Appendix A

Initial Study, Santa Clara SC-1 Data Center
(Feb. 2008)

Initial Study

Santa Clara SC-1 Data Center

File Numbers: PLN2007-06643

City of Santa Clara

February 2008

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SECTION 1 INTRODUCTION AND PURPOSE

This Initial Study of environmental impacts is being prepared to conform to the requirements of the California Environmental Quality Act (CEQA), the CEQA Guidelines (California Code of Regulations 15000 et. seq.), and the regulations and policies of the City of Santa Clara. This Initial Study evaluates the potential environmental impacts which might reasonably be anticipated to result from the construction of a 312,000 square foot internet data processing center on an approximately 16-acre site, and identifies mitigation measures included in the project.

The City of Santa Clara is the Lead Agency under CEQA and has prepared this Initial Study to address the impacts of implementing the proposed project.

SECTION 2 PROJECT INFORMATION

2.1 PROJECT TITLE

Santa Clara SC-1 Data Center Project

2.2 PROJECT LOCATION

The proposed project is located at 535-555 Reed Street and 500-520 Mathew Street, west of De la Cruz Boulevard, in Santa Clara (refer to Figures 1-3).

2.3 PROPERTY OWNER/PROPONENT

Xeres Ventures LLC
1212 New York Avenue, NW, Suite 900
Washington, DC 20005

2.4 LEAD AGENCY CONTACT

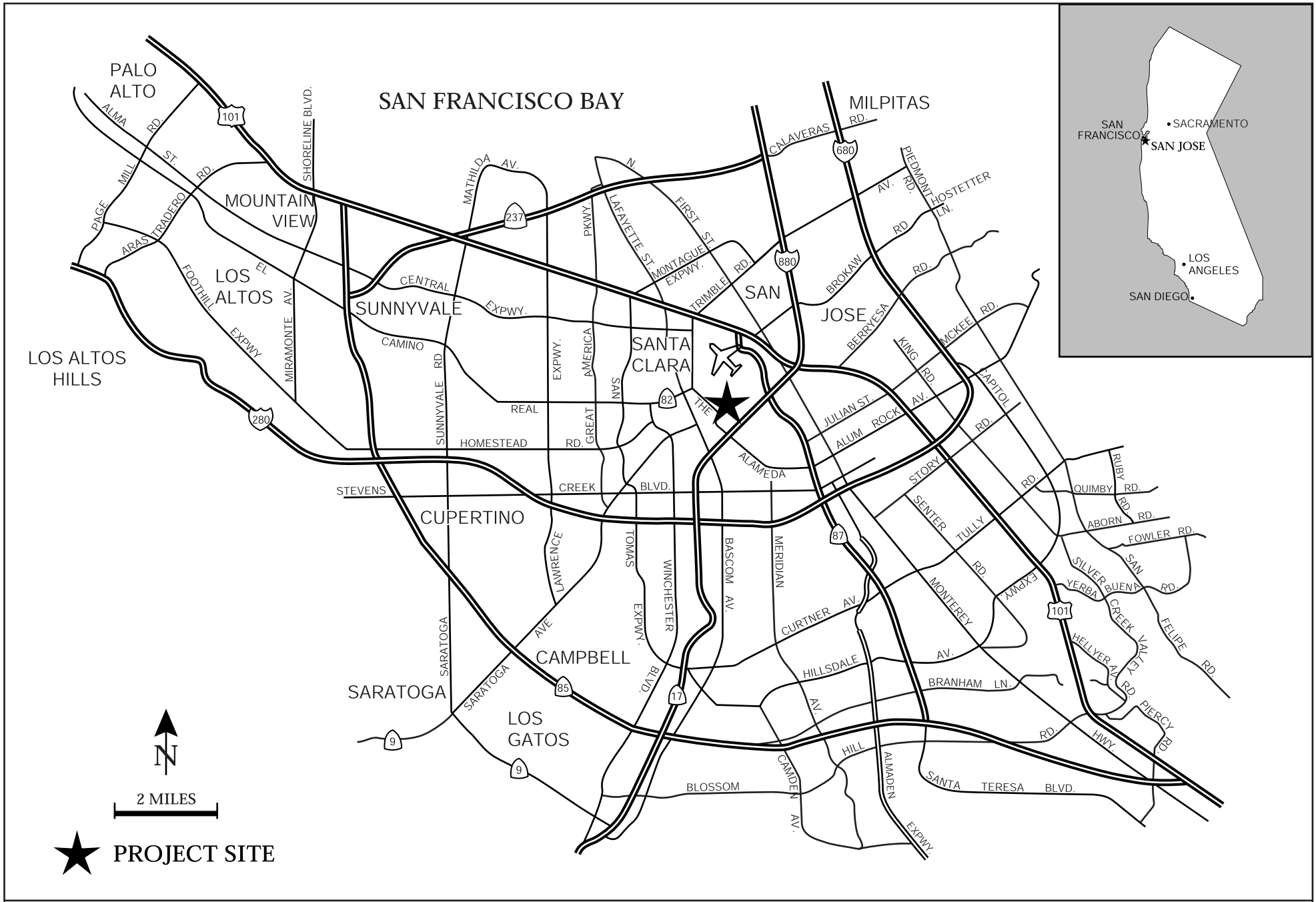
City of Santa Clara
Gloria Sciara, Development Review Officer
Planning Department
City of Santa Clara
1500 Warburton Avenue
Santa Clara, CA 95050

2.5 ASSESSOR'S PARCEL NUMBERS

230-03-075 and 230-03-080

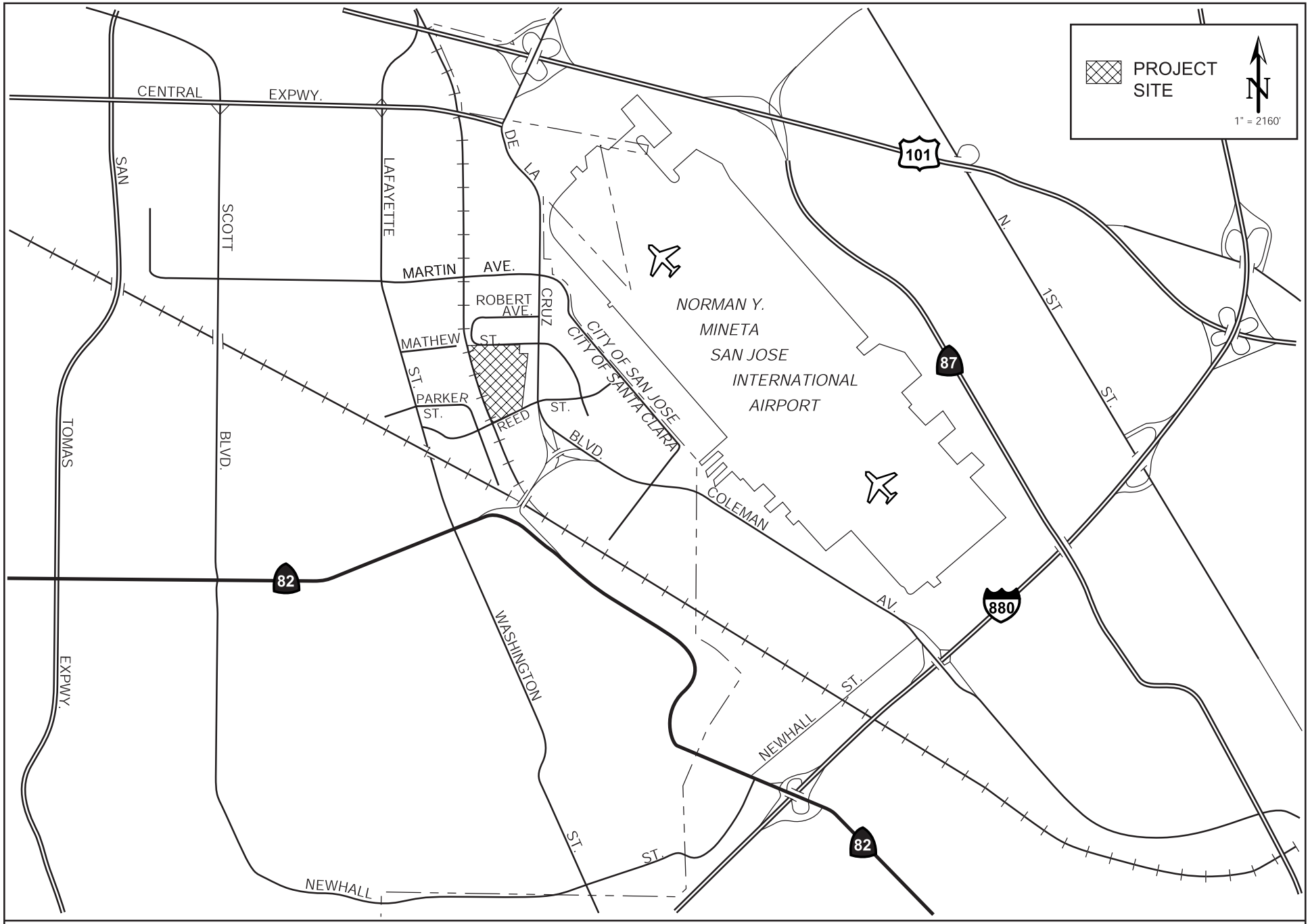
2.6 ZONING DISTRICT AND GENERAL PLAN DESIGNATIONS

Zoning District:	MH – Heavy Industrial
General Plan Designation:	Heavy Industrial



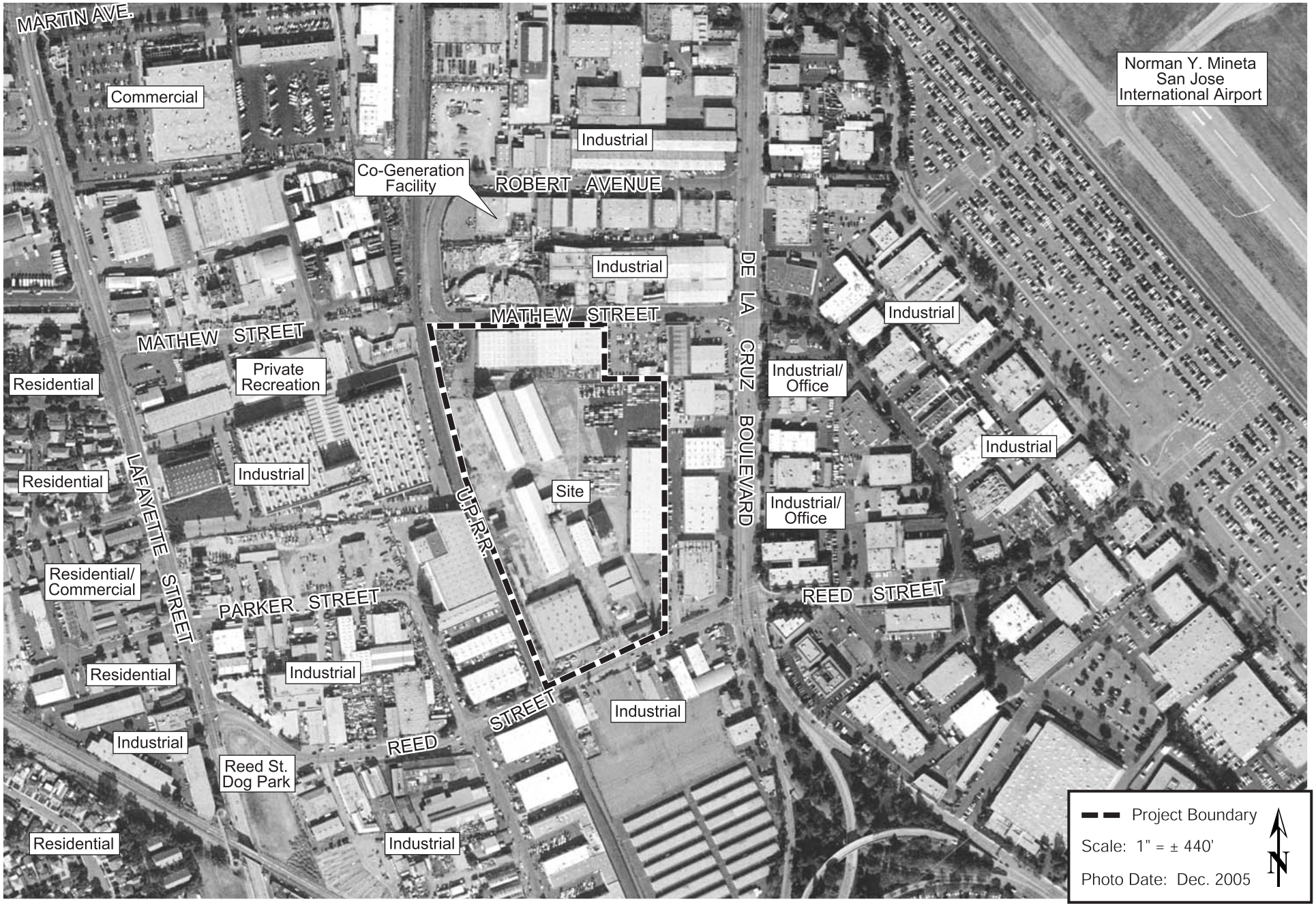
REGIONAL MAP

FIGURE 1



VICINITY MAP

FIGURE 2



AERIAL PHOTOGRAPH WITH SURROUNDING LAND USES

FIGURE 3

SECTION 3 PROJECT DESCRIPTION

3.1 SITE DEVELOPMENT

3.1.1 Data Center Uses

The project proposes to construct an approximately 312,000 square foot data center on a 16.1-acre site located on the north side of Reed Street, west of De la Cruz Boulevard, in the City of Santa Clara. The data center would house computer servers and supporting equipment for private clients, as well as associated office uses, in an environmentally controlled structure.

The proposed building would be two stories and approximately 48 feet in height. Mechanical equipment and computer servers would be housed on the first floor. The second floor would contain 14,087 square feet of offices and a 51,550 square foot penthouse enclosure for emergency backup generators. A loading dock would be constructed at the front of the building, facing south (see Figure 4).

Engine-generators (emergency backup generators) would be installed to provide for an uninterrupted power supply. Emergency backup electricity would be provided by 32 diesel fueled engine-generators located in a penthouse on the second floor of the building. The generators would provide up to 72 MW of electric power. Fuel for the generators would be stored in four 50,000-gallon underground diesel fuel tanks located under the parking lot on the eastern portion of the property.

Mechanical cooling for the data center equipment would be provided by two central chilled water plants supported by cooling towers located in the service yard in the rear of the building. Two 500,000-gallon chilled water storage tanks in the service yard would provide backup chilled water in the event of a disruption of the chiller system. Recycled water from South Bay Recycling is proposed to be used in the cooling towers.

A site plan of the proposed project is shown on Figure 4.

3.1.2 Electric Infrastructure Improvements and Public Land Dedication

The project proposes to construct an electrical primary substation and associated electrical equipment on the northeast portion of the site to provide for the electric demand of the proposed data center uses. The serving electric municipal utility, Silicon Valley Power, will route new 60kV loop feeders into and through the station along Mathew Street.

The 3-bay substation (three 30/40/50mVA 60kV-24.9kV step-down transformers) would have an all weather surface underlain by crushed granite. A post and panel precast screen wall, 15 feet in height, would surround the substation. Distribution of electrical power from the substation will be through three underground duct banks to supply the indoor distribution switchgear at 24.9kV.

Upon completion and testing of the new primary substation substation, approximately one-eighth acre of the site underlying the substation will be dedicated to the control and protection of Silicon Valley Power's 60kV loop. Electric switching equipment, owned and maintained by the project applicant, will be installed adjacent in the remainder of the yard (approximately 0.6 acre).

3.1.3 Site Clearing and Demolition

The project site is currently developed with structures associated with a lumber mill that formerly operated on the site. All of the structures currently on the site will be demolished and removed to accommodate the proposed development. The existing structures on the site are shown on Figure 5 and listed in Table 3.1-1.

Table 3.1-1
Existing Structures on the Project Site

#	Address	Building Type
1	555 Reed Street	Brick Masonry Building
2	535 Reed Street	Wood Frame Structure (Office Building)
3	535 Reed Street	Wood Frame Warehouse (Storage)
4	535 Reed Street	Dry Kiln Building
5	535 Reed Street	Metal Frame Warehouse (Mill)
6	535 Reed Street	Metal Frame Warehouse (Mill)
7	535 Reed Street	Metal Frame Building (Shop/Storage)
8	535 Reed Street	Metal Frame Warehouse (Lumber Storage)
9	535 Reed Street	Metal Frame Warehouse (Lumber Storage)
10	535 Reed Street	Metal Frame Warehouse (Lumber Storage)
11	535 Reed Street	Metal Frame Warehouse (Storage)
12	500-520 Mathew Street	Warehouse

3.1.4 Site Grading and Excavation

Building infrastructure, including electric lines, communication lines, and water lines serving mechanical equipment, will be installed under the building. To accommodate this infrastructure, soil beneath the proposed buildings would be excavated to a depth of approximately nine (9) feet below grade. The project proposes approximately 51,000 cubic yards of cut and and 51,000 cubic yards of fill (no or limited off-haul).

3.1.5 Site Access

Vehicle access to the project site would be from Reed Street and Mathew Street. Pedestrian access to the site would be provided by existing sidewalks on both streets.

