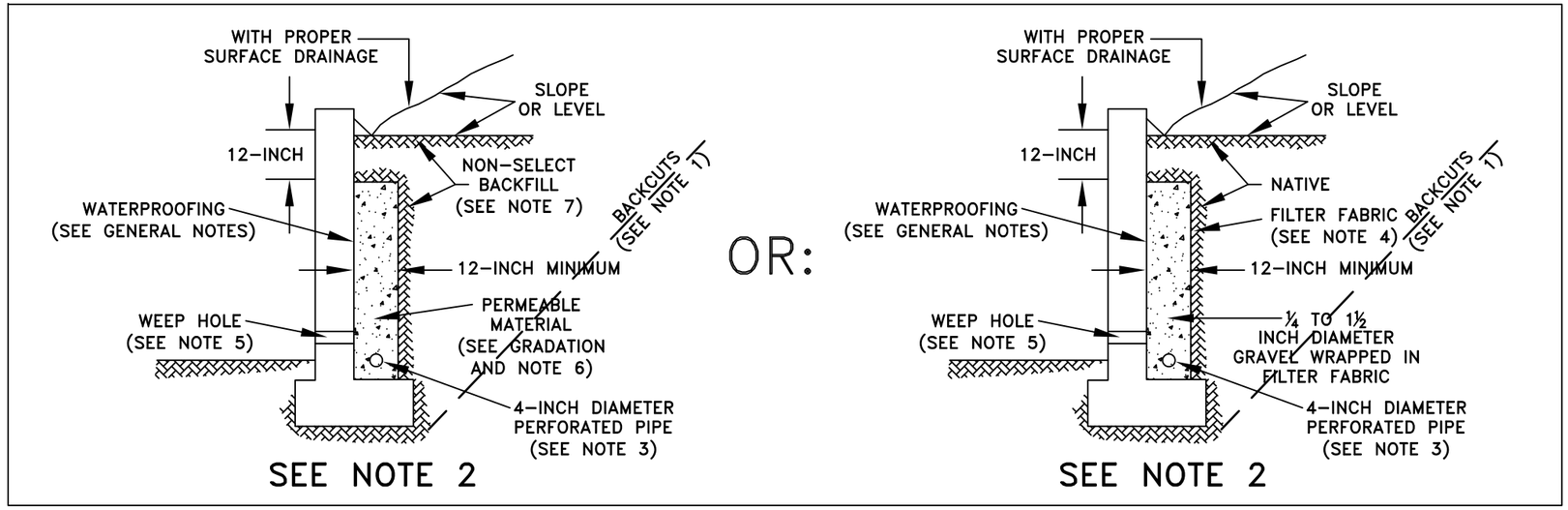
Maximum Considered Earthquake (MCE) Response Spectra

Proposed Memorial Park Water Reservoir
Santa Monica, California

PROJECT NO.
601795-001

DATE
April, 2010

Figure 6



PERMEABLE MATERIAL GRADATION

SIEVE SIZE	PERCENT PASSING
1-inch	100
3/4-inch	90-100
3/8-inch	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

RETAINING WALL BACKFILL AND DRAINAGE NOTES:

- These are schematic sections, not to scale.
- Waterproofing should be provided where moisture passing through retaining walls is undesirable. Waterproofing is not observed nor inspected by Leighton Consulting, Inc.
- All subdrains should be installed with a drainage gradient of at least 1 percent.
- Outlet portion of subdrains should be solid pipe at least 4-inches in diameter, discharging into a suitable disposal area designed by the project Civil Engineer. Subdrain pipes should be accessible for maintenance (with cleanouts, etc.).

NUMBERED NOTES KEYED TO FIGURE:

1. Backcuts: Safe backcuts, in accordance with the current California Construction Safety Orders (Article 6) are required behind retaining walls to allow for Leighton Consulting, Inc. personnel to view drainage installation and to test backfill. Site safety is the responsibility of the Contractor.
2. Foundation Bearing Surfaces: Leighton Consulting, Inc. personnel should observe foundation bearing surfaces before reinforcing steel is placed.
3. Perforated Pipes: Perforated drainpipes should be either ASTM D 1527 Acrylonitrile Butadiene Styrene (ABS) or ASTM D 1785 Polyvinyl Chloride (PVC) Schedule 40 for backfill less than 15 feet deep and Schedule 80 for deeper backfill, or approved equivalent as promulgated by the project Civil Engineer. Pipe should be installed with perforations down. Perforations should be 3/8-inch diameter placed 120° radially in two-rows at 3-inch on center (staggered). Slotted pipe can be used when backfill over the pipe is less-than 15feet deep.
4. Non-Woven Filter Fabric: Filter fabric should be Mirafi 140NC or equivalent, conforming to Section 213-2 (Table 213-2.2 (A) 90N) of the Standard Specifications For Public Works Construction (Greenbook, 2009 Edition or more current).
5. Weepholes: Weephole should be at least 3-inches in diameter and spaced no more than 10-feet on-center horizontally, at the base of retaining walls where a perforated drainpipe with gravity discharge is not provided. If exposure is permitted, weepholes should be located 12 inches above finished grade. If exposure is not permitted such as for walls adjacent to sidewalks, then a pipe under the sidewalk discharged through the curb face, or equivalent, should be provided. For basements, watertight vaults and/or reservoir walls, a proper subdrain outlet system should be provided without weepholes.
6. Permeable Material: At least one cubic-foot of permeable material or crushed rock should be placed per each horizontal foot of wall. Crushed rock should be wrapped in filter fabric as discussed in Note 4 (Mirafi 140NC or equivalent), above.
7. Backfill: All retaining wall backfill soils should have an Expansion Index (EI) <50 and should be compacted to at least 90-percent of the ASTM D 1557-07 laboratory maximum density, with all backfill tested by Leighton Consulting, Inc.

Proj: 601795-001	Eng/Geol: TCB/VPI
Scale: NTS	Date: 4/10

Drafted By: BQT | Checked By: BQT | P:\DRAFTING\601795\001\OF_2010-04-20\FIGURE7.DWG (04-20-10 9:00:25AM) Plotted by: btran

RETAINING WALL BACKFILL AND SUBDRAIN DETAIL

PROPOSED 1.0 MG BURIED PRESTRESSED CONCRETE NON-POTABLE WATER TANK
MEMORIAL PARK
SANTA MONICA, CALIFORNIA

FIGURE 7

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APPENDIX A
FIELD EXPLORATION

On March 29, 2010, Leighton Consulting, Inc. drilled three exploratory borings using a truck-mounted hollow-stem-auger drill rig. These borings were drilled to a maximum depth of 51½-feet below the existing ground surface. Approximate locations of these borings are depicted on Figure 3. Boring logs are included in this appendix.

Encountered soils were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D 2488). Relatively undisturbed soil samples were obtained at selected intervals within these borings using both a California Ring Sampler and Standard Penetration Test (SPT) split spoon sampler. Bulk samples of representative soil types were also obtained from these borings. These samples were transported to our Irvine geotechnical laboratory for evaluation and appropriate testing. After logging and sampling, these borings were backfilled with spoils generated during drilling.

The attached subsurface exploration logs and related information depict subsurface conditions only at the locations indicated and at the particular date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these logged locations. Passage of time may result in altered subsurface conditions due to environmental changes. In addition, any stratification lines on these logs represent an approximate boundary between sampling intervals and soil types; and transitions may be gradual.

GEOTECHNICAL BORING LOG B-01

Project No.	601795-001	**Date Drilled**	3-29-10
Project	Proposed Memorial Park Water Reservoir	**Logged By**	CDL
Drilling Co.	Martini Drilling Corp.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	110'
Location	See Boring Location Map (Figure 3)	**Sampled By**	CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
110	0			B-1				CL	**Artificial fill (Af):** @ Surface: Approximately 8-inches of asphalt-concrete over CLAY (CL), dark brown, very moist.	RV, CR, EI, AL SA
									Quaternary alluvium (Qal) @ 3': CLAY (CL), brown, moist.	
105	5			S-1	4 10 11		19	CL	@ 5': CLAY (CL), very stiff, brown, moist.	
100	10			R-1	6 14 19	110	19	CL	@ 10': CLAY (CL), very stiff, brown, moist, laminated bed of sandy clay, angular sand, fine to coarse grained sand.	
95	15			S-2	1 1 2		27	CL	@ 15': CLAY (CL), soft, brown, very moist, moderate thick bed of clayey sand, fine grained sand, brown, wet.	
90	20			R-2	4 8 9	98	26	CL	@ 20': CLAY (CL), stiff, brown, very moist, PP = 2.25 tons/ft^2	
85	25								Total depth of boring: 21.5 feet. Perched groundwater encountered at 15 feet. The boring was backfilled with soil cuttings, tamped and capped with cold asphalt patch. Excess soil cuttings were spread in landscaped areas.	
80	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG B-02