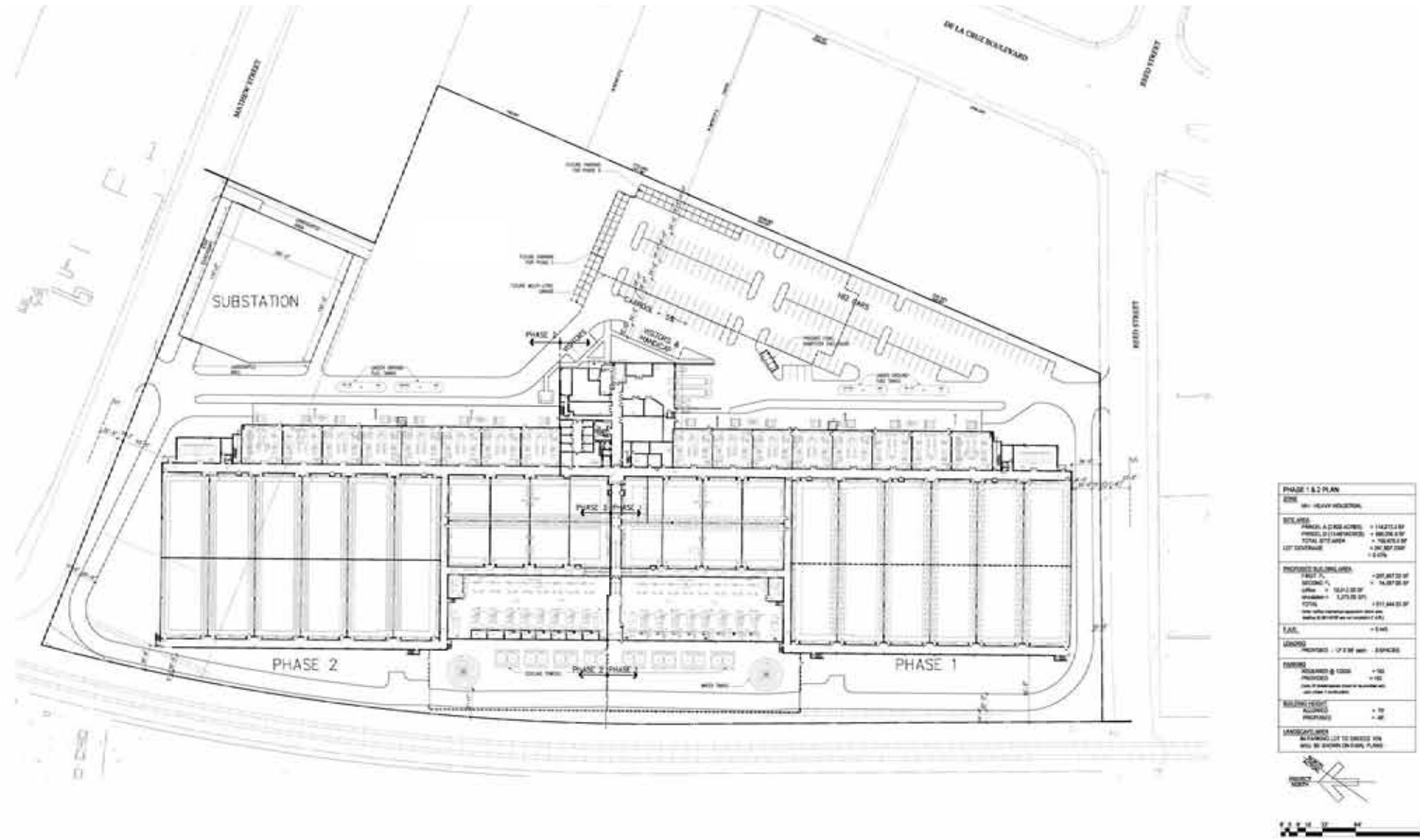
Emergency vehicle access would be provided around the perimeter of the building.

3.1.3 Parking

The project proposes to provide 182 parking spaces in a paved, surface parking lot located in the southeastern portion of the site.

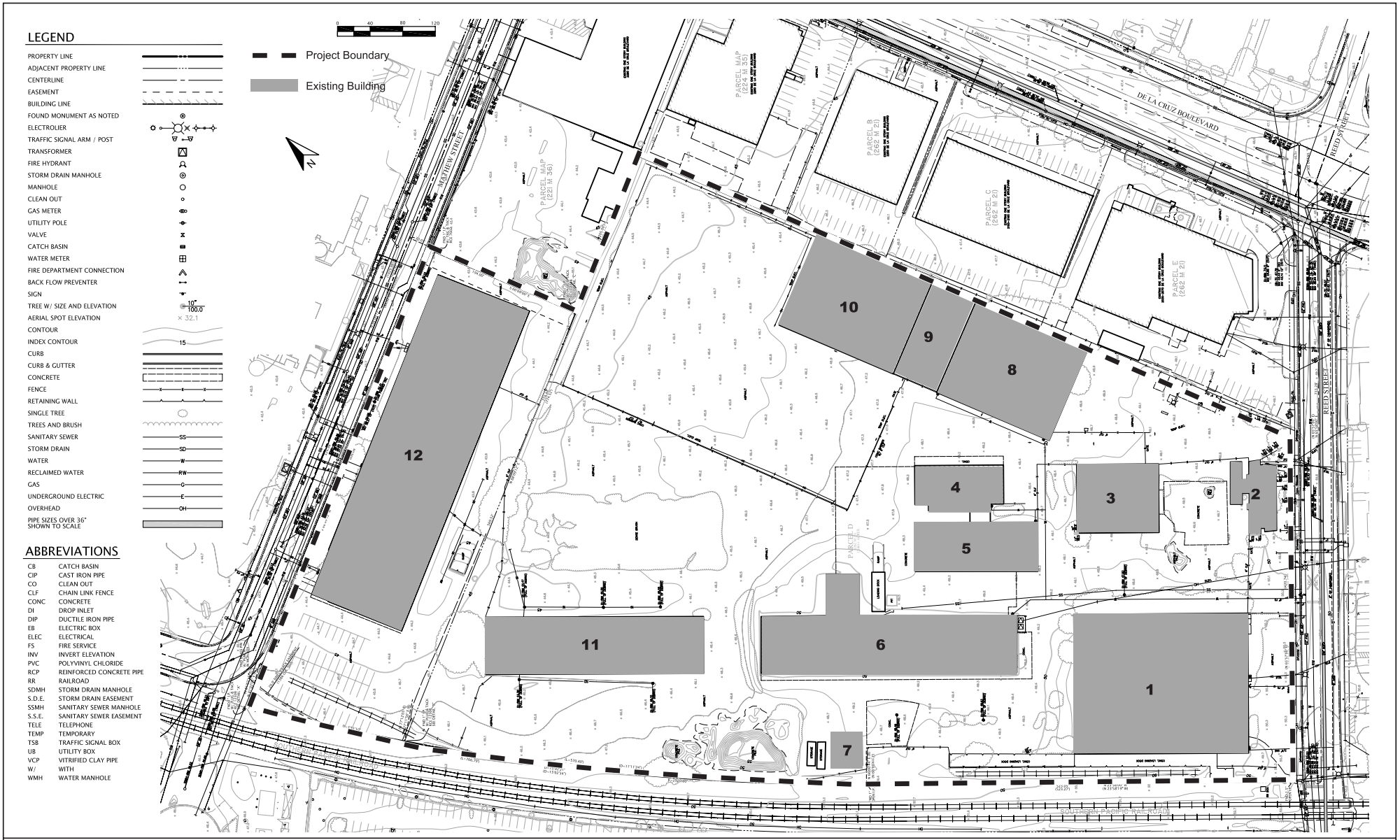
3.1.4 Phasing

The proposed project would be constructed in two phases. The southern half of the data center, including the central office, loading, and control/security areas, would be constructed during Phase 1, and the northern half would be constructed during Phase 2. The electric substation would be constructed during Phase 1. An 80,000 square foot area in the northeast corner of the site would



SITE PLAN

FIGURE 4



STRUCTURES TO BE REMOVED

FIGURE 5

remain vacant under the proposed project. Development of this area would be subject to subsequent environmental review by the City of Santa Clara at the time a specific proposal is submitted for review.

SECTION 4 ENVIRONMENTAL CHECKLIST AND DISCUSSION OF IMPACTS

This section describes the existing environmental conditions on and near the project area, as well as environmental impacts associated with the proposed project. The environmental checklist, as recommended in the California Environmental Quality Act (CEQA) Guidelines, identifies environmental impacts that could occur if the proposed project is implemented.

The right-hand column in the checklist lists the source(s) for the answer to each question. The sources cited are identified at the end of this section. Mitigation measures are identified for all significant project impacts. Measures that are standard and required by the City or law are categorized as "Standard Measures." Measures that are required to reduce significant impacts to a less than significant level are categorized as "Mitigation Measures."

4.1 AESTHETICS

4.1.1 Setting

The project site, a former lumber facility, is currently developed with buildings and paved surfaces. Landscape plantings are present in front of the existing single-story office building facing Reed Street. Views of the structures on the interior of the site from adjacent roadways are limited (see Photos 1-4).

The site is within a fully developed area in Santa Clara. The topography is flat and views of the eastern foothills are partially blocked by existing industrial and commercial structures in the area. An auto repair facility utilizes the Reed Street frontage for vehicle parking and storage.

Visually, the area is predominantly industrial in character. Structures along local and arterial streets include one and two-story masonry or metal warehouses and multiple tenant light industrial and commercial strip buildings. A large paperboard manufacturing company and energy co-generation facility, characterized by tall piles of bundled cardboard, venting steam, metal and masonry buildings, and vehicular activity associated with paperboard handling, is located just north of the site. The mainline Union Pacific Railroad tracks are located adjacent to the site and Norman Y. Mineta San José International Airport is located approximately 0.4 miles east of the site. Aircraft and train activity, along with truck and other vehicle traffic, is readily apparent in the area.

The project site is not located near a scenic highway or scenic vista.

Photo 1 - View of warehouse at 555 Reed Street.

Photo 2 - View of 555 Reed Street, looking northwest.

PHOTOS 1 AND 2

Photo 3 - Office building at 535 Reed Street.

Photo 4 - Former mill and warehouse in the interior of the site, looking west.

PHOTOS 3 AND 4

4.1.2 Environmental Checklist and Discussion of Impacts

AESTHETICS					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project:					
1) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐	1
2) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐	1,2
3) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐	1
4) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐	1

The proposed project would demolish the existing structures and construct a large industrial type building in two phases. The building would be approximately 48 feet in height. Views of the building from De La Cruz Boulevard would be substantially blocked by existing buildings fronting this arterial street. The building would be constructed roughly perpendicular to Reed Street and Mathew Street. Landscaping, including 12 36-inch trees, would be planted on the Reed Street frontage. This would soften views of the southern end of the building when viewed from the street.

The new building will be subject to the City's design review process and will conform to current architectural and landscaping standards. The proposed two-story building will be set back approximately 20 feet from Reed Street and 53 feet from Mathew Street and will be generally consistent with adjacent industrial and commercial development in terms of size and scale, although the footprint of the proposed building is larger than nearby business. Replacement of the existing structures with a new building and landscaping that conform to the standards established for the area is not anticipated to adversely affect visual quality in the area.

The project is bordered by industrial and commercial development and the Union Pacific Railroad track. The project would include outdoor lighting similar to that found on industrial properties in the area and would be required to limit spillover onto adjacent properties. The exterior surfaces of the building would not be a significant source of glare during daytime hours. The project would not substantially change day or nighttime views in the area.

4.1.3 Conclusion

The proposed project would not result in significant, adverse visual or aesthetic impacts. **[Less Than Significant Impact]**

4.2 AGRICULTURAL RESOURCES

4.2.1 Setting

According to the Santa Clara County Important Farmland 2004 Map, the project site is designated *Urban and Built-Up Land. Urban and Built-Up Land* is defined as residential land with a density of at least six units per 10-acre parcel, as well as land used for industrial and commercial purposes, golf courses, landfills, airports, sewage treatment, and water control structures. Currently, the project site is not used for agricultural purposes.

4.2.2 Environmental Checklist and Discussion of Impacts

AGRICULTURAL RESOURCES					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project:					
1) 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?	☐	☐	☐	☒	1,4
2) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒	1,3,4
3) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☐	☒	1,4

The project site is not currently used for agricultural purposes and is not designated as farmland of any type. For these reasons, the proposed project would not result in a significant impact on agricultural resources.

4.2.3 Conclusion

The proposed project would not result in impacts to agricultural resources. **[No Impact]**

4.3 AIR QUALITY

The following discussion is based in part upon air quality modeling completed by *AMEC Earth and Environmental, Inc.* Copies of the Ambient Air Quality Standards Modeling Report and an air quality modeling discussion are provided in Appendix A.

4.3.1 Setting

4.3.1.1 *Local and Regional Air Quality*

Air quality and the amount of a given pollutant in the atmosphere are determined by the amount of pollutant released and the atmosphere's ability to transport and dilute the pollutant. The major determination of transport and dilution are wind, atmospheric stability, terrain, and for photochemical pollutants, sun light.

The project site is within the San Francisco Bay Area Air Basin. The Bay Area Air Quality Management District (BAAQMD) is the regional government agency that monitors and regulates air pollution within the air basin.

Both the U.S. Environmental Protection Agency and the California Air Resources Board have established ambient air quality standards for common pollutants. These ambient air quality standards are levels of contaminants which represent safe levels that avoid specific adverse health effects associated with each pollutant. The ambient air quality standards cover what are called "criteria" pollutants because the health and other effects of each pollutant are described in criteria documents. The major criteria pollutants are ozone, carbon monoxide, nitrogen dioxide (NOx) sulfur dioxide, and particulate matter.

Three pollutants are known at times to exceed the state and federal standards in the project area: ozone, particulates (PM_{10}), and carbon monoxide. Both ozone and PM_{10} are considered regional pollutants because their concentrations are not determined by proximity to individual sources, but show a relative uniformity over a region. Carbon monoxide is considered a local pollutant because elevated concentrations are usually only found near the source (e.g., congested intersections).

In addition to the criteria pollutants discussed above, Toxic Air Contaminants (TACs) are another group of pollutants of concern. There are many different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor exhaust. Cars and trucks release at least forty different toxic air contaminants. The most important, in terms of health risk, are diesel particulate, benzene, formaldehyde, 1,3-butadiene and acetaldehyde. Public exposure to TACs can result from emissions from normal operations, as well as accidental releases.

Sensitive Receptors

BAAQMD defines sensitive receptors as facilities where sensitive receptor population groups (children, the elderly, the acutely ill and the chronically ill) are likely to be located. These land uses include residences, school playgrounds, childcare centers, retirement homes, convalescent homes, hospitals and medical clinics. The closest sensitive receptors are:

- A private, indoor soccer facility located at 500 Mathew Street, approximately 500 feet west of the site;
- Multi-family residences on the west side of Lafayette Street near Reed Street, approximately 1,100 feet west of the site;
- Multi-family (loft) residences on the east side of Lafayette Street opposite Reeve Street, approximately 1,100 feet southwest of the site; and
- Single family residences in the vicinity of Lafayette Street and Di Giulio Avenue and Lafayette Street and Parker Court, approximately 1,100-1,200 feet west of the site;

The closest school to the site, Scott Lane Elementary School (K-5), is located at 1925 Scott Boulevard, approximately 4,000 feet (0.8 miles) west of the site.

A public park, the City of Santa Clara Reed Street Dog Park (east side of Lafayette at Reed Street) is located approximately 1,100 feet west of the site.

4.3.2 Environmental Checklist and Discussion of Impacts

AIR QUALITY					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project:					
1) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐	1,5
2) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐	1,5
3) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is classified as non-attainment under an applicable federal or state ambient air quality standard including releasing emissions which exceed quantitative thresholds for ozone precursors?	☐	☐	☒	☐	1,5
4) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐	1,5
5) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒	1

4.3.2.1 *Long-Term Air Quality Impacts*

BAAQMD has established thresholds for what would be considered a significant addition to existing air pollution. According to the BAAQMD CEQA guidelines, a project that generates more than 80 pounds per day of ozone precursors (i.e., reactive organic gases (ROG) and nitrogen oxides) is considered to have a potentially significant impact on regional air quality. On an annual basis, the threshold is 15 tons per year.

Mobile Sources of Emissions

The BAAQMD generally does not recommend a detailed air quality analysis for projects generating less than 2,000 vehicle trips per day, unless warranted by the specific nature of the project setting.[1] An estimated 20-50 vehicles would be parked at the site at any one time and daily project trips are estimated to be less than 200-300. The proposed project, construction and operation of a 312,000 square foot data center, is not anticipated to generate 2,000 new daily vehicle trips, and, therefore, a detailed air quality analysis for mobile sources of air emissions was not completed.

Stationary Sources of Emissions

The project would install two boilers to provide space heating. The project would also install 32 diesel-powered engine-generators to provide power in case of electrical service interruption. Boilers and emergency diesel-powered generators are stationary sources that are subject to the rules and regulations of the local air pollution control district, the Bay Area Air Quality Management District. BAAQMD rules require the use of low-NOx boilers. The BAAQMD's Risk Management Policy for Diesel Engines also provides criteria for approval of projects that emit diesel particulates, based on the calculated incremental cancer risk and diesel emission control technology employed.

Emissions associated with the project (operation of boilers and diesel-fueled engine-generators) will be subject to the permit requirements of the Bay Area Air Quality Management District. The District's rules and regulations that will pertain to the project include:

- Regulation 2, Rule 1, General Requirements
- Regulation 2, Rule 2, New Source Review
- Regulation 6, Particulate Matter and Visible Emissions
- Regulation 9, Rule 7 Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters
- Regulation 9, Rule 8, Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines

The project proposes to install a total of 32 diesel fueled engine-generators at the data center facility. All 32 engine-generators would use ultra low sulfur diesel as fuel (< 15 parts per million sulfur by weight). Each engine-generator consists of a Detroit Diesel MTU Model 16V4000G83 engine that produces 3,848 brake horsepower (bhp) to produce 2500 kW electric from the generator output terminals. Each engine-generator will be equipped with selective catalytic reduction (SCR) technology using urea as the ammonia source. Based on the expected operation and allowing for SCR warm-up time, overall NOx control is about 65% for operation above cool down/idling mode. In cool down/idling mode, no credit was taken for SCR control of NOx because exhaust temperature may be below the minimum SCR catalyst temperature.

[1] Bay Area Air Quality Management District. BAAQMD CEQA Guidelines. December 1999.

Four, 1.4 MMBTU/hr gas-fired furnaces (boilers) are also proposed for heating at the data center facility. No emissions controls are proposed for the gas-fired boilers.

Local Criteria Pollutant-Carbon Monoxide

Emissions of carbon monoxide (CO) from the new boilers were estimated using the Screen 3 model, based on emission factors for the proposed boilers and estimated natural gas consumption.[2] Modeling for the boilers and generators showed that the maximum 1- hour and 8-hour average carbon monoxide using the worst-case Screen3 modeling assumptions would not exceed National Ambient Air Quality Standards (refer to Table 4.3-1).

Table 4.3-1
Predicted Carbon Monoxide Concentrations[1]
at 73 meters (~240 feet) from Source

Source or Standard	Predicted Concentration µg/m^3	
	1-hour	8-hour[1]
Predicted Concentrations SC1 Site	5,202	3,641
NAAQ Standard	40,000	10,000

[1]Worst-case results for 32 diesel-fueled engine-generators operating at 100% load.
[2] 8-hour average concentration is equal to 1-hour average concentration times 0.7.

Source: Screen3 Modeling in AMEC. *National Ambient Air Quality Standards Modeling Report.* November 20, 2007.

Regional Criteria Pollutants

Stationary source and vehicular emissions from the project would represent new air pollutant emissions within the entire San Francisco Bay Air Basin. Emissions of NOx, ROG and PM10 are also known as regional emissions.

Emissions of the criteria pollutants from the new boilers were estimated based on emission factors for the proposed boilers and estimated natural gas consumption.[3] Emissions from the emergency generators were estimated based maximum annual operating time of 100 hours per year for routine testing. A summary of estimated emissions is provided in Table 4.3-2.

[2] Source: National Air Quality Standards (NAAQS) Modeling Report for the SC1 Data Center, prepared by AMEC Earth and Environmental, Inc., November 20, 2007.
[3] Source: AMEC Earth and Environmental, Inc., National Air Quality Standards (NAAQS) Modeling Report for the SC1 Data Center, November 20, 2007.