Project No.	601795-001	**Date Drilled**	3-29-10
Project	Proposed Memorial Park Water Reservoir	**Logged By**	CDL
Drilling Co.	Martini Drilling Corp.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	110'
Location	See Boring Location Map (Figure 3)	**Sampled By**	CDL

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
110	0			B-1				CL	**Artificial fill (Af):** @ Surface: Approximately 6.5 inches of asphalt-concrete over CLAY (CL), dark brown, moist.	RV, CR, EI, AL SA
105	5			R-1	7 12 15	118	14	CL	**Quaternary alluvium (Qal):** @ 4': CLAY (CL), brown, moist @ 5': CLAY (CL), very stiff, brown, moist, PP = +4.5 tons/ft^2	DS
100	10			S-1	5 6 6		13	CL	@ 10': CLAY (CL), with gravel, stiff, brown, moist, fine angular gravel.	
95	15			R-2	6 7 9	95	28	ML	@ 15': SILT (ML) with sand and clay, stiff, brown, very moist (some visible free water on faces), fine grained sand, PP = 3.5 tons/ft^2	
90	20			S-2	2 7 11		19	CL	@ 20': CLAY (CL), very stiff, brown with laminated beds of reddish brown, moist, fine well rounded gravel, trace amount of coarse grained sand.	
85	25			R-3	10 15 19	118	14	CL	@ 25': CLAY (CL), with sand and gravel, very stiff, brown, moist, fine and coarse grained sand, fine angular gravel.	CN, DS
80	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG B-02

Project No.	601795-001	**Date Drilled**	3-29-10
Project	Proposed Memorial Park Water Reservoir	**Logged By**	CDL
Drilling Co.	Martini Drilling Corp.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	110'
Location	See Boring Location Map (Figure 3)	**Sampled By**	CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
80	30			S-3	8 18 22		5	SP	@ 30': SAND (SP), with gravel, dense, grayish brown, dry, fine to coarse grained sand, fine angular gravel.	
75	35			R-4	49 50/6"	114	4	SP	@ 35': SAND (SP), with gravel, very dense, oramgish brown, damp, fine to medium grained sand, some coarse grained sand, fine and coarse angular gravel.	
70	40			S-4	20 28 39		6	SP	@ 40': SAND (SP), very dense, orangish brown, moist, fine grained sand, well sorted.	
65	45			R-5	26 50/4"	93	6	SP	@ 45': SAND (SP), very dense, orangish brown, damp, fine grained sand, well sorted.	
60	50			S-5	20 50/6"		5	SP	@ 50': SAND (SP), very dense, light grayish brown, moist, fine grained sand, well sorted.	
55	55								Total depth of boring: 51.5 feet. Perched groundwater encountered at 15 feet. The boring was backfilled with soil cuttings, tamped and capped with cold asphalt patch. Excess soil cuttings were spread in landscaped areas.	
50	60									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG B-03

Project No.	601795-001	**Date Drilled**	3-29-10
Project	Proposed Memorial Park Water Reservoir	**Logged By**	CDL
Drilling Co.	Martini Drilling Corp.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	110'
Location	See Boring Location Map (Figure 3)	**Sampled By**	CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
110	0			B-1				CL	**Artificial fill (Af):** @ Surface: Approximately 6 inches of asphalt-concrete over CLAY (CL), dark brown, moist.	RV, CR, EI, AL SA
									Quaternary alluvium (Qal): @ 3': CLAY (CL), brown, moist.	
105	5			R-1	4 13 28		19	CL	@ 5': CLAY (CL), hard, brown, moist, PP = +4.5 tons/ft^2	
100	10			S-1	5 12 16			CL	@ 10': CLAY (CL), very stiff, brown, moist.	
95	15			R-2	7 9 15	102	27	CL	@ 15': CLAY (CL), stiff, brown, moist, PP = 3.75 tons/ft^2	DS
90	20			S-2	3 6 7		24	CL	@ 20': CLAY (CL), stiff, brown, moist.	
85	25								Total depth of boring: 21.5 feet. No groundwater was encountered during drilling. The boring was backfilled with soil cuttings, tamped and capped with cold asphalt patch. Excess soil cuttings were spread in landscaped areas.	
80	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
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- SG SPECIFIC GRAVITY
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APPENDIX B
GEOTECHNICAL LABORATORY TEST RESULTS

In-Situ Moisture and Density: The natural water content (ASTM D 2216) and in-situ dry density (ASTM D 2937) was determined for recovered relatively undisturbed ring-lined barrel drive samples, from our subsurface explorations. Results of these tests are shown on the logs at the appropriate sample depths, in Appendix A.

Sieve Analysis: Sieve analyses (ASTM D 422) were performed on a selected bulk sample of the subsurface soils. These tests were performed to assist in the classification of the soil and to determine grain size distributions of these soils. Results of these tests are presented on the "*Particle Size Distribution*" figures.

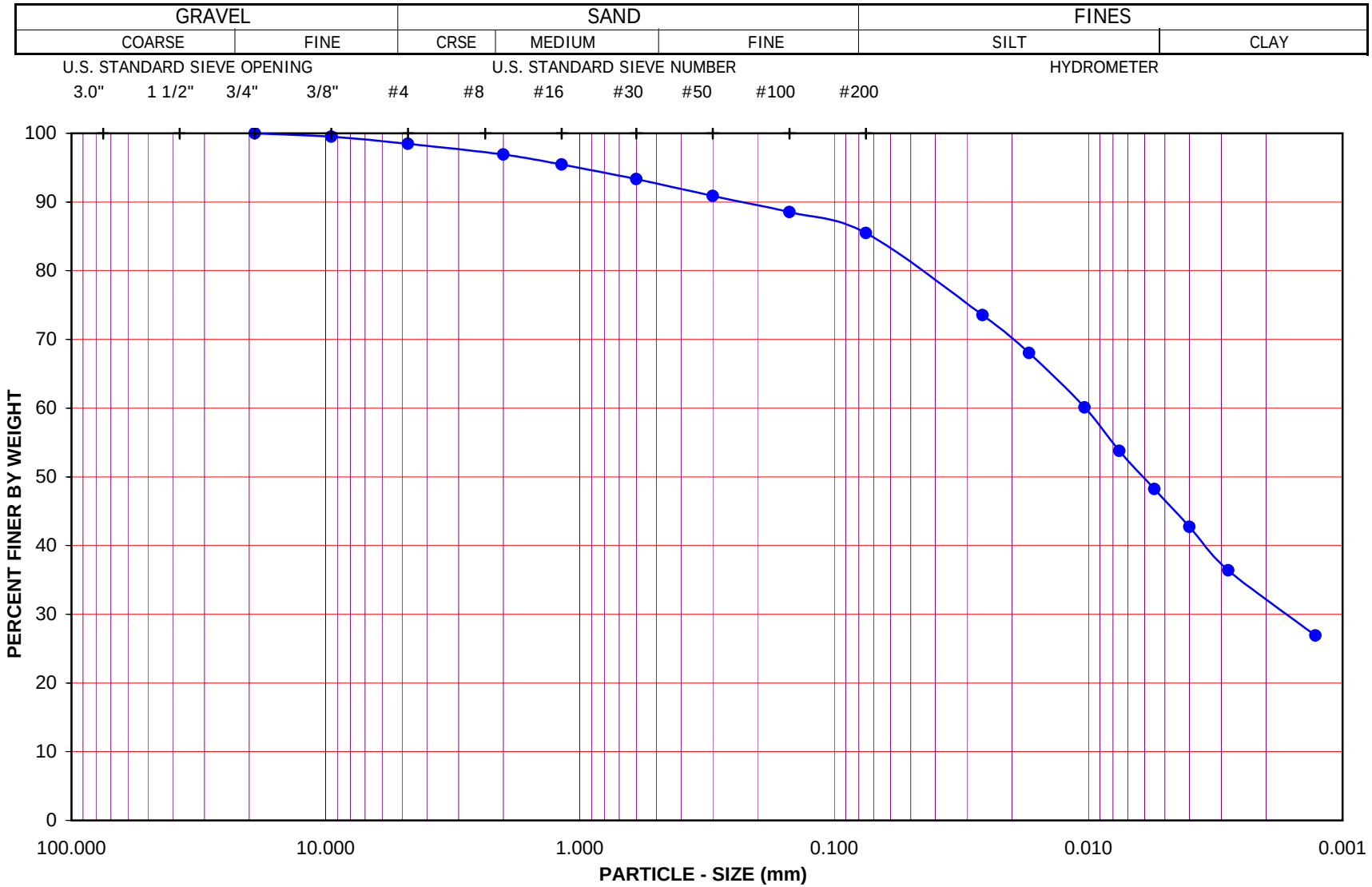
Percent Fines (Percentage Passing Sieve No. 200): Selected soil samples were wet-wash sieved through a No. 200 U.S. Standard brass sieve in accordance with ASTM Test Methods D 1140 to determine the percent fines (silts and clays). This data was used to refine the Unified Soil Classification for tested soil samples. Test results are presented in this appendix and listed on the logs in Appendix A.