Table 4.3-2 Project Regional Emissions (Tons Per Year)			
	Reactive Organic Compounds (ROC)	**Nitrogen Oxides (NO_x)**	**Respirable Particulate Matter (PM_{10})**
Stationary Sources			
Gas Fired Boilers	0.08	0.73	0.06
Engine-Generators (testing and maintenance only)	1.12	9.45	0.35
Vehicle Trips	n/a	n/a	n/a
Area Sources*	n/a	n/a	n/a
Total	1.20	10.18	0.41
BAAQMD Significance Threshold	15	15	15
Significant?	No	No	No
*Area Sources are estimated emissions from natural gas, landscaping activities, consumer products, and architectural coatings within the proposed redevelopment.			

Estimated emissions from the project would not exceed the BAAQMD thresholds of significance of 15 tons per year for ROG, NO_x or PM_{10}.

For a project that does not individually have significant operational air quality impacts, the determination of a significant cumulative air quality impact is based upon an evaluation of the consistency of the project with the local general plan and of the general plan with the most current Clean Air Plan (CAP). The proposed project, redevelopment of an industrial site, is consistent with the City of Santa Clara general plan and the assumptions in the current CAP. The project, therefore, would not result in a significant cumulative impact.

Although not a significant project impact, the project includes the following measures to reduce air pollutant emissions and the project's contribution to cumulative emissions in the San Francisco Bay Area:

- Engine-generators will be Tier 2 compliant (low-NO_x);
- Selective catalytic reduction (SCR) units will be installed on each engine;
- Use of ultra-low sulfur diesel (ULSD) fuel; and
- All equipment engines shall be maintained in good condition, in proper tune (per manufacturer's specifications), and in compliance with all State and Federal requirements.

Toxic Air Contaminants

The project includes installation of diesel-powered emergency backup generators. Diesel-fueled engines, including those in emergency generators, emit compounds considered to be toxic air contaminants, with diesel particulate emissions having the greatest risk factor of these compounds.

As noted above, installation of the proposed diesel-fueled backup generators will be subject to the permit requirements of BAAQMD and Regulation 2, Rule 1, Regulation 2, Rule 2, and Regulation 9,

Rule 8. The generators would be run for short periods for testing and maintenance purposes (up to 100 hours per year) and otherwise would not operate unless there was a power failure.

The project proposes to install generators that meet California Air Resources Board Risk Guidance requirements regarding emissions below health risk thresholds (an increased cancer risk greater than 10 per million for either residential or workplace receptors), in conformance with BAAQMD requirements. Surrounding uses are industrial and commercial facilities and the closest residential receptors are more than 1,000 feet from the proposed facility. A nearby recreational facility (Off-the-Wall Soccer) is used by both children and adults; however, possible exposures would be reduced by the intermittent and short-term use of the recreational facility by individual users and the limited hours of engine generator testing. For these reasons, the operation of the proposed engine-generators on the project site, in conformance with BAAQMD requirements, is not anticipated to result in significant emissions of toxic air contaminants or substantial new health risks to workers at nearby industrial sites.

4.3.2.2 *Short-Term Air Quality Impacts*

Construction-related air quality impacts associated with the proposed project are the result of dust creating activities, exhaust emissions of construction equipment and the use of typical construction materials such as solvents, paints and other construction materials that tend to volatilize into the atmosphere. Due to the negligible amount and short duration of these impacts, all are considered to be less than significant, except for the activities generating dust.

Construction activities such as excavation and grading operations and construction vehicles driving over and wind blowing over exposed earth, generate fugitive particulate matter that will affect local and regional air quality. The effects of these dust generating activities will be increased dustfall and locally elevated levels of PM_{10} downwind of construction activity. Construction dust also has the potential for creating a nuisance at nearby properties.[4] If uncontrolled, dust generated by construction activities could be a significant impact.

Impact AIR-1: Construction-generated dust, if uncontrolled, could result in a significant air quality impact. **[Significant Impact]**

<u>Mitigation and Avoidance Measures:</u>

MM AIR-1.1: The proposed project includes the following mitigation measures to reduce project construction impacts to a less than significant level.

- BAAQMD has prepared a list of feasible construction dust control measures that can reduce construction impacts to a level that is less than significant. The following construction practices shall be implemented during construction of the proposed project:
    - Water all active construction areas at least twice daily.
    - Cover all trucks hauling soil, sand, or other loose materials or require all trucks to maintain at least two feet of freeboard.

[4] The word nuisance is used in this Initial Study to mean "annoying, unpleasant or obnoxious" and not in its legal sense.

- Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction site.

- Sweep streets daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.

- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.

- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).

- Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.)

- Install sandbags or other effective erosion control measures to prevent silt runoff to public roadways.

- Replant vegetation in disturbed areas as quickly as possible.

4.3.3 Conclusion

The proposed project would not result in significant long-term regional or local air quality impacts**.** Short-term air quality impacts associated with construction would be reduced to less than significant levels with the implementation of standard construction measures and mitigation measures. **[Less Than Significant Impact with Mitigation]**

4.4 BIOLOGICAL RESOURCES

4.4.1.1 *Existing Habitat*

The project site is developed with 12 industrial structures and an office building. Pavement covers most of the remainder of the site. Limited landscaping is present around the office facing Reed Street (refer to Photos 1-4). The site is surrounded by industrial and commercial development with limited cover and foraging habitat for wildlife. The closest open area to the project site is the grassland surrounding the runways at the Norman Y. Mineta San José International Airport, approximately 0.5 miles from the site.

Wildlife habitats in such developed urban areas are low in species diversity. Species that use the habitat on the site are predominantly urban adapted birds, such as rock doves, mourning doves, house sparrows, finches, and starlings.

4.4.1.2 *Special Status Species*

Special status plant and wildlife species are not resident on the highly urbanized project site, although raptor (birds of prey) could use the trees adjacent to the office building on the site for nesting or as a roost. Raptors are protected by the Federal Migratory Bird Treaty Act (MBTA) (16 U.S.C. Section 703, Supp. I., 1989). No special status animal or plant species are located on the project site.

4.4.1.3 *Trees*

Trees on the site were evaluated by Paul Reed, Reed Associates Landscape Architecture in November 2007.

Five mature landscape trees are present surrounding the office building at 535 Reed Street. A summary of tree species, size, and condition is provided in Table 4.4-1, below.

Table 4.4-1
Summary of Trees on the Project Site

Tree	Diameter in Inches	Condition
Coast Redwood	24”	Good
Coast Redwood	20”	Good
Coast Redwood	10”	Good
Peruvian Pepper	24”	Poor/Fair
Southern Magnolia	11”	Fair/Good

4.4.2 Environmental Checklist and Discussion of Impacts

BIOLOGICAL RESOURCES					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project:					
1) 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?	☐	☒	☐	☐	1,2
2) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☒	☐	1,2
3) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒	1,2
4) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, impede the use of native wildlife nursery sites?	☐	☐	☒	☐	1,2
5) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☒	☐	☐	1,2
6) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☒	☐	1,2

4.4.2.1 *Impacts to Habitats*

Because of the history of development on site, no natural or sensitive habitats are present on the project site. As a result, no substantial impacts to natural plant communities or habitats would occur as a result of the proposed project.

4.4.2.2 Impacts to Special Status Species

As previously discussed, special status plant and wildlife species are not expected on this previously developed site. Urban adapted raptors (birds of prey) could use the trees adjacent to the office building on the site for nesting, however. Potential construction impacts to nesting raptors are discussed below.

Potential Construction Impacts to Nesting Raptors

The several large redwood trees on-site provide potential nesting habitat for tree-nesting raptors. If tree-nesting raptors were to nest on the site, construction activities could result in the abandonment of active nests or direct mortality to these birds. Nesting birds, including raptors, are protected by the California Department of Fish and Game Code 3503, which reads, "It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto." Construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or could otherwise lead to nest abandonment. Nest abandonment and/or loss of reproductive effort caused by disturbance are considered "take" by the CDFG, and therefore would constitute a significant impact.

Impact BIO-1: Although unlikely at this location, tree removal during the nesting season could impact protected raptors. Any loss of fertile bird eggs, or individual nesting birds, or any activities resulting in nest abandonment during construction, would constitute a significant impact. **[Significant Impact]**

<u>Mitigation and Avoidance Measure:</u>

MM BIO-1.1: The following mitigation and avoidance measures will avoid possible impacts to tree-nesting raptors during construction:

- Removal of the trees on-site, as part of a proposed project, could be scheduled between October and December (inclusive) to avoid the raptor nesting season and no additional surveys would be required.

- If removal of the trees on-site would take place between January and September, a pre-construction survey for nesting raptors will be conducted by a qualified ornithologist to identify active nesting raptor nests that may be disturbed during project implementation. Between January and April (inclusive) pre-construction surveys will be conducted no more than 14 days prior to the initiation of construction activities or tree relocation or removal. Between May and August (inclusive), pre-construction surveys will be conducted no more than thirty (30) days prior to the initiation of these activities. The surveying ornithologist shall inspect all trees in and immediately adjacent to the construction area for raptor nests. If an active raptor nest is found in or close enough to the construction area to be disturbed by these activities, the ornithologist shall, in consultation with the State of California, Department of Fish & Game (CDFG), designate a

construction-free buffer zone (typically 250 feet) around the nest until the end of the nesting activity.

- The applicant shall submit a report indicating the result of the survey and any designated buffer zones to the satisfaction of the Director of Planning and Inspection prior to the issuance of a tree removal permit by the City Arborist.

4.4.2.3 Impacts to Mature Trees

The proposed project would remove four existing trees, three coast redwoods and a Peruvian pepper, from the Reed Street frontage. Volunteer trees, including tree of heaven and fan palm, would also be removed from several locations in the interior of the site.

The project will replace removed trees on-site with new trees, including native and drought-resistant species. The project would plant trees, shrubs and ground cover at the perimeter of the site and in parking areas. Trees would be planted along both the Reed Street and Mathew Street. Tree species to be planted include coast live oak, London Plane tree, *Arbutus 'marina'*, Chinese elm, golden raintree, flowering pear, and Arizona cypress. Approximately 248 new trees would be planted on the site in containers ranging from 15-gallon to 36-inch box size.

The City of Santa Clara does not have an adopted tree ordinance, although Santa Clara's *General Plan 2000-2010*[5] lists several tree-related policies and programs, including programs to develop a tree protection ordinance, continue the City's street tree program, and to require landscaping in all private development (with emphasis on native and drought-tolerant landscaping). In accordance with City policy, the project will be required to replace the trees removed, per the conditions of approval of a tree removal permit. The project shall provide replacement for all trees removed from the Reed Street frontage by planting 36-inch box specimen trees along Reed Street, as coordinated with the City Arborist.

4.4.3 <u>Conclusion</u>

Potential impacts to nesting raptors will be reduced to a less than significant level with the implementation of the mitigation measures included in the project. **[Less Than Significant Impact with Mitigation]**

[5] See Chapter 5: *Environmental Quality Element, Flora and Fauna,* Sections 5.3.1 and 5.13.2.

4.5 CULTURAL RESOURCES

The discussion in this section is primarily based on three technical reports. The potential for buried prehistoric and historic resources on the site are evaluated in an archaeological literature review (2001) and an archaeological testing and evaluation plan (2007) for the project site prepared by *Holman and Associates, Archaeological Consultants*. A Historic Evaluation Report prepared by *Ward Hill, Consulting Architectural Historian* in April 2001 addresses the historic significance of existing structures on the site.[6] Copies of the archaeological literature review and archaeological testing and evaluation plan are on-file with the City of Santa Clara. The Historic Evaluation Report is provided in Appendix B.

4.5.1 Setting

4.5.1.1 *Buried Prehistoric and Historic Resources*

The site is located within an area sensitive for prehistoric archaeological resources due to its proximity to the Guadalupe River. The site is approximately one mile east of the current Guadalupe River channel. There are at least two reported historical or archaeological sites within one-half mile of the site.

Father Junipero Serra founded the original Mission Santa Clara de Asis on the banks of the Guadalupe River in January 1777. The mission was the eighth of the 21 missions founded during the Spanish Period in California. The first mission location is near Central Expressway and De La Cruz Boulevard in Santa Clara and is reported to have been a temporary arbor/chapel. A mission church constructed nearby at a second site was destroyed by a flood in 1779. The cemetery associated with the church continued to be used until the Mission was moved to a third location near the University of Santa Clara. Development near these first mission locations included corrals, an irrigation ditch, and a pozo, or water well.

Buried historic resources associated with the construction of the first and second Mission Santa Clara sites are possible in the project area. The location of the first Mission Santa Clara may have been approximately one-half mile north of the site and the second location is believed to have been in the vicinity of the historic marker at De La Cruz Boulevard and Martin Avenue, approximately one-quarter mile northeast of the site. Possible historic elements that could occur on the site include buildings associated with the first Mission and its cemetery, corrals which were surrounded by a ditch and a 5,000-foot long irrigation ditch and a well (referred to as a *pozo*). A house known as the "Mehrs House" was reported either on the site or in the vicinity in 1866 during the American Period, although it is not shown on maps in 1873.

4.5.1.2 *Historic Context and Structures on the Project Site*

The Pacific Redwood Casket Company originally developed the property at 535-555 Reed Street in 1945. This firm was the coffin manufacturing division of one of the largest lumber manufacturing firms in the region at the time, the Pacific Manufacturing Company.

[6] The conclusions in the evaluation on the historic significance and architectural integrity of the structures on the site have not changed since the evaluation was completed in 2001 (Ward Hill, personal communications, October 2007).

The company was incorporated in 1880. It was formed from the Enterprise Mill & Lumber Company founded in 1874 and purchased by James Pierce in 1879. The Enterprise Mill & Lumber Company was located at Bellomy Street and The Alameda in the City of Santa Clara.

The owner of Pacific Manufacturing Company, James Pierce, was born in 1824 and came to California in 1854. He had hydraulic mining interests in Yuba County until 1878 and owned the famous Empire Mine in Grass Valley before selling to the Bourn Family in 1872. He purchased a home in Santa Clara on 88 acres, part of which later became the Carmelite Monastery.

Pacific Manufacturing purchased the Pacific Casket Company in San Francisco in 1888 and had offices in Santa Clara, San Francisco, Oakland and later in Sacramento. When James Pierce died in 1897, Frank Madison became the company President.

At the turn of the 20th Century, Pacific Manufacturing employed 500 men and had expanded its original Enterprise Mill & Lumber Company site on The Alameda to 15 acres. After a month of repairs due to damage from the 1906 earthquake, the Santa Clara facilities operated 16 hours a day to supply lumber for temporary buildings for displaced San Francisco residents and businesses. The company also opened a branch in Los Angeles in 1920 in response to the building boom after World War I.

In 1933, the Pacific Redwood Casket Company was formed from the merger of the casket businesses within the Pacific Manufacturing Company and the Pacific Lumber Company. The casket company had a separate office from Pacific Manufacturing at 2698 The Alameda. In 1944, Pacific Manufacturing needed more warehouse space at the Santa Clara mill on The Alameda. The casket company was sold to a newly organized corporation that built the plant in 1945 at 555 Reed Street, in an area known as the Laurelwood Farm subdivision. The original $50,000 plant included two lumber storage buildings and the brick manufacturing/ office building at 555 Reed Street. The hollow tile, drying kiln and boiler were constructed on the site in 1951.

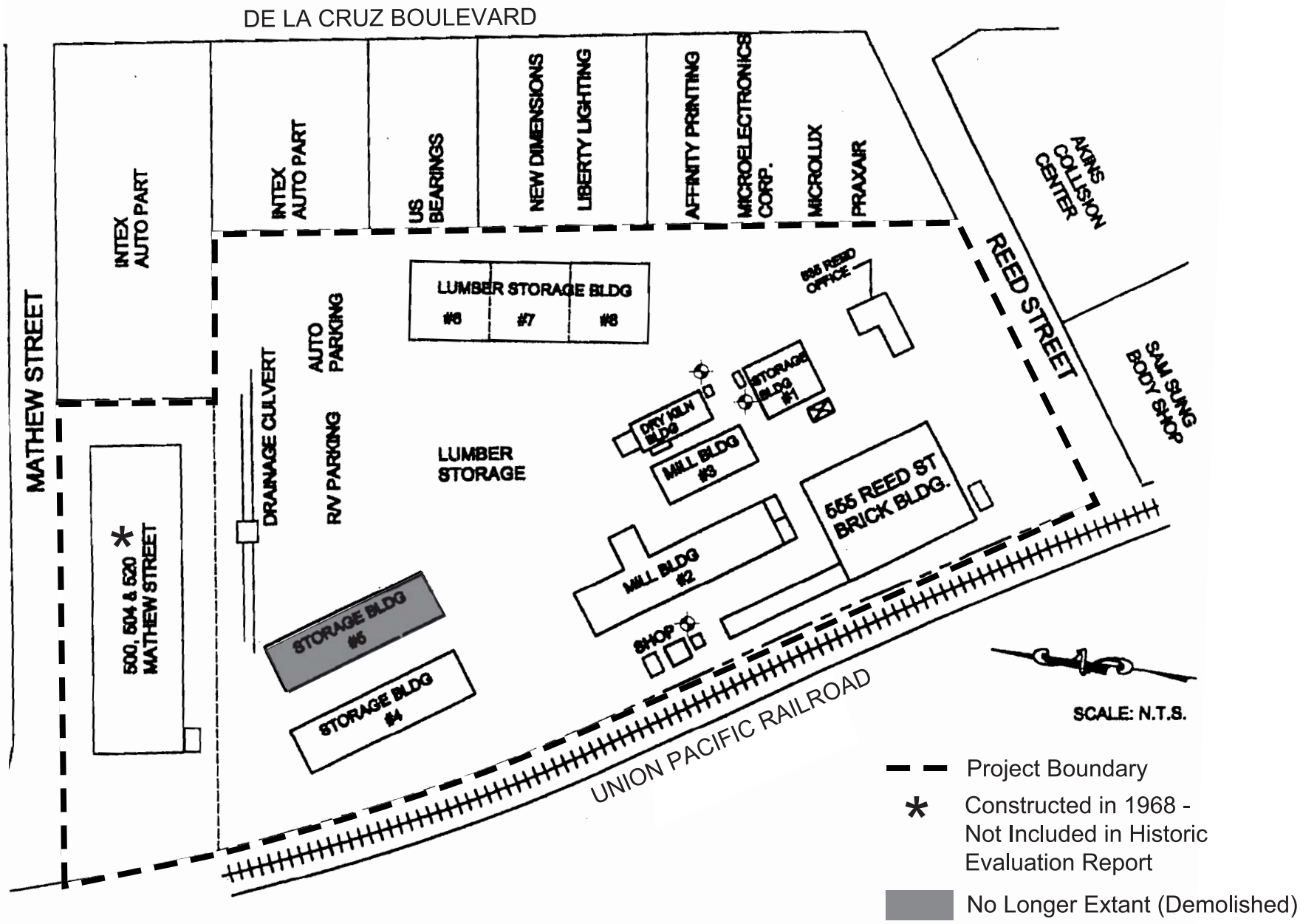
In August 1960, Pacific Manufacturing Company was dissolved and most of the buildings on The Alameda were demolished.

The 23-acre Pacific Redwood Casket Company site on Reed Street was purchased by Beaver Lumber in 1965. Beaver Lumber moved to Santa Clara after their San Leandro facility (acquired in 1947) burned in May 1965. In 1966, Beaver Lumber constructed a number of new buildings on the site, including an office building at 535 Reed Street, a mill building and metal storage buildings. A second mill building was added in 1968 and one of the original lumber storage buildings was demolished. The original corrugated metal boiler room for the dry kiln was moved near the railroad tracks and reused as a shop building. Also in 1968, the one-story warehouse building at 500-520 Mathew Street was constructed.7 In 1970, another lumber storage building and a second mill building were constructed. The brick warehouse at 555 Reed Street has been rented to a variety of different tenants during the last 25 years.

535 Reed Street

The structures on the 535 Reed Street property include an office building, lumber storage buildings, a drying kiln building, mill buildings, and a shop (refer to Figure 6). The office building is a modern,

[7] Source: AEI. 2007. *Phase I Environmental Assessment for 500-520 Mathew Street*. May 31, 2007.



BUILDINGS ON THE FORMER BEAVER LUMBER SITE

FIGURE 6

wood-frame structure with a gently pitched gable roof with wide eaves. The exterior is covered with stone facing and vertical wood siding.

The simply detailed, wood-frame lumber storage building (#1 on Figure 6) has exterior walls covered with rustic siding and double, sliding wooden doors. Inside, the interior is an open space with posts supporting heavy beams spanning the width of the roof below the rafters. The drying kiln building has a rectangular plan, hollow tile structure and a shed roof. This building is joined on the west to an adjacent mill building (#3 on Figure 6). Mill buildings on the site are steel frame structures with exterior metal panels. The shop building is a wood-frame structure with wooden roof truss supports. The two remaining modern lumber storage buildings are modern, gable steel frame structures with bolted exterior metal siding.

555 Reed Street

A single-story square plan, brick masonry building is located at 555 Reed Street. It has a flat roof covered with asphalt roof paper and four parallel rows of six skylights. The front façade on the south has two entrance doors and a concrete ramp leading to a roll-up metal door. The seven windows on the front façade have been replaced with pairs of modern metal sash windows. An abandoned railroad spur is located adjacent to the west façade and a concrete loading dock covered by a shed roof. The west façade has paired wood-sash, four over four, double-hung windows. The windowless north façade has three sliding wooden doors. The interior of the building has a small suite of offices with the reminder of the interior as open space with an exposed wood-truss roof supported by heavy posts set on a concrete slab floor. As previously noted, the building was constructed in 1945.

500-520 Mathew Street

The structure on this property consists of a modern one-story warehouse building totaling approximately 49,000 square feet in size. Portions of the current one-story warehouse building were constructed in 1968 by Beaver Lumber Company for use as a warehouse/storage facility. Two additions were made to the building in the 1970s to complete the current configuration. The structure has been occupied by several commercial/industrial tenants since at least 1970, including building supply, vehicle repair, and paper manufacturing businesses.

4.5.1.3 *Regulatory Overview and Eligibility Criteria for Historic Resources*

Several sets of criteria are used under the California Environmental Quality Act to determine whether a site, property, or building is considered a historic resource. Guidelines are set forth in Public Resources Code Section 21084.1 and Section 15064.5 of the CEQA Guidelines.

The buildings on the site were evaluated to determine if there represent a historic resource eligible for the California Register. None the buildings have been previously listed under any historic resource designations at the federal, state, or local levels. National Register criteria are not listed because they are essentially the same as the California Register criteria. However, a historic resource listed in or determined eligible for the National Register is, by definition, also eligible for the California Register. The following section provides an overview of criteria used to assess historic significance.

California Register of Historic Resources

The criteria used when establishing the significance of a property for listing on the California Register are similar to the National Register of Historic Places, with emphasis on local and state significance.8 In order for a resource to be eligible for the California Register, it must satisfy all of the following three criteria (A, B & C). The criteria for a property include:

Criterion A

A property must be significant at the local, state or national level, under one or more of the following four criteria of significance:

1. The resources is associated with events or patterns of events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States; or
2. The resource is associated with the lives of persons important to the nation or to California's past; or
3. The resource embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values; or
4. The resource has the potential to yield information important to prehistory or history of the state or the nation (this criteria applies primarily to archaeological sites).

Criterion B

The resource retains historic integrity. Integrity is defined as the authenticity of a property's physical identify, evidenced by the survival of characteristics that existed during the property's period of significance.

Criterion C

The resource is 50 years old or older (except for rare cases of structures of exceptional significance).

City of Santa Clara Architecturally or Historically Significant Properties

The City of Santa Clara maintains a list of architecturally or historically significant properties. Last revised in 2004, the list is one of several sources for identifying properties that require special consideration. None of the buildings on the project site are included on the list of architecturally or historically significant properties in the City.

4.5.1.4 *Evaluation of Historic Significance of Buildings on the Site*

535-555 Reed Street

The main building associated with the Pacific Redwood Casket Company, the brick building at 555 Reed Street, appears to retain its historic integrity, the loss of the original front façade windows appearing to be the main alteration. The dry kiln, boiler building (shop building), and wood frame

[8] Source: The California Office of Historic Preservation. *Technical Assistance Series #6, California Register and National Register: A Comparison.*

lumber storage shed on the 535 Reed Street property also have not been considerably altered. The overall setting of the Pacific Redwood Casket Company facility, however, has been considerably altered since Beaver Lumber purchased the property in 1965. Alterations include demolition of one of the original lumber storage buildings, relocation of the boiler building (the shop building), and construction of new, large buildings including two mills, several large storage buildings, and an office building.

Even if the complex had retained a higher level of integrity, the Pacific Redwood Casket Company property does not appear to be a significant business in the history of Santa Clara, thus the property does not appear to be eligible under Criterion A. Although the company had associations with the historic Pacific Manufacturing Company, Pacific Redwood Casket was organized much later (1933) as a separate firm with different personnel, and the company moved to the Reed Street location in 1945. The Pacific Redwood Casket property is a considerable distance from the original Pacific Manufacturing Company location, now completely redeveloped.

The Pacific Redwood Casket company buildings do not appear to be associated with persons of historic significance, thus the property does not appear to be eligible under Criterion B. The older industrial buildings on the site do not appear to be distinguished or unusual examples of their type, thus they do not appear to be eligible under Criterion C.

500-520 Mathew Street

The warehouse/storage building on this site was constructed in 1968 and is less than 50 years old and does not possess characteristics that are exception of its type or period of construction. Like the structures on the 535-555 Reed Street properties, it is not associated with historically significant businesses or individuals. For these reasons, the building does not appear to be eligible for historic resource status under Criteria A, B or C.

4.5.2 Environmental Checklist and Discussion of Impacts

CULTURAL RESOURCES					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project:					
1) Cause a substantial adverse change in the significance of an historical resource as defined in §15064.5?	☐	☐	☒	☐	1,6,7,8
2) Cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?	☐	☒	☐	☐	1,6,7
3) Directly or indirectly destroy a unique paleontological resource or site, or unique geologic feature?	☐	☐	☒	☐	1,6,7
4) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐	1,6,7

4.5.2.1 Buried Prehistoric and Historic Resources

The proposed project includes excavation under the proposed building to a depth of nine feet and disturbance of native soils for trenching, site grading and other construction activities. While there are no recorded archaeological or historic sites on the project site, there is a potential for buried archaeological resources and unrecorded remnants of historic Mission period materials to occur on the site.

Impact CR-1: Implementation of the proposed project could adversely impact buried cultural resources from prehistoric, Mission era, or historic periods. **[Significant Impact]**

Mitigation and Avoidance Measures

The project will be required to implement the following mitigation measures to reduce possible impacts to cultural resources to a less than significant level.

MM CR-1.1: Prior to foundation demolition and excavation presence/absence testing will be done over the entire property using a backhoe. Excavation would extend to a depth of three to four feet to search for the following:

- Prehistoric archaeological deposits. Backhoe testing at set intervals throughout the project site will serve to locate prehistoric archaeological deposits that could be disturbed by planned excavation. In the event any prehistoric site indicators are discovered, additional backhoe testing will be conducted to map the aerial extent and depth below the surface of the deposits.

- Historic archaeological deposits/architectural remains.

In the event prehistoric or historic archaeological deposits are found during presence/absence testing, the significance of the find will be determined. If deemed significant, a Treatment Plan will be prepared as outlined in MM CR-1.2, below.

MM CR-1.2: A qualified archaeologist shall monitor all ground disturbance activities during excavation, utility installation, and trenching for the project. Monitoring shall consist of coordinating subsurface work to allow for the careful examination of vertical and horizontal soil relationships for the purpose of seeking positive archaeological finds (prehistoric and/or historic). The monitor must maintain a field log of their presence and observations, carefully noting soil conditions. The archaeological monitor must be pre-approved by the Director of Planning and Inspection. After written approval, the Planning Division must be notified at least 48 hours prior to any grading or other subsurface work on the site, and the client must provide written protocol which stipulates the manner in which the applicant shall comply with the monitoring requirements.

In the event any archaeological resources are discovered during site earthwork activities, all earthwork activities in the vicinity of the find shall halt and the applicant shall retain the services of a qualified archaeologist to

evaluate the resources found on-site. The archeologist shall document their provenance and nature (through drawings, photographs, written description, etc., as necessary). The monitor will then direct the work to either proceed if the find is deemed to be insignificant or is adequately documented and resolved, or continue elsewhere, as appropriate, until adequate mitigation measures are adopted or the matter is otherwise resolved to the satisfaction of the City.

Once a find has been made and deemed to be significant, the archaeologist will then submit a Treatment Plan (if one was not previously approved) to the City. The key elements of a treatment plan shall include the following:

- Identify scope of work and range of subsurface effects (include location map and development plan).
- Describe the environmental setting (past and present) and the historic prehistoric background of the parcel (potential range of what might be found).
- Develop research questions and goals to be addressed by the investigation (what is significant vs. what is redundant information).
- Detail field strategy used to record, recover, or avoid the finds (photos, drawings, written records, provenience data maps, soil profiles, excavation techniques, standard archaeological methods) and address research goals.
- Analytical methods (radiocarbon dating, obsidian studies, bone studies, historic artifact studies [list categories and methods], packaging methods for artifacts, etc.).
- Report structure, including a technical and layman's report and an outline of document contents in one year of completion of development (provide a draft for review before a final report).
- Disposition of the artifacts.
- Appendices: site records, update site records, correspondence, consultation with Native Americans, etc. The need for a burial agreement plan for Native American burials can be incorporated into Treatment Plan but must be done in consultation with MLD. Plan should detail goals, methods, and disposition of remains and associated artifacts.

MM CR-1.3: In the event that human skeletal remains are encountered, the contractor is required by County Ordinance No. B6-18 to immediately notify the County Coroner. Pursuant to Section 7050.5 of the Health and Safety Code, and Section 5097.94 of the Public Resources Code of the State of California, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains. Upon determination by the

County Coroner that the remains are Native American, the coroner shall contact the California Native American Heritage Commission, pursuant to subdivision (c) of section 7050.5 of the Health and Safety. The Native American Heritage Commission shall be consulted to identify the most likely descendants and the appropriate disposition of the remains.

4.5.2.2 Impacts to Historic Buildings

The project site is located in an industrial area developed primarily after 1945 with modern industrial and commercial buildings. The site is not located within a designated historic district or located adjacent to any designated historic structures.

The project proposes to demolish 12 buildings on the site. As previously discussed in Section 4.5.1.4, none of the buildings on the site meet the eligibility requirements for historic resources under the CEQA Guidelines and none of the buildings are listed on local, state or national historic resources lists. The proposed project, therefore, would not result in substantial impacts to historic buildings. **[No Impact]**

4.5.3 Conclusion

The proposed project includes excavation within an archeologically sensitive area. Potential impacts associated with construction grading and excavation will be reduced to a less than significant level with the implementation of the mitigation measures included in the project. **[Less Than Significant Impact with Mitigation]**

The proposed project would not adversely impact historic buildings. **[No Impact]**

4.6 GEOLOGY AND SOILS

4.6.1 Setting

4.6.1.1 *On-Site Geologic Conditions*

Soils

The site soils are described in *Soils of Santa Clara County* (1968) as Sunnyvale silty clay, drained (Sv). A small portion of the northwest corner of the site consists of Clear Lake clay (Cg). Both Sunnyvale silty clay, drained and Clear Lake clay have a high potential for expansion.[9] Expansive soils shrink and swell as a result of moisture changes. These changes can cause heaving and cracking of slabs-on-grade, pavements and structures found on shallow foundations. Because the site topography is flat, there are limited erosion hazard and no landslide hazard.

Seismicity

The San Francisco Bay Area is one of the most seismically active regions in the United States. Santa Clara County is classified as Zone 4, the most seismically active zone. An earthquake of moderate to high magnitude generated within the San Francisco Bay region could cause considerable ground shaking at the project site. The degree of shaking is dependent on the magnitude of the event, the distance to its zone of rupture and local geologic conditions.

The three major faults in the region are the San Andreas Fault, the Calaveras Fault, and the Hayward Fault. The San Andreas Fault runs north/south and parallel to the Hayward Fault and the Calaveras Fault. The San Andreas Fault is approximately 12 miles west of the site, the Calaveras Fault is approximately 9.5 miles east of the site, and the Hayward Fault is approximately seven (7) miles north of the site.

The project site is not located within a fault rupture zone.[10]

Liquefaction

Soil liquefaction is a condition where saturated granular soils near the ground surface undergo a substantial loss of strength during seismic events. Loose, water-saturated soils are transformed from a solid to a liquid state during ground shaking. Liquefaction can result in significant deformations. Soils most susceptible to liquefaction are loose, uniformly graded, saturated, fine-grained sands that lie close to the ground surface. The project site is located within a State of California Seismic Hazard Zone for liquefaction. In the letter report summarizing environmental conditions on the site prepared by *Cornerstone Earth Systems* in January 2008, described in Section 4.7, Hazards and Hazardous Materials, groundwater was reported at 12-17 feet below ground surface (bgs), and flowing generally to the north.

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[9] United States Department of Agriculture, Soil Conservation Service, *Soils of Santa Clara County*, 1968, and County of Santa Clara Department of Public Works, *Soil Map Sheet 19*, 1964.
[10] California Department of Conservation, *Geologic Map of the San Francisco-San José Quadrangle*, 1990.

Lateral Spreading

Lateral spreading is a type of ground failure related to liquefaction. It consists of the horizontal displacement of flat-lying alluvial material toward an open area, such as a steep bank of a stream channel. There are no stream channels on or adjacent to the site that would be subject to substantial lateral spreading.

4.6.2 Environmental Checklist and Discussion of Impacts

GEOLOGY AND SOILS					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project:					
1) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:					
a) Rupture of a known earthquake fault, as described 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.)	☐	☐	☒	☐	1,11
b) Strong seismic ground shaking?	☐	☐	☒	☐	1,11
c) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐	1,11
d) Landslides?	☐	☐	☐	☒	1
2) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐	1,9,10
3) Be located on a geologic unit or soil that is unstable, or that will become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☒	1,9,10
4) 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?	☐	☐	☒	☐	1,9,10
5) 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?	☐	☐	☐	☒	1,9,10

The project site is located in a mapped liquefaction hazard zone, and soils on the site have a high potential for expansion. The project site is not located within a fault rupture zone or landslide hazard zone.

The project site is located in a seismically active region. Geologic conditions on the site will require that the new buildings be designed and constructed in accordance with standard engineering techniques and Uniform Building Code guidelines for Seismic Zone 4, to avoid or minimize potential damage from seismic shaking and liquefaction on the site.

The proposed building will be designed and constructed in accordance with a design-level geotechnical investigation prepared for the site, which will identify the specific design features that will be required for the project, including site preparation, compaction, trench excavations, foundation and subgrade design, drainage, and pavement design. At the present time, it is anticipated that concrete augered piles, or a similar foundation design, would be used to support the proposed structure. With implementation of recommendations in the design level geotechnical report, the project will not expose people or property to significant impacts associated with geologic or seismic conditions on site.

4.6.3 Conclusion

The proposed project would not result in significant, adverse geology, soils, or seismicity impacts that cannot be avoided through standard engineering and construction techniques. **[Less Than Significant Impact]**

4.7 HAZARDS AND HAZARDOUS MATERIALS

The following discussion is based in part upon two Phase I Environmental Site Assessments prepared by *AEI Consultants* in May 2007 and a letter report summarizing environmental conditions prepared by *Cornerstone Earth Systems* in January 2008. Copies of the assessments and letter report are provided in Appendix C of this Initial Study.

4.7.1 Setting

4.7.1.1 *Background Information*

Hazardous materials encompass a wide range of substances, some of which are naturally-occurring and some of which are man-made. Examples of hazardous materials include pesticides, herbicides, petroleum products, metals (e.g., lead, mercury, arsenic), asbestos and chemical compounds used in manufacturing. Determining if such substances are present on or near project sites is important because exposure to hazardous materials above certain thresholds can result in adverse health effects on humans, as well as harm to plants and wildlife.

Due to the fact that these substances have properties that, above certain thresholds, are toxic to humans and/or the ecosystem, there are multiple regulatory programs in place that are designed to minimize the chance for unintended releases and/or exposures to occur. Other programs establish remediation requirements for sites where contamination has occurred.

4.7.1.2 *Site Conditions*

Based on historical aerial photographs and other reviewed information, the project site historically was used for agricultural production until the late 1940's. The Pacific Redwood Casket Company operated on the southern portion of the site from the late 1940's until approximately 1966. The site was occupied by Beaver Lumber Company from at least 1968 until the early 2000's. Several other commercial and industrial tenants also operated on the site in the past, including manufacturing, office, sales, and storage uses.

There are 12 existing buildings on the site, including eight warehouses, a brick masonry building, a dry kiln building, a wood frame office building, and a metal frame shop/storage building. The project site is located in an industrial area. Surrounding land uses include commercial and industrial operations such as recycling facilities, auto body shops, and printing facilities.

4.7.1.3 *Potential On-Site Sources of Contamination*

Former Agricultural Use

Due to the agricultural history of the project site, there is a potential that agricultural chemicals, such as pesticides (including organochlorine pesticides), herbicides, and fertilizers, were used on the site. As a result, residual agricultural chemicals may be present in the native soils.