Atterberg Limits: The Atterberg Limits were determined in accordance with ASTM Test Method D4318 for engineering classification of fine-grained materials. Test results are presented on the *Atterberg Limits* sheet in this appendix for a composite specimen.

Direct Shear Tests: Direct shear tests were performed, in general accordance with ASTM Test Method D 3080, on undisturbed native soil samples, which were soaked for a minimum of 24 hours under a surcharge equal to the applied normal force during testing. After transfer of the sample to the shear box, and reloading the sample, pore pressures set up in the sample due to the transfer were allowed to dissipate for a period of approximately 1 hour prior to application of shearing force. These specimens were tested under various normal loads with a motor-driven, strain-controlled, direct-shear testing apparatus at a strain rate of 0.05 inches per minute (depending upon the soil type). Test results are presented on the *Direct Shear Test Results* sheets which follow in this appendix.

Expansion Index: An Expansion Index (EI) test was performed on a representative bulk soil-sample from the site, in general accordance with the ASTM D 4829 Standard Test Method. Results of this test are presented on the following "*Expansion Index of Soils*" figure in this appendix.

Consolidation: A consolidation test was performed on a selected soil sample in general accordance with ASTM Test Method D 2435. Test results are presented on the "*One-Dimensional Consolidation Properties of Soils*" sheet in this appendix.



Project Name: Memorial Park

Project No.: 601795-001

Exploration No.: B-1, B-2, B-3 combine Sample No.: B-1 from each

Depth (feet) : 1-5 Soil Type : (CL)s

Soil Identification: Brown lean clay with sand (CL)s

GR:SA:FI : (%) 2 : 13 : 85

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PARTICLE - SIZE DISTRIBUTION ASTM D 422

Apr-10

SA & Hyd B-1, B-2, B-3 combined, B-1 from each @ 1-5

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ATTERBERG LIMITS

ASTM D 4318

Project Name:	Memorial Park	Tested By:	V. Juliano	Date:	04/07/10
Project No. :	601795-001	Input By:	J. Ward	Date:	04/09/10
Boring No.:	B-1, B-2, B-3 combined	Checked By:	J. Ward		
Sample No.:	B-1 from each	Depth (ft.)	1-5		
Soil Identification:	Brown lean clay with sand (CL)s				

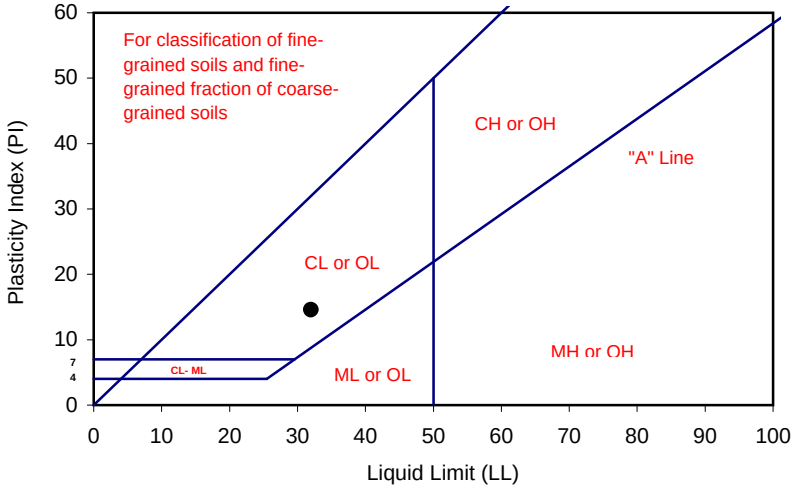
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			35	28	22	
Wet Wt. of Soil + Cont. (g)	40.53	40.51	39.62	42.81	39.87	
Dry Wt. of Soil + Cont. (g)	39.12	39.17	36.09	38.46	36.17	
Wt. of Container (g)	31.00	31.50	24.85	24.87	24.85	
Moisture Content (%) [Wn]	17.36	17.47	31.41	32.01	32.69	

Liquid Limit	**32**
Plastic Limit	**17**
Plasticity Index	**15**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 8.76

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.12}$



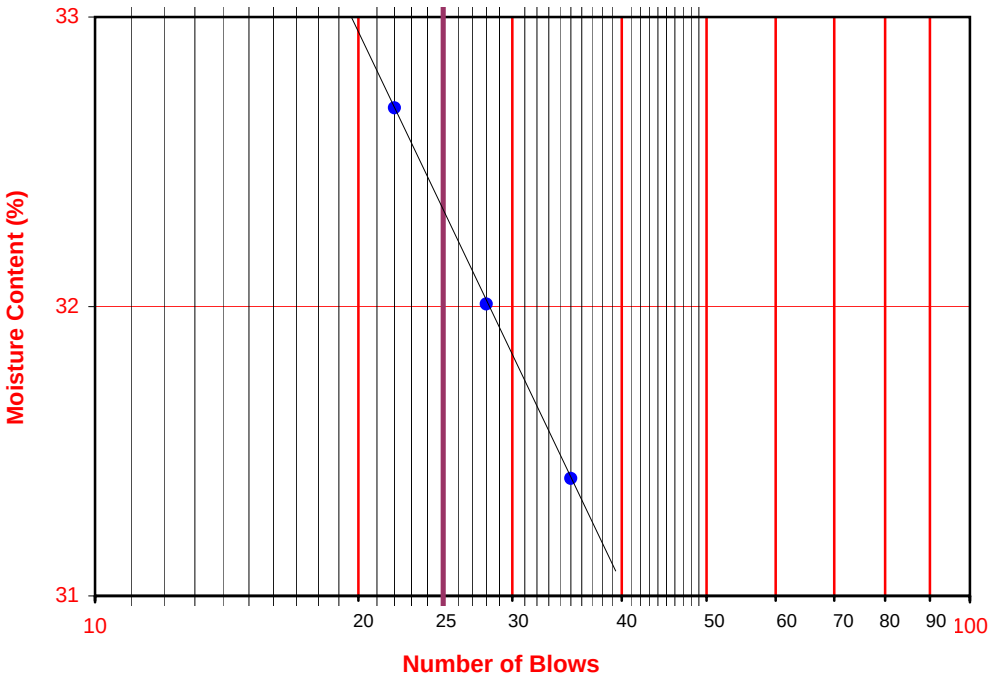
PROCEDURES USED

[ ] Wet Preparation
Multipoint - Wet

[X] Dry Preparation
Multipoint - Dry

[X] Procedure A
Multipoint Test

[ ] Procedure B
One-point Test



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DIRECT SHEAR TEST

Consolidated Undrained

Project Name:	Memorial Park	Tested By:	A. Santos	Date:	03/31/10
Project No.:	601795-001	Checked By:	J. Ward	Date:	04/09/10
Boring No.:	B-1	Sample Type:	Drive		
Sample No.:	R-1	Depth (ft.):	10.0		

Soil Identification: Dark brown lean clay (CL)

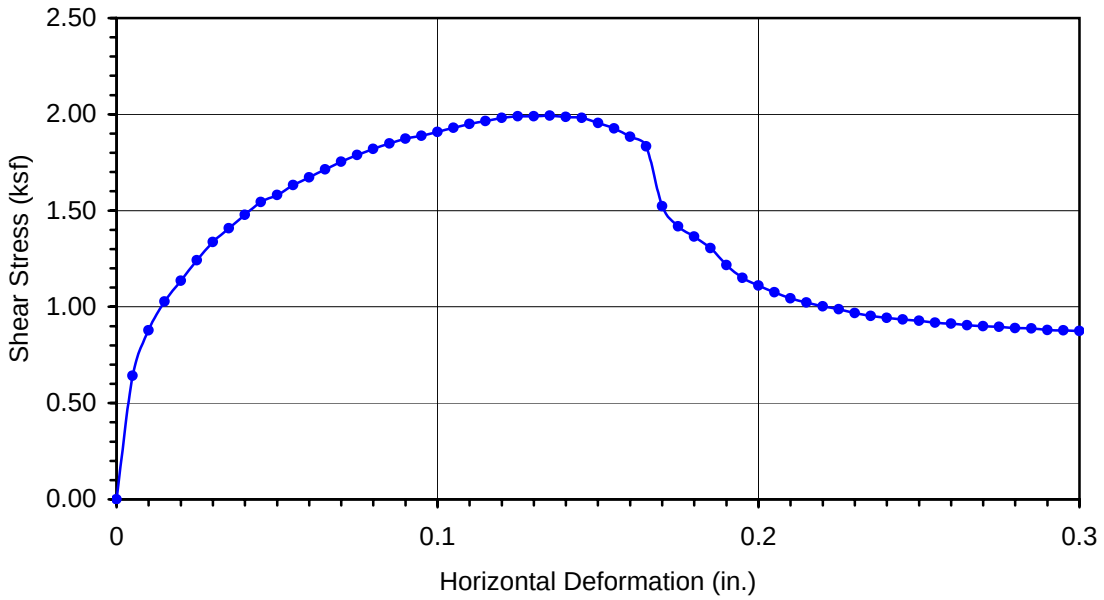
Sample Diameter(in):	2.415		
Sample Thickness(in.):	1.000		
Weight of Sample + ring(gm):	198.49		
Weight of Ring(gm):	40.93		