Pentachlorophenol (PCP)

The project site contained an aboveground pentachlorophenol (PCP) tank on the north side of the shop/storage building on the western portion of the site. The tank was utilized by the Beaver Lumber Company from the mid- to late-1960's to the late 1980's for treating lumber. Wood products were

dipped in the tank and placed on unpaved ground until they dried. The PCP tank was removed in the late 1980's. In 1985, during the removal of a nearby underground storage tank (UST), PCP was detected in a soil sample.

Under RWQCB oversight between October 2000 and March 2006, several measures were undertaken to characterize and address PCP contamination (RWQCB Case #43S0958). These measures included drilling of borings, installation of monitoring wells, over-excavation of the PCP tank source area, treatment and disposal of stockpiled soil, and groundwater remediation measures. The PCP release impacted the shallowest groundwater beneath the site, which occurs at a depth of approximately 12 to 17 feet and is approximately 10-20 feet deep. Based on 12 groundwater sampling events, the overall size and geometry of the contaminant plume appears to have remained constant, measuring approximately 400 feet long by 150 feet wide. The contamination appears to be contained on-site. The PCP dipping tank source area was excavated in January 2002. In June 2003, 40 percent of the excavated soils (the portion meeting specific criteria for PCP) were replaced in the excavation. The portion of the soil stockpile that did not meet re-use criteria (60 percent of the stockpile) was transported to a nonhazardous landfill for disposal. In 2005, reported groundwater concentrations were considered stable and constrained to the site[11] and regulatory closure was issued by the RWQCB in March 2006. Based on the last sampling on the site in 2005, residual levels of PCP in soil and groundwater likely remain at the site.

Underground Storage Tanks (USTs)

The project site formerly contained eight underground storage tanks (USTs), which consisted of the following:

- One 200 gallon waste oil tank (removed in 1985)
- One 10,000 gallon diesel tank (removed in 1986)
- One 550 gallon waste oil tank (removed in 1992)
- One 1,000 gallon gasoline tank (removed in 1992)
- One 2,000 gallon gasoline tank (removed in 1992)
- Two 10,000 gallon gasoline tanks (removed in 1992)
- One 10,000 gallon gasoline/diesel tank (removed in 2001)

Soil and groundwater contamination associated with USTs on the southern portion of the property was encountered during tank removal activities. Three groundwater monitoring wells were installed. After monitoring and reporting for a number of years, regulatory closure was issued by the Santa Clara Valley Water District in February 2002 (Case #06S1W35PO1f).

Asbestos and Lead-Based Paint

Since construction of the existing buildings on the site occurred prior to 1980, building materials containing asbestos (ACMs) may be present. The buildings were constructed prior to 1978, at which time lead was banned as an additive in paint. Lead-based paint may be present on building materials.

[11] Stellar Environmental Solutions, Inc. 2005. *Year 2005 Groundwater Monitoring Documentation Report and Petition for Case Closure*. Included in Appendix C (References) of the Phase I Environmental Assessment for 535-555 Reed Street.

4.7.1.4 *Potential Off-Site Sources of Contamination*

Several industrial facilities located adjacent to the project site have recorded fuel leak incidents from USTs. These facilities include California Paperboard (525 Mathew Street), Nelson Brothers Trucking (600 Mathew Street), Intex Auto Parts (2290 De La Cruz Boulevard), and Jenic (448 Roberts Avenue). All of these sites are located in cross- or down-gradient groundwater flow positions from the project site.

4.7.2 **Environmental Checklist and Discussion of Impacts**

HAZARDS AND HAZARDOUS MATERIALS					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project:					
1) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐	1,12,13
2) 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?	☐	☐	☒	☐	1,12,13
3) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐	1,12,13
4) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☒	☐	1,12,13
5) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒	1,12,13
6) 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?	☐	☐	☐	☒	1

HAZARDS AND HAZARDOUS MATERIALS					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project:					
7) Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒	1,2
8) 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?	☐	☐	☐	☒	1

4.7.2.1 *Impacts from Building Demolition*

The twelve existing structures on the site would be removed to allow for construction of the proposed data center. As previously described, the existing structures could include building materials containing asbestos (ACMs) and lead-based paint. In conformance with existing safety regulations, the following standard measures will be implemented by the project.

Standard Measures:

Prior to demolition, an asbestos survey will be conducted under National Emissions Standards for Hazardous Air Pollutants (NESHAP) guidelines. All potentially friable asbestos containing material (ACMBs) will be removed according to NESHAP guidelines prior to building demolition.

A lead survey of painted surfaces and soil will also be performed prior to demolition. Cal/OSHA requirements will be followed during demolition activities, including employee training, employee air monitoring, and dust control. Any debris or soil containing lead-based paint or coatings will be disposed of at landfills permitted to accept the waste being disposed.

Foundation Removal

Removal of existing foundations could disturb soils contaminated with residual agricultural chemicals, petroleum hydrocarbons, or PCP. Possible impacts associated with disturbance of contaminated surface soils on the site are described below under *Section 4.7.2.2.*

4.7.2.2 *Impacts Associated with Building Construction*

There are no active leaking underground storage tanks or other hazardous materials database cases on the project site; however soil and groundwater contamination from industrial activities has been reported in the past.

The proposed project includes excavation under the proposed building to a depth of approximately nine feet and disturbance of native soils for trenching, site grading and other construction activities.

Given the former agricultural and industrial uses of the site and known releases associated with lumber treatment with PCP, soil and/or groundwater contaminated with residual agricultural chemicals, petroleum hydrocarbons, or PCP could be encountered during construction.

The project would use piles to support the proposed building. Driven piles potentially could push contamination downward towards the water table. An alternative pile design, using augered rather than driven piles, may be used.

At this time, it anticipated that the cut and fill on the site will balance and no off-haul of soil materials will be required.

Impact HAZ-1: Excavation of contaminated soil materials and/or the use of foundation piles could result in hazards to the environment, construction workers or the public if contaminated soil and groundwater encountered under the site is not handled properly. **[Significant Impact]**

Mitigation and Avoidance Measures

MM HAZ-1.1: A Site Management Plan that provides guidelines for contractors to follow during construction activities where they may encounter contaminated soil and groundwater (specifically near former underground fuel storage tank (UST) locations in the general vicinity of the PCP treatment area and stormdrains, sumps, and clarifiers) will be prepared for the site. The plan will address handling of fills near former UST excavations and any contaminated soil encountered. In the event contaminated soil or groundwater is encountered, it will be handled in accordance with regulatory requirements of the Regional Water Quality Control Board and/or County of Santa Clara Department of Environmental Health Local Oversight Program (LOP). The Site Management Plan shall be submitted to the Regional Water Quality Control Board prior to issuance of a grading permit.

MM HAZ-1.2: Undocumented fills at former UST locations will be over-excavated. An environmental engineer or geologist shall observe the over-excavation at each location. Soil suspected of being contaminated shall be stockpiled separately from "clean" soil. Prior to reuse on-site, soil samples from soil suspected to be contaminated shall be collected and analyzed for chemicals of concern in accordance with Regional Water Quality Control Board guidance for the reuse of soil. In the event contaminants are detected above regulatory screening levels, the soil may be disposed of off-site, at an appropriate hazardous waste facility, in accordance with regulatory requirements. An Operations and Maintenance Plan shall be prepared if contaminated soil above residential (unrestricted use) regulatory screening levels will be left in place. The purpose of this plan is to notify tenants of the existence and location of this contamination and to provide protocols for handling this soil if encountered during future site maintenance activities.

MM HAZ-1.3: Contractors whose vehicles and construction equipment contact soil that is suspected of being contaminated shall be required to clean the equipment prior to leaving the site. A gravel equipment cleaning pad will be built near the construction exit. Soil must be removed from the equipment and vehicles

before leaving the site. Cleaning methods used may include dry methods, such as brushing, scraping, or vacuuming. If dry methods are not effective, wet methods, such as steam cleaning or pressure-washing, may be used. The contractor will be required to contain and appropriately manage rinse water.

MM HAZ-1.4: The foundation of the building, which may include piles, shall incorporate measures to help reduce the potential for the downward migration of contaminated groundwater. These measures shall be identified in the Geotechnical Investigation report and implemented as a part of the project.

MM HAZ-1.5: If utility trenches extend into the top of the groundwater, appropriate measures shall be implemented to reduce groundwater migration through trench backfill and utility conduits. Such measures may include placement of low-permeability backfill "plugs" at intervals on-site and where utility trenches extend off-site. In addition, utility conduits that are placed below groundwater shall be installed with water-tight fittings to help prevent groundwater from migrating into conduits.

If excavation dewatering is required, the ponded groundwater shall be sampled and analyzed for chemicals of concern prior to water pumping in order to evaluate discharge alternatives. If the pumped water is to be used for on-site dust control, concentrations of chemicals of concern shall be compared to the lower of the Regional Water Quality Control Board's Environmental Screening Levels (ESLs) for fresh or estuarine surface water. If the concentrations detected exceed the ESLs, then Regional Water Quality Control Board staff shall be consulted. Discharge to the sanitary sewer or storm sewer shall be performed under an approved permit from the Regional Water Quality Control Board. If required, water shall be treated prior to discharge.

MM HAZ 1.6: Health and safety plans will be prepared per California Code of Regulations, Title 8 to provide general health and safety guidance for construction activities, including soil and groundwater handling, by contractors. Contractors are also required to determine the requirements for worker training, based on the level of the expected contact to soil and groundwater associated with the contractor's activities and locations with respect to the areas of concern.

MM HAZ-1.7: Inactive monitoring wells will be properly destroyed under SCVWD requirements prior to beginning construction activities.

4.7.3 Conclusion

Potential hazards and hazardous materials impacts will be reduced to a less than significant level with the implementation of the mitigation measures included in the project. **[Less Than Significant Impact with Mitigation]**

4.8 HYDROLOGY AND WATER QUALITY

4.8.1 Setting

4.8.1.1 *Hydrology and Flooding*

According to the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map (FIRM), the project site is located within Zone B. Zone B is defined as areas between the limits of a 100-year flood and a 500-year flood, or certain areas subject to 100-year flooding with average depths of less than one foot, as well as areas where the contributing drainage area is less than one square-mile.[12] The existing elevation of the site ranges from approximately 43 feet to 50 feet above mean sea level (msl).

The proposed project site is located approximately one mile southwest of the Guadalupe River. There are no dams or levee systems in the project area. The project area is not subject to inundation from a seiche, tsunami, or mudflow.

4.8.1.2 *Storm Drainage*

The City of Santa Clara owns and maintains the municipal storm drainage system in the vicinity of the project. Storm drains are currently installed in Reed Street.

4.8.1.3 *Groundwater*

In the letter report summarizing environmental conditions on the site prepared by *Cornerstone Earth Systems* in January 2008, described in Section 4.7, Hazards and Hazardous Materials, groundwater was reported at 12-17 feet below ground surface (bgs), and flowing generally to the north.

4.8.1.4 *Water Quality*

The federal Clean Water Act and California's Porter-Cologne Water Quality Control Act are the primary laws related to water quality. Regulations set forth by the U.S. Environmental Protection Agency (EPA) and the State Water Resources Control Board have been developed to fulfill the requirements of this legislation. EPA's regulations include the National Pollutant Discharge Elimination System (NPDES) permit program, which controls sources that discharge pollutants into waters of the United States (e.g., streams, lakes, bays, etc.). These regulations are implemented at the regional level by water quality control boards, which for the Santa Clara area is the San Francisco Bay Regional Water Quality Control Board (RWQCB).

The Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) was developed in accordance with the requirements of the revised 1995 version of the San Francisco Bay Basin Water Quality Control Plan, for the purpose of reducing water pollution associated with urban stormwater runoff. The SCVURPPP was also designed to fulfill the requirements of Section 304(1) of the Federal Clean Water Act, which mandated that the Environmental Protection Agency develop the NPDES requirements for stormwater discharges, including those from municipal storm drain systems and construction sites. The SCVURPPP, of which the City of Santa Clara is a participant, was

[12] Federal Emergency Management Agency, Flood Insurance Rate Map, Community Panel No. 060350 0003D, December 22, 1998.

developed in accordance with the requirements of the RWQCB's *San Francisco Bay Basin Water Quality Control Plan*, as well as the requirements of EPA's NPDES permit program.

Additional water quality control measures were approved in October 2001 (revised in 2005), when the RWQCB adopted an amendment to the NPDES permit for Santa Clara County. This amendment, which is commonly referred to as "C.3" (referring to the applicable section of the permit amendment), requires all new and redevelopment projects that result in the addition or replacement of impervious surfaces totaling 10,000 square feet or more, to be designed with Best Management Practices (BMPs) that reduce stormwater pollution through source control measures and stormwater treatment measures.

The proposed project is required to comply with Provision C.3 of the City's NPDES permit and the City's local polices and ordinances regarding urban runoff and water quality. In practical terms, the C.3 requirements seek to reduce water pollution by both reducing the volume of stormwater runoff and the amount of pollutants that are contained within the runoff. The methods used to achieve these objectives vary from site to site, but can include measures such as a reduction in impervious surfaces, onsite detention facilities, biofiltration swales, settlement/debris basins, etc.

4.8.2 Environmental Checklist and Discussion of Impacts

HYDROLOGY AND WATER QUALITY					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project:					
1) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐	1,2
2) 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)?	☐	☐	☐	☒	1,2
3) 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 siltation on- or off-site?	☐	☐	☒	☐	1,2

HYDROLOGY AND WATER QUALITY					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project:					
4) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-or off-site?	☐	☐	☒	☐	1,2
5) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐	1,2
6) Otherwise substantially degrade water quality?	☐	☐	☒	☐	1,2
7) 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?	☐	☐	☒	☐	1,2,14
8) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☒	☐	14
9) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒	1
10) Be subject to inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒	1,2

4.8.2.1 *Drainage and Flooding*

The proposed project would conform to the City flood hazard management ordinance, ensuring that the buildings are protected from flood damage. Therefore, implementation of the project would not result in people or structures being exposed to any significant flood risk.

Impervious surfaces on the project site would be reduced from 98 percent to 69 percent after construction of the project, as shown in Table 4.8-1. This net reduction in impervious surfaces would ensure that stormwater runoff from the project site would not exceed the capacity of the existing storm drainage system, or contribute significantly to downstream flooding.

New catch basins and storm drain lines would be installed on the site as part of the project, and would connect to the existing City of Santa Clara stormdrain system. Vegetated swales would be installed on site as part of the project, and would help to detain stormwater runoff and infiltrate excess water into the soil.

Table 4.8-1
Pervious and Impervious Surfaces On-Site

Site Surface	Existing/Pre-Construction (sf)	%	Project/Post-Construction (sf)	%	Difference (sf)	%
Impervious						
Building Footprint	197,042	28	324,732	46	+127,690	18
Parking/Driveways Sidewalks/Patios/Paths	488,741	72	158,408	23	-330,333	47
Subtotal	*685,783*	*98*	*483,140*	*69*	*-202,643*	*29*
Pervious						
Landscaping	14,779	2	217,422	31	+202,643	29
Subtotal	*14,779*	*2*	*217,422*	*31*	*+202,643*	*29*
TOTAL	700,562	100	700,562	100		

4.8.2.2 *Water Quality*

The project proposes the demolition of 12 existing structures and the construction of an approximately 312,000 square foot data center, along with landscaping and an associated paved parking lot.

The project includes stormwater quality best management practices such as directing site runoff into vegetated swales in conformance with requirements in the City of Santa Clara's Municipal NPDES Permit. The coverage of impervious surfaces would be less than the current condition. With implementation of standard conditions, water quality impacts during the post-construction operation of the proposed project are anticipated to be less than significant.

Construction activities on site would temporarily generate dust, sediment, litter, oil, paint, and other pollutants that could contaminate runoff from the site.

Impact HYDRO-1: Construction activities could temporarily increase pollutant loads in stormwater runoff. **[Significant Impact]**

<u>Mitigation and Avoidance Measures:</u>

The following mitigation measures are included in the project to reduce water quality impacts during construction and post-construction periods to a less than significant level:

MM HYDRO-1.1: Prior to construction of the project, the City shall require the applicant to submit a Storm Water Pollution Prevention Plan (SWPPP) and a Notice of Intent (NOI) to the State of California Water Resource Quality Control Board to control the discharge of storm water pollutants including sediments associated with construction activities. Along with these documents, the

applicant may also be required to prepare an Erosion Control Plan. The Erosion Control Plan may include Best Management Practices (BMPs) as specified in the California Storm Water Best Management Practice Handbook (such as silt fences/straw waddles around the perimeter of the site, regular street cleaning, and inlet protection) for reducing impacts on the City's storm drainage system from construction activities. The SWPPP shall include control measures during the construction period for:

- Soil stabilization practices,
- Sediment control practices,
- Sediment tracking control practices,
- Wind erosion control practices, and
- Non-storm water management and waste management and disposal control practices.

MM HYDRO-1.2: Prior to issuance of a grading permit, the applicant shall be required to submit copies of the NOI and Erosion Control Plan (if required) to the Department of Public Works. The applicant shall also be required to maintain a copy of the most current SWPPP on-site and provide a copy to any City representative or inspector on demand.

MM HYDRO-1.3: The development shall comply with City of Santa Clara ordinances, including erosion- and dust-control during site preparation and grading, and maintaining adjacent streets free of dirt and mud during construction.

MM HYDRO-1.4: The proposed development shall comply with the NPDES permit issued to the City of Santa Clara.

4.8.3 Conclusion

The proposed project would not result in substantial adverse flooding or drainage impacts. **[Less Than Significant Impact]**

With implementation of the mitigation measures included in the project, possible impacts to water quality would be reduced to a less than significant level. **[Less Than Significant Impact with Mitigation]**

4.9 LAND USE

4.9.1 Setting

The project site was previously developed with industrial uses, including a lumber mill facility. The site is currently developed with 12 vacant buildings, consisting primarily of industrial warehouses. Lumber operations on the site ceased in the early 2000's.

4.9.1.1 *General Plan and Zoning*

General Plan Land Use Designation

The project site is designated as *Heavy Industrial* in the City's General Plan. The *Heavy Industrial* designation is intended to protect a minimum amount of land in the City for those uses that only are appropriate in a heavy industrial zoning district. Such uses might include auto wrecking, concrete batching plants, and large warehouses. Frontage landscaping and off-street customer parking are required. Building height is limited to 70 feet with no maximum building coverage requirement, and properties are subject to required parking, landscaping, and setbacks.

Zoning Designation

The project site has a zoning designation of *MH – Heavy Industrial*. The *MH – Heavy Industrial* designation is intended to encourage sound heavy industrial development in the City by providing and protecting an environment exclusively for such development. Maximum building height under this zoning designation is 70 feet.

4.9.1.2 *Surrounding Land Uses*

Surrounding properties are developed with industrial and commercial uses. A paperboard recycling facility and a co-generation facility are located north of the project site across Mathew Street. Industrial and commercial uses border the site to the east, including a recycling facility. Light industrial uses, including auto body shops, are located south of the site across Reed Street. The site is bordered to the west by UPRR tracks, across which are located industrial and commercial uses, including a data center. An indoor soccer facility is also present west of the UPRR tracks on Mathew Street.

4.9.2 Environmental Checklist and Discussion of Impacts

LAND USE					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project: 1) Physically divide an established community?	☐	☐	☐	☒	1,2

LAND USE					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project:					
2) 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?	☐	☐	☒	☐	1,2
3) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒	1,2

4.9.2.1 *General Plan and Zoning*

The project proposes to demolish the existing structures on the site and construct an approximately 312,000 square foot data center to house computer servers and supporting equipment for private clients, as well as associated office uses, in an environmentally controlled structure. The proposed uses would be consistent with allowed uses for the *Heavy Industrial* land use designation and zoning.

4.9.2.2 *Land Use Compatibility*

Land use conflicts can arise from two basic causes: 1) a new development or land use may cause impacts to persons or the physical environment in the vicinity of the project site or elsewhere; or 2) conditions on or near the project site may have impacts on the persons or development introduced onto the site by the new project. Both of these circumstances are aspects of land use compatibility. Potential incompatibility may arise from placing a particular development or land use at an inappropriate location, or from some aspect of the project's design or scope. Depending on the nature of the impact and its severity, land use compatibility conflict can range from minor irritation and nuisances to potentially significant effects on human health and safety. The discussion below distinguishes between potential impacts from the proposed project upon people and the physical environment, and potential impacts from the project's surroundings upon the project itself.

Impacts From the Project

The proposed project will change the character of the project site. The project will intensify uses on the site and replace 12 existing vacant industrial structures with an approximately 312,000 square foot data center and paved parking lot. The proposed project is not located immediately adjacent to existing sensitive land uses such as residences or schools. The closest residential uses are located on the west side of Lafayette Street, approximately 1,100 feet west of the site. A private, indoor soccer facility is located at 500 Mathew Street, approximately 500 feet west of the site. Building setbacks and landscape buffers on the site would not decrease. While the project would introduce new sources of noise and lighting, increases would not be substantial over existing levels and are not anticipated to adversely affect adjacent industrial properties or exceed restrictions in the City's zoning ordinance. The proposed project, therefore, would not result in land use compatibility impacts to adjacent uses.

Impacts to the Project

The proposed project would redevelop an industrial property with a data center that is compatible with both the existing and planned land uses in the area. No on-going land use conflicts with adjacent uses are anticipated.

Proximity of the Project to San José International Airport:
Land Use Plan for Areas Surrounding Santa Clara County Airports
Airport Land Use Commission, September 1992

The *Land Use Plan for Areas Surrounding Santa Clara County Airports*, adopted by the Santa Clara County Airport Land Use Commission (ALUC) in September 1992, establishes a comprehensive land use plan that provides for the orderly growth of the area surrounding the airports in Santa Clara County. The ALUC has established provisions for the regulation of land use, building height, safety, and noise insulation within the areas adjacent to each of the public airports in the county. Designated safety zones and noise contours in the Plan have subsequently been updated based upon the 2002 California Department of Transportation (Division of Aeronautics) Airport Land Use Planning Handbook and a FAA sponsored study of aircraft operations.

The proposed project would be an industrial use located approximately 0.4 miles west of the Norman Y. Mineta San José International Airport, outside of the established 65 dB CNEL noise contour. No sensitive uses are being proposed which would be incompatible with the Land Use Plan, and the project site is not located within an established ALUC safety zone. The ALUC recommends that proposed projects not extend above established height restriction boundaries, particularly along the approach and departure routes. Proposed buildings on the site, which would be approximately 48 feet in height, would not extend to the height restriction specified for the project area in the Land Use Plan (206 feet in elevation above mean sea level). The proposed project, therefore, is consistent with the provisions of the ALUC Land Use Plan.

4.9.3 Conclusion

The proposed project would not result in significant, adverse land use impacts. **[Less Than Significant Impact]**

4.10 MINERAL RESOURCES

4.10.1 Setting

The project site does not contain any known or designated mineral resources.

4.10.2 Environmental Checklist and Discussion of Impacts

MINERAL RESOURCES					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project:					
1) 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?	☐	☐	☐	☒	1,2
2) 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?	☐	☐	☐	☒	1,2

The project would not result in the loss of availability of a known mineral resource, and no mineral excavation sites are present within the general area. The proposed project, therefore, would not result in impacts to mineral resources.

4.10.3 Conclusion

The project would not result in impacts to known mineral resources. **[No Impact]**

4.11 NOISE

4.11.1 Setting

4.11.1.1 *Noise Background*

Noise is defined as unwanted sound. Noise can be disturbing or annoying because of its pitch or loudness. Pitch refers to relative frequency of vibrations, higher pitch signals sound louder to people.

A decibel (dB) is measured based on the relative amplitude of a sound. Ten on the decibel scale marks the lowest sound level that a healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis such that each 10 decibel increase is perceived as a doubling of loudness. The California A-weighted sound level, or dBA, gives greater weight to sounds to which the human ear is most sensitive.

Sensitivity to noise increases during the evening and at night because excessive noise interferes with the ability to sleep. Twenty-four hour descriptors have been developed that emphasize quiet-time noise events. The Day/Night Average Sound Level, L_{dn}, is a measure of the cumulative noise exposure in a community. It includes a 10 dB addition to noise levels from 10:00 PM to 7:00 AM to account for human sensitivity to night noise.

4.11.1.2 *Applicable Noise Standard*

The Environmental Quality Element of the City of Santa Clara's General Plan identifies noise and land use compatibility standards for various land uses (General Plan Figure 5-G). The City establishes 70 DNL as the noise limit for industrial land uses. Chapter 9.10 "Regulation of Noise and Vibration," of the City of Santa Clara Municipal Code identifies allowable hours for construction to limit impacts to sensitive uses.

4.11.1.3 *Existing Noise Environment*

Based on the Figure 5-L of the General Plan (*2005 Traffic Noise Levels (dBA, CNEL) – South Santa Clara*), noise levels on the site were estimated between 60 and 65 dBA. The site is outside of the 65 dB CNEL contour for the Norman Y. Mineta San José International Airport.[13]

[13] Airport Land Use Commission. Land Use Plan for Areas Surrounding Santa Clara County Airports. September 1992.

4.11.2 Environmental Checklist and Discussion of Impacts

NOISE					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project result in:					
1) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐	1,2
2) Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐	1
3) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐	1
4) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐	1
5) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒	1,2
6) 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?	☐	☐	☐	☒	1

4.11.2.1 *Noise Exposure Impacts to the Project*

The proposed project would be subject to noise primarily from nearby industrial uses, trains using the adjacent UPRR tracks, and traffic on nearby roadways. Noise levels at the project site could exceed the 70 dBA DNL noise limit considered compatible for industrial uses in the General Plan. According to the General Plan, noise levels over 70 dBA at industrial uses would require design and insulation to reduce noise levels.

Office areas would be located on the opposite side of the site from the UPRR tracks and sound attenuation from measures included in the building design would reduce noise levels in the interior areas of the building to an acceptable level for employees and visitor-tenants.

4.11.2.2 *Noise Impacts From Project Traffic*

The project site is located in an area of existing industrial uses. No residential or other sensitive uses are adjacent or close to the project site.

Operation of the proposed data center project will increase noise levels on the site. The proposed data center will include noise-generating mechanical equipment, such as chillers and cooling towers. The emergency backup generators would also be a noise source, when in operation. The project proposes to incorporate noise attenuation measures in conformance with the with Santa Clara County Municipal Code noise standards of 70 dBA at the property line. Traffic increases due to the project would not represent a doubling of traffic on any neighboring streets and traffic noise from the project would not result in a substantial increase in ambient noise levels. The noise produced by the proposed project, therefore, would not result in significant noise impacts.

4.11.2.3 *Noise Impacts From Construction*

The construction of the project would generate noise, and would temporarily increase noise levels at adjacent industrial and commercial land uses. The significance of noise impacts during construction depends on the noise generated by various pieces of construction equipment, the timing and duration of noise generating activities, and the distance between construction noise sources and noise sensitive receptors. The demolition of the existing buildings and the construction of the proposed project would generate noise and would temporarily increase noise at adjacent businesses. Drilling for augered foundation piles will be required during the construction of the buildings. Drilling would take place over a period of several weeks during both Phase I and Phase II of the project.

Construction activities generate considerable amounts of noise, especially during the demolition phase and the construction of project infrastructure when heavy equipment is used. Typical hourly average construction generated noise levels are about 75 dBA to 80 dBA measured at a distance of 100 feet from the source during busy construction periods (e.g., earth moving equipment, impact tools, etc.). Noise from pile driving would be approximately 100 dBA at a distance of 65 feet from the source. Construction generated noise levels drop off at a rate of about six dBA per doubling of distance between the source and receptor.

Construction noise impacts are more significant when construction occurs during noise-sensitive times of the day (early morning, evening, or nighttime hours near residential uses), the construction occurs in areas immediately adjoining noise sensitive land uses, or when construction lasts extended periods of time. Construction activities may result in annoyances to existing industrial uses adjacent to the project site. However, because the duration of construction would be temporary in nature (approximately 10 to 12 months), and no sensitive land uses have been identified within 1,000 feet of the site, the project would not result in significant short-term construction related noise impacts. In addition, the project will be required to comply with the applicable provisions of Chapter 9.10 of the City of Santa Clara Municipal Code.

4.11.3 Conclusion

Implementation of the proposed project would not result in significant noise impacts. **[Less than Significant Impact]**

4.12 POPULATION AND HOUSING

4.12.1 Setting

The project proposes to redevelop an industrial site in the City of Santa Clara. According to the Association of Bay Area Government's *Projections 2007*, the City of Santa Clara had an estimated total of 104,920 jobs and 49,470 employed residents in 2005, resulting in a jobs/housing ratio of 2.12 jobs per employed resident.

4.12.2 Environmental Checklist and Discussion of Impacts

POPULATION AND HOUSING					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project:					
1) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐	1,2
2) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒	1
3) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒	1

The project would redevelop a predominantly vacant industrial site with an approximately 312,000 square foot data center. Although approval of the project would result in a slight increase in jobs in the City, the proposed project would not induce substantial population growth in the City or substantially alter the City's jobs/housing ratio and would therefore result in a less than significant population and housing impact. The project would not displace housing or residents.

4.12.3 Conclusion

The proposed project would not result in significant population or housing impacts. **[Less Than Significant Impact]**

4.13 PUBLIC SERVICES

4.13.1 Setting

4.13.1.1 *Fire Service*

Fire protection services are provided by the City of Santa Clara Fire Department (SCFD). The SCFD is comprised of approximately 176 fire service personnel and 65 volunteers. The SCFD receives approximately 7,500 emergency calls per year, including hazardous materials, emergency medical, specialized rescue, and fires.[14] The goal of the SCFD is to maintain a force sufficiently staffed and deployed to sustain a three-minute response time to initial calls 90-95 percent of the time.[15]

The department consists of ten stations distributed throughout the City. The closest station to the project site is Station 1, located at 777 Benton Street, which is approximately one mile south of the project site.

4.13.1.2 *Police Service*

Police protection services are provided by the City of Santa Clara Police Department (SCPD). The SCPD has approximately 148 sworn officers, 48 civilian employees, and 32 reserves. Police headquarters are located at 601 El Camino Real, approximately one mile southeast of the project site.[16]

4.13.1.3 *Parks and Schools*

The nearest public parks to the project site are the Reed Street Dog Park, located at 888 Reed Street (approximately 0.3 miles west of the site), and Larry J. Marsalli Park, located at the intersection of Lafayette Street and El Camino Real (approximately 0.7 miles southwest of the site).

The nearest schools to the project site are Scott Lane Elementary School, located at 1925 Scott Boulevard (approximately 1.8 miles west of the site traveling by road), Buchser Middle School, located at 1111 Bellomy Street (approximately 1.4 miles south of the site), and Santa Clara High School, located at 3000 Benton Street (approximately 3.1 miles southwest of the site).

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[14] City of Santa Clara, *Fire Department Fact Sheet- FY 2004/05*, http://www.ci.santa-clara.ca.us/pdf/collateral/FactSheet-FireDept.pdf , November 30, 2007.
[15] City of Santa Clara, *City of Santa Clara General Plan 2000-2010*, 2002.
[16] City of Santa Clara Police Department, http://www.ci.santa-clara.ca.us/police/pol_index.html, November 30, 2007.

4.13.2 Environmental Checklist and Discussion of Impacts

PUBLIC SERVICES					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project: 1) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:					
Fire Protection?	☐	☐	☒	☐	1
Police Protection?	☐	☐	☒	☐	1
Schools?	☐	☐	☒	☐	1
Parks?	☐	☐	☒	☐	1
Other Public Facilities?	☐	☐	☐	☒	1

4.13.2.1 *Public Services Impacts*

The proposed project is the redevelopment of an industrial site with an approximately an approximately 312,000 square foot data center. The proposed redevelopment on the site would be reviewed by the City of Santa Clara Police and Fire Departments before project approval. The project would be constructed in conformance with current codes, including features that will reduce potential fire hazards and increase security. Based upon consultation with City of Santa Clara Public Works Staff, sufficient water is available for fire flow at the site. The proposed project may result in an incremental increase in the need for police and fire services, but would not require the construction of new facilities or stations.

The proposed project would not generate substantial population growth in the project area or result in the use of public park facilities in the City by new residents. Some employees at the project site may visit local parks, however, it is not anticipated that this use would create the need for any new facilities or adversely impact the physical condition of existing facilities.

The proposed project is located 1.4 miles from the closest school site and would not generate new students. The project, therefore, would not result in an increase in school population or result in the need for new school facilities, or modification to school facilities, that could result in significant environmental impacts.

4.13.3 Conclusion

The project would not result in significant impacts to public facilities. **[Less Than Significant Impact]**

4.14 RECREATION

4.14.1 Setting

The City of Santa Clara General Plan states that neighborhood parks and recreational centers are of great importance to the City. The City currently maintains 38 municipal parks and playgrounds, including a wildlife and natural vegetation park, and a skate park. Neighborhood parks typically range in size from one to 10 acres. The Department of Parks and Recreation also maintains a recreational program that supports a wide variety of activities including a Senior Citizens Center, a gymnastics center, nine neighborhood tennis centers, a Youth Activities Center, baseball fields, a football field, basketball courts, picnic facilities, and the International Swim Center. The City's recreational system is augmented by local school facilities, which are available to the general public.[17]

The nearest general use public park to the project site is Larry J. Marsalli Park, located approximately 0.7 miles southwest of the site at the intersection of Lafayette Street and El Camino Real.

4.14.2 Environmental Checklist and Discussion of Impacts

RECREATION					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project:					
1) 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?	☐	☐	☒	☐	1
2) 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?	☐	☐	☐	☒	1

Although the proposed project may increase employee usage of nearby parks and recreation facilities, this increase would not have an impact on these facilities such that adverse physical effects would result.

4.14.3 Conclusion

The proposed project would not result in significant impacts to parks and recreational facilities. **[Less Than Significant Impact]**

[17] City of Santa Clara, *City of Santa Clara General Plan 200-2010*, 2002

4.15 TRANSPORTATION

4.15.1 Setting

4.15.1.1 *Existing Roadway Network*

The project site can be accessed from Reed Street and Mathew Street. Regional access is provided by US 101 and Central Expressway. Local access is provided by De La Cruz Boulevard, Martin Avenue and Mathew Street (refer to Figures 2 and 3).

4.15.1.1 *Regional and Local Roadway Access*

4.15.1.2 Existing Transit Service

Transit service in the area includes local bus service provided by the Santa Clara Valley Transportation Authority (VTA).

Bus Service

Two local bus routes serve the project area. Route 44 provides service on weekdays between the Santa Clara Transit Center (El Camino Real and Railroad Avenue) to North First Street and River Oaks Parkway in San José with 20 to 50 minute headways. Buses operate northbound in the morning and southbound in the evening. Route 304 also operates only on weekdays and provides limited stop service between the Santa Teresa light rail transit (LRT) station in South San José and the Mountain View Caltrain Station via De La Cruz Boulevard and Central Expressway. It operates northbound in the morning and southbound in the evening.

Caltrain and ACE

The Santa Clara Caltrain station is located approximately one mile from the project site, near Railroad Avenue and El Camino Real. Caltrain commuter rail service between San Francisco to Gilroy and the Altamont Commuter Express (ACE) rail service between Stockton and San José both stop at the Santa Clara Caltrain Station. Caltrain provides service with 15- to 30-minute headways during commute hours. The ACE rail service operates four trains during the morning and afternoon commute periods.

4.15.1.3 Existing Pedestrian and Bicycle Facilities

Pedestrian facilities comprise sidewalks, crosswalks, and pedestrian signals. Sidewalks are provided on both sides of the roadways bordering the project site.

Bicycle facilities comprise paths (Class I), lanes (Class II), and routes (Class III). Bicycle paths are paved trails that are separate from roadways. Bicycle lanes are lanes on roadways designated for bicycle use by striping, pavement legends, and signs. Bicycle routes are roadways designated for bicycle use by signs only. There are no bicycle paths, lanes or routes in the project vicinity.

4.15.2 Environmental Checklist and Discussion of Impacts

TRANSPORTATION/TRAFFIC					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project:					
1) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio of roads, or congestion at intersections)?	☐	☐	☒	☐	1
2) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐	1
3) 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?	☐	☐	☐	☒	1
4) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible land uses (e.g., farm equipment)?	☐	☐	☐	☒	1
5) Result in inadequate emergency access?	☐	☐	☐	☒	1
6) Result in inadequate parking capacity?	☐	☐	☐	☒	1
7) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	☒	1

4.15.2.1 *Overview*

Access to the site would be provided via one driveway on Reed Street and one driveway on Mathew Street (see Figure 3). Access to the proposed electric substation would be from the Mathew Street driveway.

The proposed data center would employ approximately 30 people. In addition, approximately 20 clients would visit the site to work on the servers at the facility.[18] At any one time, an estimated 50 people would be at the site.

[18] Source: Ron Ronconi, Principal Architect, CAS Architects, Inc., personal communications, October 11, 2007.

Traffic Impacts

The standard reference for trip generation, the Institute of Transportation Engineers (ITE) trip generation manual (7th Edition, 2003), does not include trip generation rates for data centers. Trip generation rates, including during peak hour periods, are expected to be low, however, due to a low employment density and the occupation of much of the building with equipment. The proposed project is anticipated to generate less than 100 new peak hour trips or add less than 10 vehicles per lane during the peak hour on surrounding streets. For these reasons, the proposed project is not anticipated to result in transportation level of service impacts to signalized intersections or freeway segments.