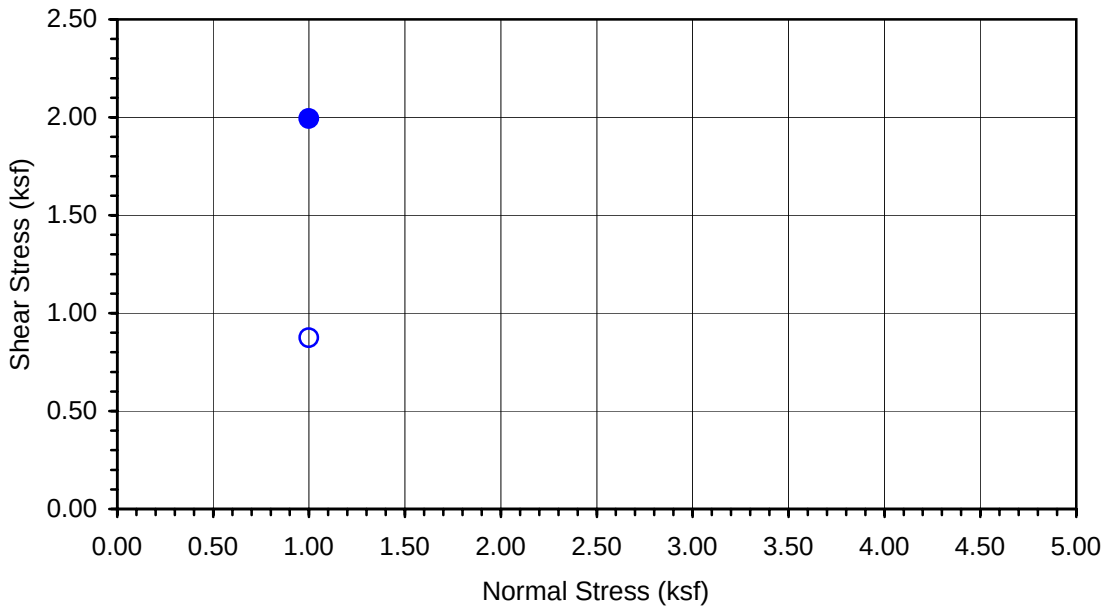
Before Shearing

Weight of Wet Sample+Cont.(gm):	397.00		
Weight of Dry Sample+Cont.(gm):	345.80		
Weight of Container(gm):	77.51		
Vertical Rdg.(in): Initial	0.2964		
Vertical Rdg.(in): Final	0.2972		

After Shearing

Weight of Wet Sample+Cont.(gm):	198.29		
Weight of Dry Sample+Cont.(gm):	168.93		
Weight of Container(gm):	38.76		
Specific Gravity (Assumed):	2.70		
Water Density(pcf):	62.43		





Boring No.	**B-1**
Sample No.	**R-1**
Depth (ft)	**10**

Sample Type:

Drive

Soil Identification:
Dark brown lean clay (CL)

Normal Stress (kip/ft²)	1.000		
Peak Shear Stress (kip/ft²)	● 1.993		
Shear Stress @ End of Test (ksf)	○ 0.874		
Deformation Rate (in./min.)	0.0500		
Initial Sample Height (in.)	1.000		
Diameter (in.)	2.415		
Initial Moisture Content (%)	19.08		
Dry Density (pcf)	110.0		
Saturation (%)	96.9		
Soil Height Before Shearing (in.)	0.9992		
Final Moisture Content (%)	22.6		

Leighton

DIRECT SHEAR TEST RESULTS
Consolidated Undrained

Project No.: 601795-001

Memorial Park

03-10

Leighton

DIRECT SHEAR TEST

Consolidated Undrained

Project Name:	Memorial Park	Tested By:	A. Santos	Date:	03/31/10
Project No.:	601795-001	Checked By:	J. Ward	Date:	04/09/10
Boring No.:	B-2	Sample Type:	Drive		
Sample No.:	R-1	Depth (ft.):	5.0		

Soil Identification: Dark brown lean clay (CL)

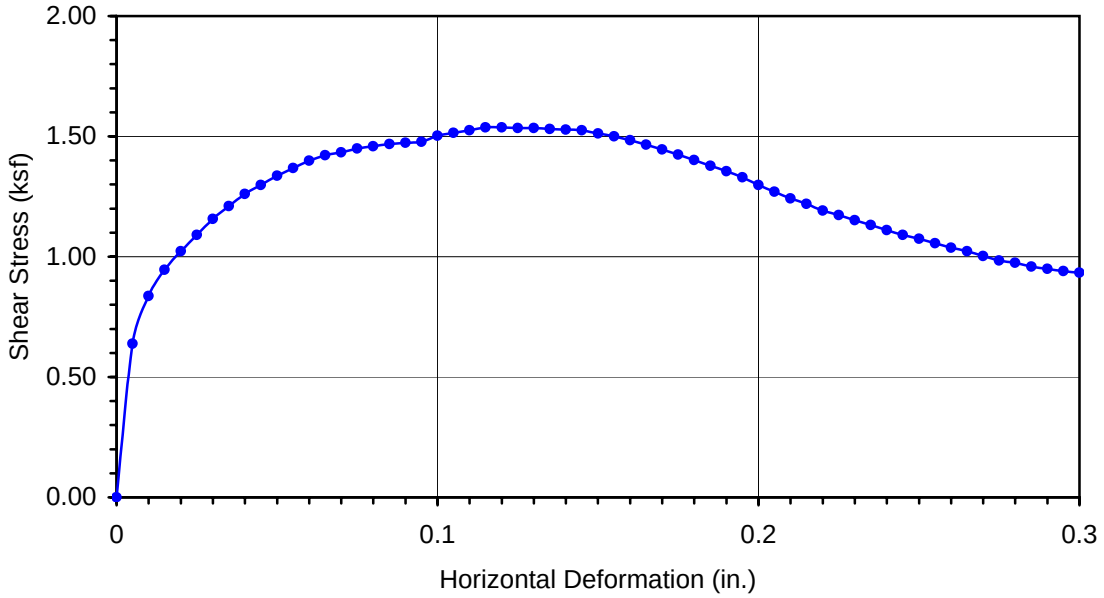
Sample Diameter(in):	2.415		
Sample Thickness(in.):	1.000		
Weight of Sample + ring(gm):	208.00		
Weight of Ring(gm):	45.38		

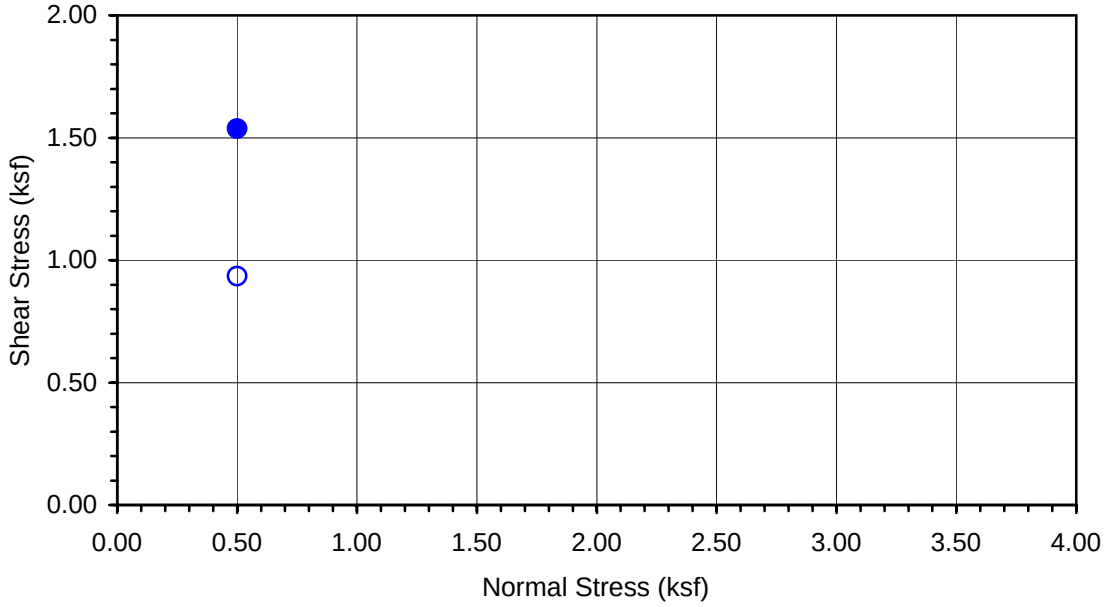
Before Shearing

Weight of Wet Sample+Cont.(gm):	396.70		
Weight of Dry Sample+Cont.(gm):	347.10		
Weight of Container(gm):	77.52		
Vertical Rdg.(in): Initial	0.2135		
Vertical Rdg.(in): Final	0.2072		

After Shearing

Weight of Wet Sample+Cont.(gm):	203.19		
Weight of Dry Sample+Cont.(gm):	175.34		
Weight of Container(gm):	38.73		
Specific Gravity (Assumed):	2.70		
Water Density(pcf):	62.43		





Boring No.	**B-2**
Sample No.	**R-1**
Depth (ft)	**5**

Sample Type:

Drive

Soil Identification:
Dark brown lean clay (CL)

Normal Stress (kip/ft²)	0.500		
Peak Shear Stress (kip/ft²)	● 1.537		
Shear Stress @ End of Test (ksf)	○ 0.934		
Deformation Rate (in./min.)	0.0500		
Initial Sample Height (in.)	1.000		
Diameter (in.)	2.415		
Initial Moisture Content (%)	18.40		
Dry Density (pcf)	114.2		
Saturation (%)	104.4		
Soil Height Before Shearing (in.)	1.0063		
Final Moisture Content (%)	20.4		

Leighton

DIRECT SHEAR TEST RESULTS
Consolidated Undrained

Project No.: 601795-001

Memorial Park

03-10

Leighton

DIRECT SHEAR TEST

Consolidated Undrained

Project Name:	Memorial Park	Tested By:	A. Santos	Date:	03/31/10
Project No.:	601795-001	Checked By:	J. Ward	Date:	04/09/10
Boring No.:	B-2	Sample Type:	Drive		
Sample No.:	R-3	Depth (ft.):	25.0		

Soil Identification: Dark brown lean clay (CL)

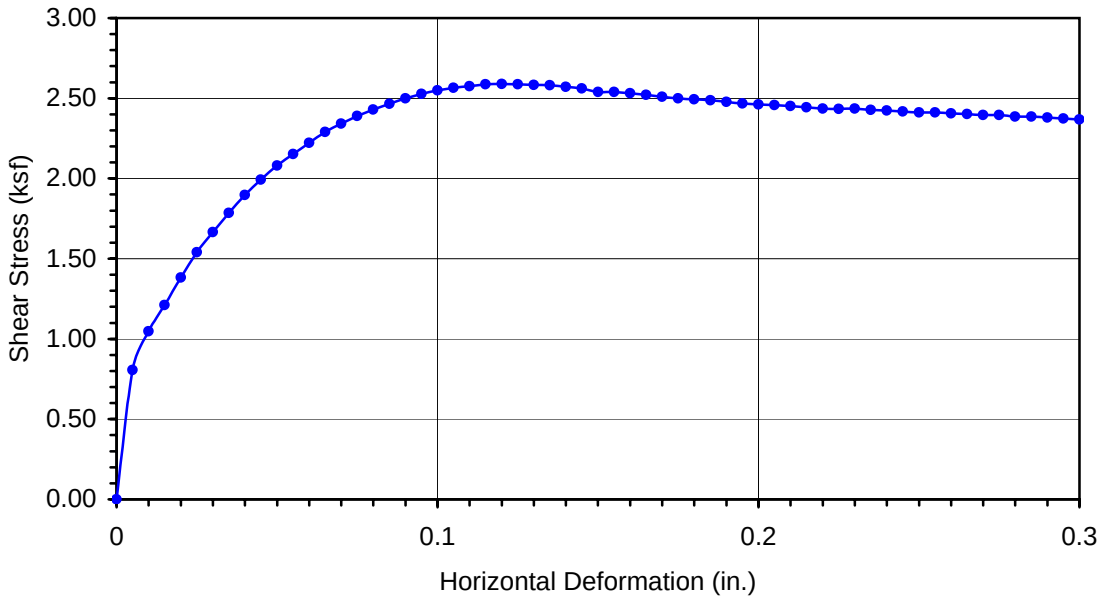
Sample Diameter(in):	2.415		
Sample Thickness(in.):	1.000		
Weight of Sample + ring(gm):	203.98		
Weight of Ring(gm):	42.71		

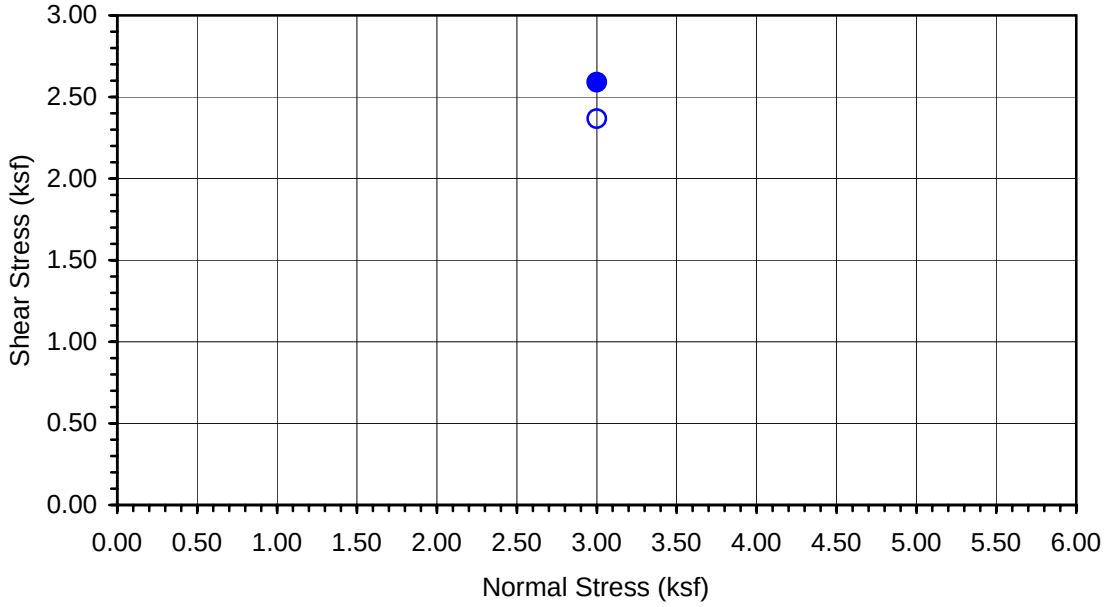
Before Shearing

Weight of Wet Sample+Cont.(gm):	369.50		
Weight of Dry Sample+Cont.(gm):	334.50		
Weight of Container(gm):	78.16		
Vertical Rdg.(in): Initial	0.0000		
Vertical Rdg.(in): Final	-0.0239		

After Shearing

Weight of Wet Sample+Cont.(gm):	198.97		
Weight of Dry Sample+Cont.(gm):	174.60		
Weight of Container(gm):	39.19		
Specific Gravity (Assumed):	2.70		
Water Density(pcf):	62.43		





Boring No.	**B-2**
Sample No.	**R-3**
Depth (ft)	**25**

Sample Type:

Drive

Soil Identification:
Dark brown lean clay (CL)

Normal Stress (kip/ft²)	3.000		
Peak Shear Stress (kip/ft²)	● 2.590		
Shear Stress @ End of Test (ksf)	○ 2.367		
Deformation Rate (in./min.)	0.0500		
Initial Sample Height (in.)	1.000		
Diameter (in.)	2.415		
Initial Moisture Content (%)	13.65		
Dry Density (pcf)	118.0		
Saturation (%)	86.1		
Soil Height Before Shearing (in.)	0.9761		
Final Moisture Content (%)	18.0		

Leighton

DIRECT SHEAR TEST RESULTS
Consolidated Undrained

Project No.: 601795-001

Memorial Park

03-10

DS (1 pt) B-2, R-3 @ 25

Leighton

DIRECT SHEAR TEST

Consolidated Undrained

Project Name:	Memorial Park	Tested By:	G. Bathala	Date:	04/07/10
Project No.:	601795-001	Checked By:	J. Ward	Date:	04/09/10
Boring No.:	B-3	Sample Type:	Drive		
Sample No.:	R-2	Depth (ft.):	15.0		

Soil Identification: Dark olive gray silt (ML)