Transit Impacts

Some employees and visitors to the site may use public transit (bus or train services) to access the site.

Transit service impacts are defined to occur when a project conflicts with existing or planned transit facilities or generates potential transit trips without providing adequate facilities for pedestrians and bicyclists to access transit routes and stops.

VTA, Caltrain, and ACE provide transit service to the Santa Clara Caltrain Station and Santa Clara Transit Center, approximately one mile from the site. In addition, VTA also provides bus service along De La Cruz Boulevard near the project site. There are adequate pedestrian connecting the project site to the bus stops on De La Cruz Boulevard.

The project is expected to generate less than ten new trips during the peak hour. All transit lines serving the project site can comfortably accommodate higher passenger loads. Thus, transit capacity is sufficient to adequately handle all new transit trips generated by the proposed project.

Based on the impact criteria listed above, the proposed project would not have a significant impact on transit facilities.

Impacts to Pedestrian or Bicycle Facilities

The project would modify existing sidewalks on Reed Street and Mathew Street to accommodate two new driveways. Other than temporary impacts during construction, the project would not result in conflicts with pedestrian facilities in the area. The project would not impact bicycle facilities in the project vicinity.

The project includes on-site bicycle storage, changing rooms, and showers to accommodate travel by bicycle by employees and clients.

Parking

The data center building would be approximately 312,000 square feet in size. The project proposes 182 parking spaces, which is above City of Santa Clara parking requirements of one space per 2,000 square feet for warehouse-type uses (Santa Clara Municipal Code Section 18.74.020).

Emergency Access

Emergency access would be provided to the site via the two project driveways. Paved access is proposed to extend around the entire building. The final site design is proposed to be consistent with regulatory requirements for fire truck access.

4.15.3 Conclusion

The proposed project would have adequate parking and would not result in significant transportation impacts. **[Less Than Significant Impact]**

4.16 UTILITIES AND SERVICE SYSTEMS

4.16.1 Setting

4.16.1.1 *Water Service*

Water services to the site are provided by the City of Santa Clara Department of Water and Sewer Utilities. The Santa Clara Water Utility has a capacity of 80 million gallons per day (mgd) and produces an average of 24 mgd. The Water System consists of more than 330 miles of water mains, 27 wells and seven storage tanks with more than 27 million gallons of water capacity. Drinking water is provided by an extensive underground aquifer (access by the City's wells) and by two wholesale water importers: the Santa Clara Valley Water District (SCVWD) (imported from the Sacramento-San Joaquin Delta) and the San Francisco Hetch-Hetchy System (imported from the Sierra Nevada). About 35 percent of the City's water comes from these imported treated water supplies. The remaining 65 percent is pumped from the City's system of 27 deep wells. The three sources are used interchangeably or are blended together. A water recharge program administered by SCVWD from local reservoirs and imported water enhances the dependability of the underground aquifer.

The General Plan states that in 1988, the City used approximately 10 billion gallons of water for a population of 90,879. The current water demand (2007) is approximately 7.6 billion gallons per year[19] for an estimated population of 113,600.[20]

The South Bay Water Recycling Program was initiated to reduce the amount of effluent entering San Francisco Bay from the San José/Santa Clara Water Pollution Control Plant. The City of Santa Clara recycles approximately one percent of its water through non-potable uses by businesses, industries, parks, and schools along pipeline routes.

There are existing water lines in Reed Street and Mathew Street.

4.16.1.2 *Wastewater*

Wastewater from the City of Santa Clara is treated at the San Jose/Santa Clara Water Pollution Control Plant, located near Alviso. The Water Pollution Control Plant (WPCP) is owned jointly by the two cities and is operated by the City of San José's Department of Environmental Services. The WPCP is one of the largest advanced wastewater treatment facilities in California and serves over 1,500,000 people in San José, Santa Clara, Milpitas, Campbell, Cupertino, Los Gatos, Saratoga, and Monte Sereno. The WPCP provides primary, secondary, and tertiary treatment of wastewater and has the capacity to treat 167 million gallons of wastewater a day (mgd).[21]

The WPCP is currently operating under a 120 million gallon per day dry weather effluent flow constraint. This requirement is based upon the State Water Resources Control Board and the Regional Water Quality Control Board concerns over the effects of additional freshwater discharges from the WPCP on the saltwater marsh habitat, and pollutant loading to the Bay from the WPCP.

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[19] City of Santa Clara Water Utility, Consumer Confidence Report 2007.
[20] Association of Bay Area Governments, Projections 2007. Note: this population estimate was calculated by averaging the 2005 and 2010 population numbers for the City of Santa Clara.
[21] City of San Jose website.

Approximately ten percent of the plant's effluent is recycled for non-potable uses and the remainder flows into San Francisco Bay.

Sanitary sewer lines that serve the project site are maintained by the City of Santa Clara Sewer Utility.

4.16.1.3 *Storm Drainage*

The City of Santa Clara owns and maintains the municipal storm drainage system which serves the project site. Stormwater sheets off the site and into storm drains located on Reed Street and Mathew Street, eventually flowing to the Guadalupe River and the San Francisco Bay.

4.16.1.3 *Solid Waste*

Solid waste collection in the City of Santa Clara is provided by Mission Trail Waste System through a contract with the City. The City has an arrangement with the owners of the Newby Island Landfill, located in San José, to provide disposal capacity for the City of Santa Clara through 2019. Recycling services are provided through Stevens Creek Disposal and Recycling. The City of Santa Clara is working to meet the waste diversion goal of 50 percent set by the state law for all jurisdictions to be met by 2000. According to the California Integrated Waste Management Board's website, preliminary information identified a diversion rate of between 41 and 45 percent for the City of Santa Clara.

4.16.1.4 *Natural Gas and Electricity Services*

Electric service is provided to the site by Silicon Valley Power and natural gas is provided by Pacific Gas and Electric (PG&E).

4.16.2 <u>Environmental Checklist and Discussion of Impacts</u>

UTILITIES AND SERVICE SYSTEMS					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project:					
1) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒	1
2) 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?	☐	☐	☐	☒	1
3) 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?	☐	☐	☐	☒	1

UTILITIES AND SERVICE SYSTEMS					
	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
Would the project:					
4) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒	1
5) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒	1
6) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒	1
7) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒	1

4.16.2.1 *Water Supply*

The proposed project would increase water demand by 105 gallons per day over the estimated demand of the previous development on site.[22] Recycled water from South Bay Recycling is proposed to be used in the two 500,000-gallon chilled water storage tanks in the service yard. Redevelopment of the project site with new industrial uses would incrementally increase demand of water, but would not substantially increase demand beyond what is anticipated in the City's General Plan. Adequate water supply services are available to serve the project site.

4.16.2.2 *Wastewater*

The WPCP has the capacity to treat 167 million gallons of wastewater a day. Currently, the WPCP is operating under a 120 million gallon per day dry weather effluent flow constraint. The proposed project will have an average wastewater flow of approximately 109,840 gallons per day under peak conditions, with an instantaneous peak of 290,880 gallons per day.[23] Effluent flows from the WPCP would be reduced to the extent that the project would use recycled water in cooling systems. With implementation of the proposed project, the WPCP will still operate below the required 120 million gallons per day constraint and would not increase the need for wastewater treatment beyond the capacity of the WPCP. As a result, the WPCP has the ability to treat wastewater generated by the proposed project.

[22] Barry Schmitt, PE, personal communication, November 2007.
[23] This represents flows for the proposed project; wastewater flows from the existing warehouses on Mathew Street have not been subtracted.

Sanitary Sewer Infrastructure

Sanitary sewer lines installed on-site would connect to existing sanitary sewer lines in Mathew Street and Reed Street.

The output of the latest City of Santa Clara Sanitary Sewer Capacity Model (SSCM) run shows that a sanitary sewer main extension or sanitary sewer main upsizing downstream of the project site is not required to accommodate the project at build-out (i.e., completion of Phase II) under the 290,880 gallon/day peak flow conditions. Repeated peak flow conditions on a daily basis could affect other users of the system over time. The SSCM output may change based on pending development applications and future projects. The SSCM output does not guarantee or in any way reserves or holds sewer capacity until a developer has final approval for the project. An on-site facility to regulate peak discharges to the sanitary sewer system could avoid future upgrades to the public infrastructure.

In the event inadequate downstream capacity is identified in future SSCM runs prior to the developers obtaining final approval for the project, the project will provide a fair share contribution or construct sanitary sewer main extensions or sanitary sewer main upsizing at the developer's expense. It is anticipated that any required improvements could be installed within public streets, and would not result in substantial physical impacts to the environment. This assumes the implementation of standard dust and sediment control measures by contractors installing new sanitary sewer infrastructure.

4.16.2.3 *Storm Drainage*

As discussed in *Section 4.8, Hydrology and Water Quality*, the proposed project would decrease the percentage of impervious surfaces on site from the previous developed condition, reducing overall stormwater flows. On-site drainage facilities would be designed to meet City of Santa Clara standards and would drain to the existing storm drain system. Due to the decrease in impervious surface on site and implementation of C.3/post-construction measures (ie., direction of runoff to vegetated swales), it is anticipated that runoff from the site would be reduced, and therefore would not exceed the capacity of the City's storm water drainage system.

4.16.2.4 *Solid Waste*

The City of Santa Clara has secured landfill disposal capacity for all the City's solid waste requirements until the year 2019 through an agreement with Newby Island Landfill in San José. The proposed project would result in an incremental increase in waste sent to the landfills, but would not result in the landfill exceeding capacity.

4.16.2.4 *Natural Gas and Electricity Services*

The project proposes to construct an electrical primary substation and associated electrical equipment to provide for the electric demand of the proposed data center uses. Silicon Valley Power will route new 60kV loop feeders into and through the station along Mathew Street.

Pacific Gas and Electric (PG&E) owns natural gas distribution facilities within the City of Santa Clara. The proposed project would incrementally increase natural gas use, but would not require the construction of any additional off-site facilities.

4.16.3 Mitigation and Avoidance Measures

The project includes the following measures to avoid possible future impacts to sanitary sewer level of service and to reduce wastewater flows from the site:

- In the event inadequate downstream capacity is identified, the project will provide a fair share contribution or construct sanitary sewer main extensions or sanitary sewer main upsizing, at developers expense, to the satisfaction of the Director of Public Works and the Director of Planning and Inspection. The fair share contributions shall be used by the City of Santa Clara to construct necessary sanitary sewer improvements.

- The project shall attenuate the instantaneous sanitary sewer peak flow to regulate the discharge with an on-site facility, such as an underground retention system or other means, to the satisfaction of the Director of Public Works.

- The project includes the use of water conserving fixtures including dual flush toilets, waterless urinals and low flow showers and faucets with aerators.

4.16.4 Conclusion

The proposed project would not exceed the capacity of existing utilities and service systems. **[Less Than Significant Impact]**

4.17 MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Source(s)
1) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐	1
2) 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)?	☐	☐	☒	☐	1
3) Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals?	☐	☐	☒	☐	1
4) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐	1

Discussion: With the implementation of the mitigation and avoidance measures included in the project and described in the specific sections of this report (refer to *Section 4. Environmental Setting, Checklist, and Discussion of Impacts*), on pages 7-68 of this Initial Study, the proposed project would not result in significant environmental impacts.

4.17.1 Global Climate Change Impacts (Cumulative Impacts and Long-Term Environmental Goals)

Global climate change is the alteration of the Earth's weather including its temperature, precipitation, and wind patterns. Global temperatures are affected by naturally occurring and anthropogenic-generated atmospheric gases, such as carbon dioxide, methane, and nitrous oxide. These gases allow sunlight into the Earth's atmosphere, but prevent radiative heat from escaping into outer space, which is known as the "greenhouse" effect. The world's leading climate scientists have reached consensus that global climate change is underway and is very likely caused by humans.[24]

[24] IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Available at: http://www.ipcc.ch/.

Agencies at the international, national, state, and local levels are considering strategies to control emissions of gases that contribute to global warming. There is no comprehensive strategy that is being implemented on a global scale that addresses climate change; however, in California, a multi-agency "Climate Action Team" has identified a range of strategies and the Air Resources Board, under Assembly Bill (AB) 32, has been designated to adopt the main plan for reducing California's GHG emissions by January 1, 2009, and various regulations and other initiatives for reducing GHG emissions by January 1, 2011. AB 32 requires achievement by 2020 of a statewide greenhouse gas emissions limit equivalent to 1990 emissions, and the adoption of rules and regulations to achieve the maximum technologically feasible and cost-effective greenhouse gas emissions reductions. By 2050, the state plans to reduce emissions to 80 percent below 1990 levels.

While the state of California has established programs to reduce greenhouse gas emissions, there are no established standards for gauging the significance of greenhouse gas emissions. Neither CEQA nor the CEQA Guidelines provide any methodology for analysis of greenhouse gases. Given the global scope of global climate change, the challenge under CEQA is for a Lead Agency to translate the issue down to the level of a CEQA document for a specific project in a way that is meaningful to the decision making process. Under CEQA, the essential questions are whether a project creates or contributes to an environmental impact or is subject to impacts from the environment in which it would occur, and what mitigation measures are available to avoid or reduce impacts.

4.17.1.1 *Impacts From the Project*

The proposed project is the construction and operation of a data center. Data centers, because of the concentration of computer servers and electrical equipment within buildings and the associated needs for cooling and temperature control, use one to two percent of the electricity in California. The project would generate greenhouse gases primarily through electricity generation/use and, to a lesser extent, generation of vehicle trips. Efforts to reduce the project's greenhouse gas emissions by reducing electricity demand and reducing vehicle trips and miles, therefore, should be implemented.

The project proposes to include design features outlined in the United States Green Building Council's LEED (Leadership in Energy and Environmental Design) rating system to achieve a Silver Certification. The LEED features in the proposed building to reduce energy use and resulting carbon dioxide equivalent emissions are summarized in Table 4.17-1.

Given the overwhelming scope of global climate change, it is not anticipated that a single development project would have an individually discernable effect on global climate change. It is more appropriate to conclude that the greenhouse gas emissions generated by the proposed project would combine with emissions across the state, nation, and globe to cumulatively contribute to global climate change.

To the extent that the project incorporates energy saving measures for building cooling and is located in a service area with reliable electric power (limiting the use of backup emergency generators), a centralized data center on a Brownfield site would be consistent with several strategies identified by the State of California Climate Action Team (CAT) to reduce greenhouse gas emissions.[25]

[25] These general strategies include strategies for water use efficiency, green building, increased recycling, and reduced vehicle miles traveled (in this case, obtaining construction materials from sources within 500 miles of the project site and providing for alternative transportation use).

Table 4.17-1 Energy Conservation and Sustainability Features Included in the Project to Achieve Silver LEED Certification	
Sustainable Site Features	**Comments**
Site Selection	The project involves redevelopment of a Brownfield site within an established industrial area of the City of Santa Clara. Use of a Brownfield site requires less energy use for the construction of infrastructure and transportation. Contamination from previous uses will be remediated as appropriate for the proposed use.
Alternative Transportation	Bicycle storage, changing rooms and showers are provided to encourage alternative transportation methods and healthy life style. Preferred parking spaces will be provided for low-emitting and fuel efficient vehicles.
Heat Island Effect	The proposed project includes installation of a White TPO (thermoplastic polyolefin) roof membrane to reflect light and heat, decreasing building cooling requirements and reducing the heat island effect.
Water Efficiency Features	
Water Use Reduction	Recycled water from South Bay Water Recycling would be used for landscape watering and for the make-up water for the cooling towers. Water from South Bay Water Recycling is tertiary-treated sewage effluent. Potable water use would be reduced by 50 percent through the use of water conserving fixtures including dual flush toilets, waterless urinals and low flow showers and faucets with aerators.
Energy and Atmosphere Features	
Building Envelope	Low E energy saving glass is included in the project to reduce heat load and retain visual transmission for day lighting. Wall and roof insulation will exceed Title 24 requirements.
Energy Performance	Highly efficient mechanical system (for heating and cooling) would save a minimum of 15% over the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) 90.1 Standard.
Materials and Resources Features	
Construction Waste Management	The proposed Construction Waste Management Plan for the project would recycle and/or salvage at least 50% and up to 75% of construction and demolition waste.
Recycled Materials	Materials with recycled content of at least 20% of the total value of the materials in the project would be used, reducing the impacts from extraction and processing of virgin materials.

Table 4.17-1 Energy Conservation and Sustainability Features Included in the Project to Achieve Silver LEED Certification	
Sustainable Site Features	**Comments**
Regional Materials	Twenty (20) percent of the total value of the materials used to construct the project would be from within a 500 mile radius, reducing environmental impacts from transportation
Certified Wood	Ninety-five (95) percent of wood-based materials and products used in the project would be from managed forests certified by the Forest Stewardship Council (FSC)
Indoor Environmental Quality Features	
Increased Ventilation	Outdoor air ventilation rates are increased by at least 30 percent above the minimum rates required by ASHRAE's Standard.
Construction Indoor Air Quality	Construction Indoor Air Quality management plans would be implemented to reduce indoor air quality pollution during construction and before occupancy.
Low-Emitting Materials	Low VOC paints, adhesives, sealants and carpets would be used to reduce the quantity of indoor air contaminants. Composite wood and agrifiber products used inside the building have no added urea-formaldehyde resins.
Green Housekeeping/ Maintenance	The owner proposes to institute a green housekeeping plan and training program for all occupants and cleaning personnel on green housekeeping procedures, including using low toxicity cleaning products, energy and water conservation measures, measures to minimize chemical exposure, pest management and landscape maintenance procedures.

4.17.1.2 *Impacts to the Project*

Impacts to the project from global climate change could include reduced water availability due to changes in the Sierra snowpack and/or droughts. Energy use could also rise as average temperatures rise. The project site is located over five miles from San Francisco Bay and at elevations ranging from approximately 44-50 feet msl, is not within possible inundation areas from an up to three meter (approximately 10 feet) rise in sea level. Given that the project includes the use of recycled water for the cooling towers and landscaping, the potential for the project to be adversely impacted by reduced potable water supplies is limited.

4.17.1.3 *Significance of Cumulative Global Climate Change Impacts*

Declaring an impact significant or not implies some knowledge of incremental effects that is several years away, at best. To determine whether the proposed project would have a significant impact on global climate change is speculative, because there are no existing numerical thresholds to determine an impact. In an effort to disclose environmental impacts and to conform with the CEQA Guidelines [§16064(b)], it is the City's position that, based on the nature of this redevelopment project, its location within an established urban area served by existing infrastructure (rather than a greenfield site) and the measures included in the project to reduce energy use, the proposed project would not

impede the state's ability to reach the emission reduction limits/standards set forth by the State of California by Executive Order S-3-05 and AB 32.

Conclusion: With implementation of the proposed energy and water conservation measures, the project would not make a cumulatively considerable contribution to global climate change.
[Less Than Significant Cumulative Impact with Measures Included in the Project]

4.18 DETERMINATION

☐ 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.