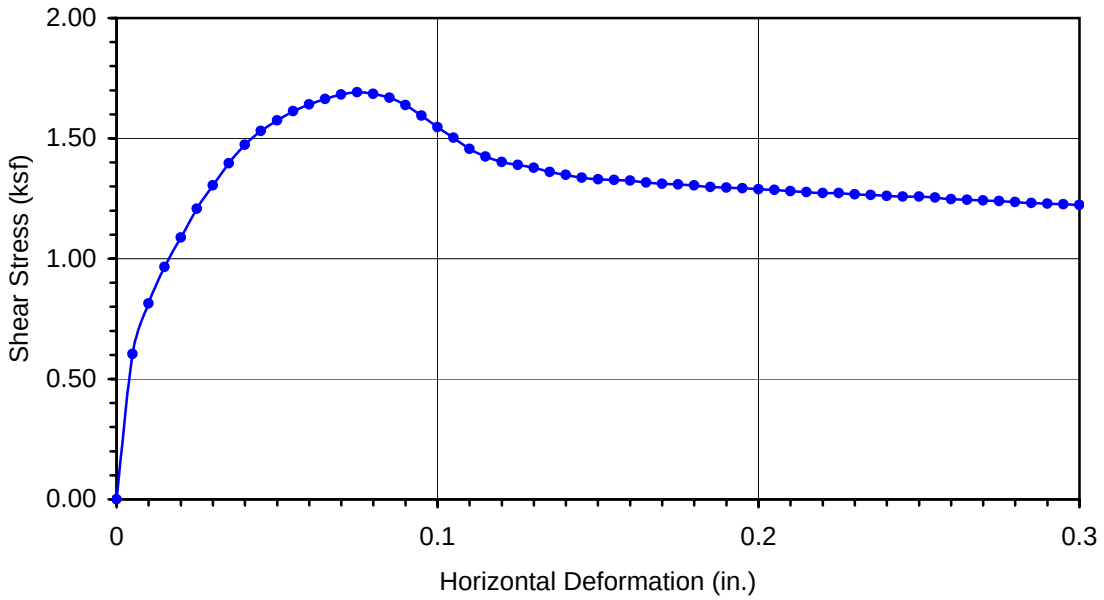
Sample Diameter(in):	2.415		
Sample Thickness(in.):	1.000		
Weight of Sample + ring(gm):	194.31		
Weight of Ring(gm):	44.16		

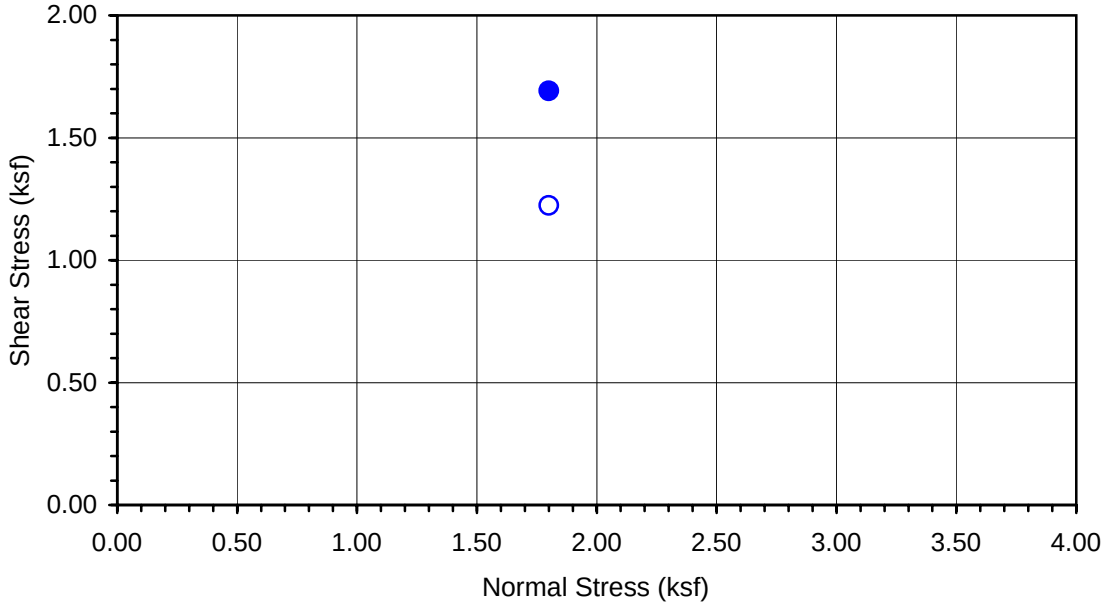
Before Shearing

Weight of Wet Sample+Cont.(gm):	179.94		
Weight of Dry Sample+Cont.(gm):	153.59		
Weight of Container(gm):	39.05		
Vertical Rdg.(in): Initial	0.0000		
Vertical Rdg.(in): Final	-0.0115		

After Shearing

Weight of Wet Sample+Cont.(gm):	288.27		
Weight of Dry Sample+Cont.(gm):	261.99		
Weight of Container(gm):	139.95		
Specific Gravity (Assumed):	2.70		
Water Density(pcf):	62.43		





Boring No.	**B-3**
Sample No.	**R-2**
Depth (ft)	**15**

Sample Type:

Drive

Soil Identification:
Dark olive gray silt (ML)

Normal Stress (kip/ft²)	1.800		
Peak Shear Stress (kip/ft²)	● 1.691		
Shear Stress @ End of Test (ksf)	○ 1.223		
Deformation Rate (in./min.)	0.0500		
Initial Sample Height (in.)	1.000		
Diameter (in.)	2.415		
Initial Moisture Content (%)	23.01		
Dry Density (pcf)	101.5		
Saturation (%)	94.1		
Soil Height Before Shearing (in.)	0.9885		
Final Moisture Content (%)	21.5		

Leighton

DIRECT SHEAR TEST RESULTS
Consolidated Undrained

Project No.: 601795-001

Memorial Park

04-10

Leighton

EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Memorial Park	Tested By:	S. Felter	Date:	04/07/10
Project No. :	601795-001	Checked By:	J. Ward	Date:	04/09/10
Boring No.:	B-1, B-2, B-3 combined	Depth (ft.)	1-5		
Sample No. :	B-1 from each				
Soil Identification:	Brown lean clay with sand (CL)s				

Dry Wt. of Soil + Cont.	(g)	1000.00
Wt. of Container No.	(g)	0.00
Dry Wt. of Soil	(g)	1000.00
Weight Soil Retained on #4 Sieve		0.00
Percent Passing # 4		100.00

MOLDED SPECIMEN		Before Test	After Test
Specimen Diameter	(in.)	4.01	4.01
Specimen Height	(in.)	1.0000	1.0410
Wt. Comp. Soil + Mold	(g)	590.20	424.70
Wt. of Mold	(g)	205.70	0.00
Specific Gravity (Assumed)		2.70	2.70
Container No.		O	O
Wet Wt. of Soil + Cont.	(g)	768.60	630.40
Dry Wt. of Soil + Cont.	(g)	689.30	550.50
Wt. of Container	(g)	0.00	205.70
Moisture Content	(%)	11.50	23.17
Wet Density	(pcf)	116.0	123.1
Dry Density	(pcf)	104.0	99.9
Void Ratio		0.621	0.687
Total Porosity		0.383	0.407
Pore Volume	(cc)	79.3	87.8
Degree of Saturation (%) [S_{meas}]		**50.0**	91.0

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
04/07/10	11:40	1.0	0	0.1665
04/07/10	12:00	1.0	20	0.1660
Add Distilled Water to the Specimen				
04/07/10	13:35	1.0	95	0.1945
04/08/10	6:45	1.0	1125	0.2075
04/08/10	7:15	1.0	1155	0.2075

Expansion Index (EI_{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	**42**

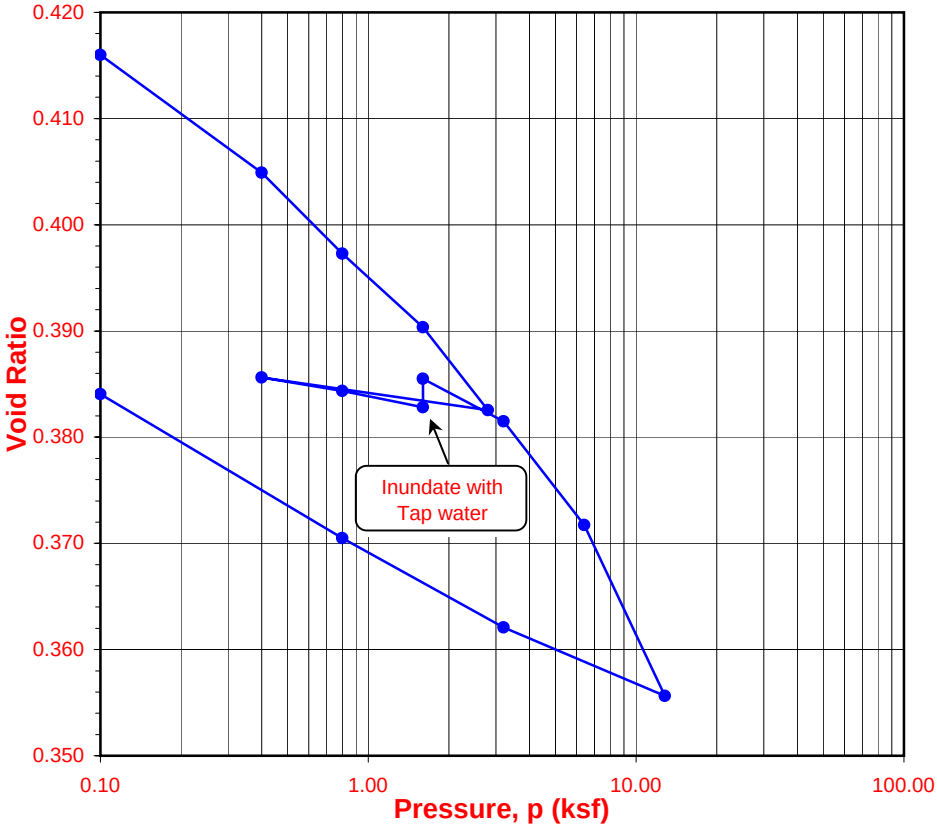
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS

(ASTM D 2435)

Leighton

Project Name:	Memorial Park	Tested By:	A. Santos	Date:	03/31/10
Project No.:	601795-001	Checked By:	J. Ward	Date:	04/09/10
Boring No.:	B-2	Depth (ft.):	25.0		
Sample No.:	R-3	Sample Type:	Drive		
Soil Identification:	Dark brown lean clay (CL)				

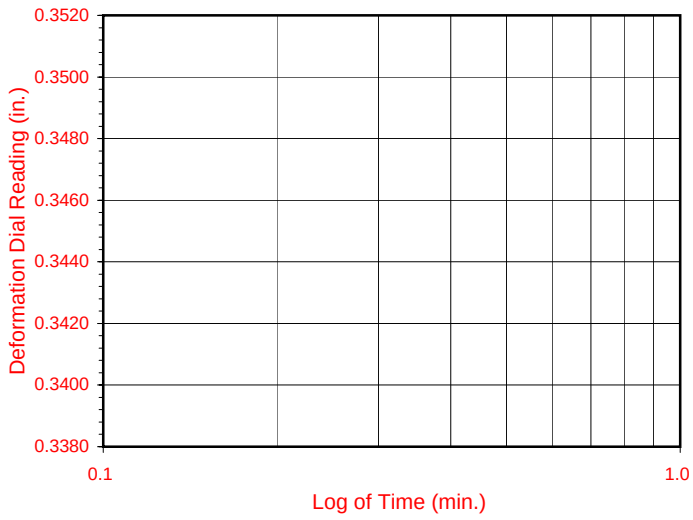
Sample Diameter (in.)	2.416
Sample Thickness (in.)	1.000
Wt. of Sample + Ring (g)	205.64
Weight of Ring (g)	43.25
Height after consol. (in.)	0.9749
Before Test	
Wt.Wet Sample+Cont. (g)	369.50
Wt.of Dry Sample+Cont. (g)	334.50
Weight of Container (g)	78.16
Initial Moisture Content (%)	13.7
Initial Dry Density (pcf)	118.7
Initial Saturation (%)	88
Initial Vertical Reading (in.)	0.2303
After Test	
Wt.of Wet Sample+Cont. (g)	409.31
Wt. of Dry Sample+Cont. (g)	386.19
Weight of Container (g)	204.33
Final Moisture Content (%)	16.68
Final Dry Density (pcf)	118.1
Final Saturation (%)	106
Final Vertical Reading (in.)	0.2032
Specific Gravity (assumed)	2.70
Water Density (pcf)	62.43

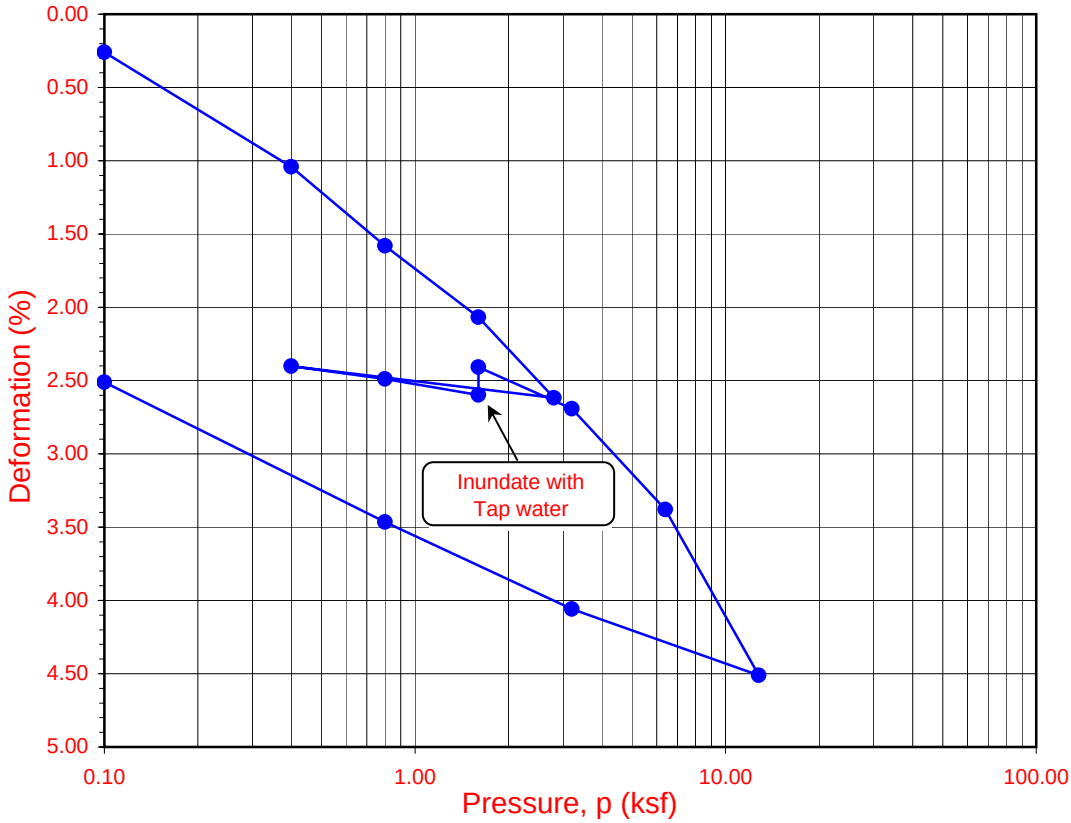


Pressure (p) (ksf)	Final Reading (in.)	Apparent Thickness (in.)	Load Compliance (%)	Deformation % of Sample Thickness	Void Ratio	Corrected Deforma-tion (%)
0.10	0.2277	0.9974	0.00	0.26	0.416	0.26
0.40	0.2193	0.9890	0.06	1.11	0.405	1.04
0.80	0.2134	0.9831	0.11	1.69	0.397	1.58
1.60	0.2079	0.9776	0.17	2.24	0.390	2.07
2.80	0.2016	0.9713	0.25	2.87	0.383	2.62
0.40	0.2057	0.9754	0.06	2.47	0.386	2.40
0.80	0.2043	0.9740	0.11	2.60	0.384	2.49
1.60	0.2026	0.9723	0.17	2.77	0.383	2.60
1.60	0.2045	0.9742	0.17	2.58	0.386	2.41
3.20	0.2006	0.9703	0.28	2.97	0.381	2.69
6.40	0.1923	0.9620	0.43	3.81	0.372	3.38
12.80	0.1792	0.9489	0.60	5.11	0.356	4.51
3.20	0.1854	0.9551	0.43	4.49	0.362	4.06
0.80	0.1926	0.9623	0.30	3.77	0.370	3.47
0.10	0.2032	0.9729	0.20	2.71	0.384	2.51

No Time Readings				
Date	Time	Elapsed Time (min)	Square Root of Time	Dial Rdgs. (in.)

No Time Readings





Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
B-2	**R-3**	**25.0**	**13.7**	**16.7**	**118.7**	**118.1**	**0.420**	**0.384**	**88**	**106**

Soil Identification: Dark brown lean clay (CL)

Leighton

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
(ASTM D 2435)

Project No.: 601795-001

Memorial Park

04-10

APPENDIX C
EARTHWORK AND GRADING GUIDE SPECIFICATIONS

Leighton

APPENDIX C

LEIGHTON CONSULTING, INC.
EARTHWORK AND GRADING GUIDE SPECIFICATIONS

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C-1.0 GENERAL

C-1.1 Intent

These Earthwork and Grading Guide Specifications are for grading and earthwork shown on the current, approved grading plan(s) and/or indicated in the Leighton Consulting, Inc. geotechnical report(s). These Guide Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the project-specific recommendations in the geotechnical report shall supersede these Guide Specifications. Leighton Consulting, Inc. shall provide geotechnical observation and testing during earthwork and grading. Based on these observations and tests, Leighton Consulting, Inc. may provide new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

C-1.2 Role of Leighton Consulting, Inc.

Prior to commencement of earthwork and grading, Leighton Consulting, Inc. shall meet with the earthwork contractor to review the earthwork contractor's work plan, to schedule sufficient personnel to perform the appropriate level of observation, mapping and compaction testing. During earthwork and grading, Leighton Consulting, Inc. shall observe, map, and document subsurface exposures to verify geotechnical design assumptions. If observed conditions are found to be significantly different than the interpreted assumptions during the design phase, Leighton Consulting, Inc. shall inform the owner, recommend appropriate changes in design to accommodate these observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include (1) natural ground after clearing to receiving fill but before fill is placed, (2) bottoms of all "remedial removal" areas, (3) all key bottoms, and (4) benches made on sloping ground to receive fill.

Leighton Consulting, Inc. shall observe moisture-conditioning and processing of the subgrade and fill materials, and perform relative compaction testing of fill to determine the attained relative compaction. Leighton Consulting, Inc. shall provide *Daily Field Reports* to the owner and the Contractor on a routine and frequent basis.

C-1.3 The Earthwork Contractor

The earthwork contractor (Contractor) shall be qualified, experienced and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Guide Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing grading and backfilling in accordance with the current, approved plans and specifications.

The Contractor shall inform the owner and Leighton Consulting, Inc. of changes in work schedules at least one working day in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that Leighton Consulting, Inc. is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish earthwork and grading in accordance with the applicable grading codes and agency ordinances, these Guide Specifications, and recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of Leighton Consulting, Inc., unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, adverse weather, etc., are resulting in a quality of work less than required in these specifications, Leighton Consulting, Inc. shall reject the work and may recommend to the owner that earthwork and grading be stopped until unsatisfactory condition(s) are rectified.

C-2.0 PREPARATION OF AREAS TO BE FILLED

C-2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies and Leighton Consulting, Inc.. Care should be taken not to encroach upon or otherwise damage native and/or historic trees designated by the Owner or appropriate agencies to remain. Pavements, flatwork or other construction should not extend under the “drip line” of designated trees to remain.

Leighton Consulting, Inc. shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 3 percent of organic materials (by dry weight: ASTM D 2974-00). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area. As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

C-2.2 Processing

Existing ground that has been declared satisfactory for support of fill, by Leighton Consulting, Inc., shall be scarified to a minimum depth of 6 inches (15 cm). Existing ground that is not satisfactory shall be overexcavated as specified in the following Section C-2.3 on

shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

C-2.3 Overexcavation

In addition to removals and overexcavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by Leighton Consulting, Inc. during grading. All undocumented fill soils under proposed structure footprints should be excavated

C-2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), (>20 percent grade) the ground shall be stepped or benched. The lowest bench or key shall be a minimum of 15 feet (4.5 m) wide and at least 2 feet (0.6 m) deep, into competent material as evaluated by Leighton Consulting, Inc.. Other benches shall be excavated a minimum height of 4 feet (1.2 m) into competent material or as otherwise recommended by Leighton Consulting, Inc.. Fill placed on ground sloping flatter than 5:1 (horizontal to vertical units), (<20 percent grade) shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.

C-2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by Leighton Consulting, Inc. as suitable to receive fill. The Contractor shall obtain a written acceptance (*Daily Field Report*) from Leighton Consulting, Inc. prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

C-3.0 FILL MATERIAL

C-3.1 Fill Quality

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by Leighton Consulting, Inc. prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to Leighton Consulting, Inc. or mixed with other soils to achieve satisfactory fill material.

C-3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 6 inches (15 cm), shall not be buried or placed in fill unless location, materials and

placement methods are specifically accepted by Leighton Consulting, Inc.. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 feet (3 m) measured vertically from finish grade, or within 2 feet (0.61 m) of future utilities or underground construction.

C-3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of Section C-3.1, and be free of hazardous materials ("contaminants") and rock larger than 3-inches (8 cm) in largest dimension. All import soils shall have an Expansion Index (EI) of 20 or less and a sulfate content no greater than (≤) 500 parts-per-million (ppm). A representative sample of a potential import source shall be given to Leighton Consulting, Inc. at least four full working days before importing begins, so that suitability of this import material can be determined and appropriate tests performed.

C-4.0 FILL PLACEMENT AND COMPACTION

C-4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill, as described in Section C-2.0, above, in near-horizontal layers not exceeding 8 inches (20 cm) in loose thickness. Leighton Consulting, Inc. may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers, and only if the building officials with the appropriate jurisdiction approve. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

C-4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM) Test Method D 1557-07.

C-4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density as determined by ASTM Test Method D 1557-07. For fills thicker than 15 feet (4.5 m), the portion of the fill deeper than 15 feet below proposed finish grade shall be compacted to 95 percent of the ASTM D 1557-07 laboratory maximum density. Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

C-4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet (1 to 1.2 m) in fill elevation, or by other methods producing satisfactory results acceptable to Leighton Consulting, Inc.. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of the ASTM D 1557-07 laboratory maximum density.

C-4.5 Compaction Testing

Field-tests for moisture content and relative compaction of the fill soils shall be performed by Leighton Consulting, Inc.. Location and frequency of tests shall be at our field representative(s) discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

C-4.6 Compaction Test Locations

Leighton Consulting, Inc. shall document the approximate elevation and horizontal coordinates of each density test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that Leighton Consulting, Inc. can determine the test locations with sufficient accuracy. Adequate grade stakes shall be provided.

C-5.0 EXCAVATION

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by Leighton Consulting, Inc. during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by Leighton Consulting, Inc. based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by Leighton Consulting, Inc. prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by Leighton Consulting, Inc..

C-6.0 TRENCH BACKFILLS

C-6.1 Safety

The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations. Work should be performed in accordance with Article 6 of the *California Construction Safety Orders*, 2003 Edition or more current (see also: http://www.dir.ca.gov/title8/sb4a6.html).

C-6.2 Bedding and Backfill

All utility trench bedding and backfill shall be performed in accordance with applicable provisions of the 2009 Edition of the *Standard Specifications for Public Works Construction* (Green Book). Bedding material shall have a Sand Equivalent greater than 30 (SE>30). Bedding shall be placed to 1-foot (0.3 m) over the top of the conduit, and densified by jetting in areas of granular soils, if allowed by the permitting agency. Otherwise the pipe bedding zone should be backfilled with Controlled Low Strength Material (CLSM) consisting of at least one sack of Portland cement per cubic-yard of sand, and conforming to Section 201-6 of the 2009 Edition of the *Standard Specifications for Public Works Construction* (Green Book). Backfill over the bedding zone shall be placed and densified mechanically to a minimum of 90 percent of relative compaction (ASTM D 1557-07) from 1 foot (0.3 m) above the top of the conduit to the surface. Backfill above the pipe zone shall **not** be jetted. Jetting of the bedding around the conduits shall be observed by Leighton Consulting, Inc. and backfill above the pipe zone (bedding) shall be observed and tested by Leighton Consulting, Inc..

C-6.3 Lift Thickness

Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to Leighton Consulting, Inc. that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method, and only if the building officials with the appropriate jurisdiction approve.

APPENDIX D
TIE-BACK TESTING PROCEDURES

1. Leighton Consulting, Inc. shall observe all tie-back anchor tests. A safe construction environment shall be provided by the Contractor during anchor testing.

2. The Contractor shall provide a calibrated jack for anchor testing, calibrated within 30 calendar days before the start of testing. Calibration must be performed by a City approved testing laboratory. Calibration documentation shall be submitted to Leighton Consulting, Inc. for anchor loading device(s) used at this site prior to the start of testing, and for no more than 30 day intervals thereafter.

3. Each tie-back anchor shall be tested to a minimum of 150% of the design load. For a test to pass, the anchor threadbar or strands (including threadbar or strand load stretching) shall not move more than 12-inches axially, during application of the test load from 0 to 150% of the design load. At 150% of the design load, the anchor axial movement shall not exceed 0.1 inch during a 15 minute static test period.

4. Unless otherwise approved by the City, ten percent of all tie-back anchors shall be tested at 200% of the design load. In addition, a representative sample of tie-back anchors shall be tested at a sustained 200% load for at least 24 hours. Axial extension of these 24-hour test anchors shall not exceed ¼-inch. These 200% test anchors may require additional steel threadbars or strands. Therefore, before installation, the Contractor and Leighton Consulting, Inc. shall designate which anchors are to be 200% test anchors, so that adequate anchor steel can be installed for safe testing.

5. No test shall be performed until anchor concrete has attained 100% of the design 28-day compressive strength, as indicated on the shoring plans. Tests shall be completed and the anchor locked off before Controlled Low Strength Material (CLSM – sand and Portland cement slurry) is placed in the portion of the shaft in the active wedge, between the anchor and soldier pile.

6. For anchors failing this and/or the designer's test criteria, the shoring designer shall be notified so that remedial measures can be undertaken.