_____

Kevin Riley
Director of Planning and Inspection
City of Santa Clara

Date: _____

Checklist Sources

1. CEQA Guidelines - Environmental Thresholds (Professional judgment and expertise and review of project plans).
2. City of Santa Clara, *City of Santa Clara General Plan 2000-2010*, 2002.
3. City of Santa Clara, *Municipal Code.*
4. California Department of Conservation, *Santa Clara County Important Farmland 2004*, Map. June 2005.
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9. County of Santa Clara Department of Public Works, *Soil Map Sheet 19*, 1964.
10. United States Department of Agriculture, Soil Conservation Service, *Soils of Santa Clara County*, 1968.
11. California Department of Conservation, *Geologic Map of the San Francisco-San José Quadrangle*, 1990.
12. AEI, *Phase I Environmental Assessment for 500-520 Mathew Street*, May 31, 2007.
13. AEI, *Phase I Environmental Assessment for 535-555 Reed Street*, May 31, 2007.
14. Federal Emergency Management Agency, *Flood Insurance Rate Map, Community Panel No. 060350 0003D*, December 22, 1998.
15. Airport Land Use Commission, *Land Use Plan for Areas Surrounding Santa Clara County Airports*, September 1992.

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Stellar Environmental Solutions, Inc, *Year 2005 Groundwater Monitoring Documentation Report and Petition for Case Closure (Included in Appendix C (References) of the Phase I Environmental Assessment for 535-555 Reed Street).*

The California Office of Historic Preservation, *Technical Assistance Series #6, California Register and National Register: A Comparison*, March 2006.

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Appendix A

A-1 SC-1 CEQA Air Quality

A-2 National Ambient Air Quality Standards (NAAQS) Modeling Report

Appendix A-1

SC-1 CEQA Air Quality

1.0 AIR QUALITY

1.1 Environmental Setting

An air basin is a region that has similar meteorological and topographic conditions. Air quality within a basin is influenced by various factors, including the amount of pollutant emissions and the ability of the atmosphere to transport and dilute those pollutants. Air quality can also vary within a basin, and is therefore monitored by county, as well as basin, for some pollutants. Wind, topography, sunlight, and climate are major factors that determine pollutant dispersion.

The U.S. Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) and the California Air Resources Board (CARB) has established California Ambient Air Quality Standards (CAAQS) to assist with regulation of criteria pollutants within both in an air basin and counties within the basin. Criteria pollutants include, Ozone (O_3), Nitrogen Dioxide (NO_2), Carbon Monoxide (CO), Sulfur Dioxide (SO_2), Particulate Matter 10 microns in diameter or less (PM_{10}), and lead (Pb).

Toxic Air Contaminants (TACs) are not criteria pollutants; however, they are of concern because exposure can lead to increased human health risks. Normal operations or accidental releases from petroleum refining, diesel engine operation, motor exhaust from cars and trucks, and other operations, can release TACs into the atmosphere.

The proposed project is located in the City of Santa Clara, which is in Santa Clara County, California and is part of the San Francisco Bay Area Air Basin (SFBAAB). Santa Clara extends to the southeast from the San Francisco Bay and is oriented in a northwest-southeast direction with mountain ranges on either side. The City is located primarily at sea level although the southern and eastern regions extend into the foothills of the Santa Cruz and Diablo Mountain Ranges. The climate in Santa Clara is characterized as Mediterranean, due to distinct wet and dry seasons and mild weather. The wet season is from October to March during which most (>80 percent) of the 14.4 inches of mean annual rain will fall. The dry season has warm sunny days and little rain fall. Typical dry season temperatures average 70° F and in the wet season are closer to 50° F. Dry season winds are calm around sunset and mid-day; however a strong northwesterly breeze can develop in the afternoon, due to the City's proximity to the San Francisco Bay and Pacific coast.

The proposed project site is adjacent to the Norman Y Mineta San Jose International Airport and a Cal Train Rail Line. The site is at sea level and near the southern part of the San Francisco Bay, north of downtown San Jose. The proposed project site is located within the Bay Area Air Quality Management District (BAAQMD). The BAAQMD administers air quality regulations for Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara Counties, and the southern portions of Solano and Sonoma Counties. It is the responsibility of the BAAQMD to ensure that state and federal ambient air quality standards are achieved and maintained in the region.

Air quality measurements within the SFBAAB have exceeded CAAQS for Ozone (O_3) and Particulate Matter 10 microns in diameter or less (PM_{10}). Both PM_{10} and O_3 are considered regional pollutants, because their effects and concentrations tend to be relatively uniform over a given air basin. As such, the Santa Clara portion of the SFBAAB is considered a nonattainment area for CAAQS for O_3 and PM_{10}. The proposed project area is considered an attainment area for National Ambient Air Quality Standards (NAAQS) for all other criteria pollutants.

The proposed project would include 2 gas-fired boilers, for space heating, and 32 diesel-powered generators to be used for back-up power. Operation of these stationary sources is regulated by the BAAQMD and will require a permit issued by the agency. Based on advances in diesel emission control technology and the incremental cancer risk associated with diesel particulates, BAAQMD has established a Risk Management Policy for Diesel Engines. The policy lists criteria for approval of projects, including the use of low-NO_x boilers. Operation of the boilers and generators will need to conform to BAAQMD permit requirements.

1.2 Sensitive Receptors

Residences, schools, retirement homes, hospitals, and other establishments that attract the elderly, children, and the ill, are considered sensitive receptors. The sensitive receptors in closest proximity to the proposed project site are:

- A private, indoor soccer facility, 500 Mathew St., 500 feet west of the site.
- Multi-family residences on the west side of Lafayette St. near Reed St., roughly 1,100 feet west of the site.
- Multi-family (loft) residences on the east side of Lafayette St. and Di Giulio Ave. and Lafayette St. and Parker Ct., roughly 1,100-1,200 feet west of the site.

Scott Lane Elementary School (K-5) is the closest school (4,000 feet or 0.8 mile) west of the site. The Reed St. Dog Park on the east side of Lafayette St. at Reed St., is the closest public park (1,100 feet) west of the site.

1.2.1 Air Quality Checklist

	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
WOULD THE PROJECT:				
a) Conflict with or obstruct implementation of the applicable air quality plan or regulation?	☐	☐	☒	☐
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 which exceed quantitative thresholds for ozone precursors)?	☐	☒	☐	☐

	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
d) Expose sensitive receptors to substantial pollutant concentrations (e.g., children, the elderly, individuals with compromised respiratory or immune systems)?	☐	☐	☒	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

1.3 Discussion

a,b) The emissions associated with project operations are presented in Table 1, Project Operational Emissions, and are summarized below. BAAQMD considers emissions from a criteria pollutant, in excess of 15 tons/year, to cause a significant impact on regional air quality.

Table 1.
Projected Operational Emissions[1]

Emission Source	tons/ yr		
	Reactive Organic Compounds (ROC)	Nitrogen Oxides (NO_x)	Respirable Particulate Matter(PM_{10})
Stationary Sources			
Gas Fired Boilers	0.08	0.73	0.06
Diesel Generators (testing & maintenance only)	1.12	9.45	0.35
Vehicle Trips	n/a	n/a	n/a
*Area Sources	n/a	n/a	n/a
TOTAL	1.20	10.18	0.41
Significance Criteria	15	15	15
Significant?	*No*	*No*	*No*

*Area Sources = estimated emissions from natural gas, landscaping, consumer products, and architectural coatings within the project area.
[1]Note: All assumptions used to calculate emissions for generators and gas-fired boilers are based on calculations found in the Application for ATC/PTO submitted to the BAAQMD, November, 2007, and prepared by AMEC Earth and Environmental.

As shown in Table 1, the emissions associated with the project operations (testing and maintenance of diesel generators and operation of gas fired boilers) are well below BAAQMD significance criteria for significant air quality impacts. Therefore, operational emissions would not cause or contribute to a violation of an air quality standard, or conflict with applicable plans and programs regulating ambient air quality. Less Than Significant Impact.

c) Data from the BAAQMD air quality monitoring station on Jackson St. in San Jose, approximately 4 miles from the proposed project site indicates that this is a nonattainment area for PM_{10} and O_3. In addition, the SFBAAB is considered a nonattainment area in PM_{10} and O_3. Emissions associated with the project operations are well below BAAQMD standards, and therefore impacts to regional air quality would be considered less than significant after mitigation. Less Than Significant Impact with Mitigation.

Mitigation Measures Air-1

- Engine generators will be Tier 2 compliant (low-NO_x)
- Selective catalytic reduction (SCR) units will be installed on each engine
- Use of ultra-low sulfur diesel (ULSD) fuel
- All equipment engines shall be maintained in good condition, in proper tune (per manufacturer's specifications), and in compliance with all State and Federal requirements

d) Health-based air quality standards have been established by the state and federal government for the following criteria air pollutants: O_3, CO, NO_2, PM_{10}, SO_2, and lead (Pb). These standards were established to protect sensitive receptors from adverse health impacts due to exposure to air pollution. It is the responsibility of the BAAQMD to ensure that state and federal ambient air quality standards are achieved and maintained in the SFBAAB. The emissions associated with project operation are presented in Table 1. As shown in Table 1, the emissions are well below the BAAQMD's significance criteria for air quality impacts. Thus, operational emissions would not cause or contribute to exposure of sensitive receptors. Less Than Significant Impact.

e) The project would not be expected to be a significant source of diesel exhaust particulates or objectionable odors that would cause a significant impact on a substantial number of people. Less Than Significant Impact.

Appendix A-2

National Ambient Air Quality Standards (NAAQS) Modeling Report

National Ambient Air Quality Standards (NAAQS) Modeling Report

Prepared for:

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for the:

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LIST OF APPENDICES

Appendix A - SCREEN3 Modeling Output

1.0 BACKGROUND

AMEC Earth and Environmental, Inc. (AMEC) performed air dispersion modeling of carbon monoxide (CO) and nitrogen oxides (NOx) emissions from the engine generators at the proposed Xerex Ventures LLC SC1 facility. The diesel engine-driven generators power alternate power supplies for the proposed data center. The modeling consisted of a conservative screening-level modeling approach using the SCREEN3 dispersion model. This document discusses the modeling and the results with respect to the National Ambient Air Quality Standard (NAAQS) applicable to CO and NOx.

2.0 PREDICTED CO AND NOx EMISSIONS

A total of 32 diesel engine-driven engine-generators (EGs) are proposed for the SC1 facility. All 32 EGs will use ultra low sulfur diesel as fuel (≤ 15 ppm sulfur by weight). Each EG consists of a Detroit Diesel MTU Model 16V4000G83 engine that produce 3,848 brake horsepower (bhp) to produce 2500 kW electric from the generator output terminals. In addition, each EG will be equipped with selective catalytic reduction (SCR) technology using urea liquor as the ammonia source. Based on the expected operation and allowing for SCR warm-up time, overall NOx control is about 65% for operation above cooldown/idling mode. In cooldown/idling mode, no credit is taken for SCR control of NOx because exhaust temperature may be below the minimum SCR catalyst temperature. Finally, four 1.4 MMBTU/hr gas-fired furnaces are proposed for this facility. No emissions controls are proposed for the gas-fired boilers.

AMEC used the nominal emission rates for CO and NOx for the engine loads to compute their respective emission rates for each of the engine generators for their expected operating conditions. These are as shown in the emission estimates separately submitted with the air permit application. It was assumed that all 32 EGs would be operating simultaneously. Twelve of the EGs are assumed be initially operating at 1,700 kilowatts electrical (KWe). Twelve of the EGs are assumed to initially operating at 1,450 KWe. Eight of the EGs are assumed to be initially operating at 1,100 KWe. As part of the operator-controlled shut down sequence, after transferring the data center electrical load back to the primary power supply, each EG will operate in idling / cool down mode for about five minutes. Review of the emissions estimate showed that idling / cool down operation was 5% of the assumed operating hours, but only contributed 3% of the total annual NOx, even assuming that SCR is not operating in this mode because the exhaust temperature can drop below the minimum catalyst operating temperature. Thus, the contribution of idling / cool down operating hours was ignored since including these hours will slightly reduce the predicted average annual NOx concentration.

Use of nominal emission rates for analysis of this type, rather than not to exceed values, is used because engine-to-engine variations of identical engine models and stack testing measurement uncertainties will result in an overall average value that closely matches the nominal emission rates for the given load point.

The upper-bound CO emission rate was based on the assumption that all 32 EGs operate simultaneously at rated full load. Though this scenario is extremely unlikely to occur and only for a few minutes, it provides and upper bound estimate on short-term emissions of CO. Therefore, the SCREEN3 analysis assumed 100% power for all 32 EGs to assure that the CO analysis was bounding. In addition, the differentiation in loads was made in recognition of the short-term averaging times for the CO NAAQS (1- and 8-hour average) and the potential for short-term full power needs versus the long-term NOx NAAQS (annual average) which would be better bounded by an weighted average emission rate of 7.2 lbs/hour NOx per engine.

Emissions from the gas-fired boilers were computed assuming that two of the four boilers are operating for 4380 hrs per year each. Under this scenario, the combined annual gas consumption is 14.67 MMSCF/yr.

Table 1 summarizes the CO and NOx emission rates from the EGs. As stated above, the NOx emission rates shown in Table 1 assume the weighted average power output for the 32 EGs,

whereas CO emissions are based on 100% power for all EGs. In addition, the emissions for the gas-fired boilers are also shown on Table 1. The gas boilers are designed to be redundant – only one gas boiler per building wing is needed to operate, or two out of four. The emissions from the gas-fired boilers represent only 3% of all annual NOx emissions and less than 1% of the CO emissions. Because the emissions from the boilers are relatively insignificant with respect to the total emissions and because SCREEN3 is a single emission source model, the emissions from the boilers were pooled with those from the engines for modeling.

Table 2 summarizes the physical characteristics of the stacks including stack ID, stack height, stack diameter, stack gas temperature, and stack gas flow rate for a generator. The physical characteristics shown in Table 2 were used to model emissions from the proposed generators. Again, for modeling purposes, the emissions for all 32 generators and the operating gas boilers were assumed to emit from a single point with characteristics consistent with those shown in Table 2.

3.0 AIR DISPERSION MODELING APPROACH

To assess the compliance status of the proposed back-up electrical generators, AMEC used conservative screening level modeling approach and compared predicted off-site concentrations with applicable NAAQS. Section 3.1 summarizes the SCREEN3 modeling.

3.1 SCREEN3 Modeling

AMEC used the EPA-approved dispersion model, SCREEN3 (version 96043). Because SCREEN3 is not a multi-source model, AMEC conservatively assumed that all emissions from 32 diesel generators and the gas-fired boilers were emitted from a single location. As a result, AMEC modeled only one emission point. Emission rates are summarized in Table 1 and stack characteristics are summarized in Table 2.

The SCREEN3 model was run with urban dispersion coefficients selected. In addition, the model was set to evaluate the full set of meteorological conditions. Building downwash and cavity region concentrations were evaluated using the default regulatory option. A building height of 26 feet was used to assess potential building downwash and cavity regions. This building height was used with horizontal building dimensions of 256 feet by 1099 feet. SCREEN3 results are shown in Appendix A.

3.1.1 Receptors

SCREEN3 was set up to use the automated distances array for receptor locations from 1 to 50,000 meters. In addition, SCREEN3 iterates to find the worst-case receptor location. Given the flat topography surrounding the proposed facility, all receptors were assigned elevations equivalent to the stack base.

4.0 MODELING RESULTS

4.1 SCREEN3 Results

SCREEN3 computed the maximum 1-hour average CO and NOx concentrations assuming all emissions were released from a single emission point. For all SCREEN3 modeling runs, AMEC conservatively assumed that the CO and NOx from all engine generators and gas-fired boilers were being emitted from one combined emission point.

The 1-hour average CO concentration from SCREEN3 was converted to an 8-hour average using the EPA conversion factor of 0.7. As shown in Table 3, the maximum predicted 1-hour average CO concentration from SC1 is 5,202 micrograms per cubic meter (µg/m^3) and the maximum predicted 8-hour average is 3,641 µg/m^3.

The 1-hour average NOx concentration computed with SCREEN3 was converted to an annual average concentration using the 1-hour to annual EPA conversion factor of 0.08 and a scaling factor that recognizes that the EGs will have limited operation. The EPA conversion factor of 0.08 was computed assuming that the facility operates for 8,760 hours/year. The additional scaling factor is employed to account for the fact that the EGs at SC1 will have operation limits in the permit. The scaling factor is equivalent to an assumed average EG annual operating time (216 hours) corresponding to the annual NOx emission limit (in tons per year) divided by 8,760 hours per year.

Table 4 summarizes the worst-case SCREEN3-predicted NOx concentrations from SC1. As shown in Table 4, using the conservative SCREEN3 approach, a worst-case annual NOx concentration of 2.5 µg/m^3 is predicted. For this facility, the use of SCREEN3 overestimates long-term average conditions because it cannot account for the spatial affect of stack locations on downwind receptor locations. Nor can it evaluate individual hours of operation. As a result this analysis is conservative and likely overestimates the potential impacts of the combined facilities. Nevertheless, the combined impact is predicted to be considerably less than the NAAQS for NOx.

5.0 CO AND NOx NAAQS COMPLIANCE

CO has both a 1-hour average and an 8-hour average NAAQS. These values are 40,000 µg/m^3 and 10,000 µg/m^3, respectively. The maximum predicted 1-hour and 8-hour CO concentrations from the SCREEN3 modeling (5,202 µg/m^3 and 3,641µg/m^3) are well below their respective NAAQS.

For NOx, there is only the annual average NAAQS value, which is 100 µg/m^3. The predicted worst-case annual average concentration of 2.5 µg/m^3 is below the NAAQS

This conservative modeling approach shows that the proposed diesel-driven EGs for SC1 will not violate the NAAQS for CO and NOx even at the highest permitted emissions. These conclusions apply even if the engines are assumed to operate at 100% power for CO and for the highest expected electrical load combinations for NOx.

Table 1. NOx and CO Emissions Based on Annual Estimated Emissions

Pollutant	Annual Estimated Emissions											
	Full Power Conditions [a]		Expected Operating Conditions [b]						Gas Fired Boilers		Total for Expected Operating Conditions	
			EGs Operating at 1700 kW		EGs Operating at 1450 kW		EGs Operating at 1100 kW					
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
NOx	NA [c]	NA	99.76	10.23	83.6	8.6	42.3	4.3	0.3	0.7	226.0	23.9
CO	1139	NA	NA	NA	NA	NA	NA	NA	0.28	0.61	1139.4	NA

Notes:

a - Full power peak will occur for period of time much less than one-hour, but is used to obtain upper bound CO emission rate. Assumes 32 EGs are operating at full rated output conditions corresponding to 2500 kW electric.
b - Assumes that 32 engines run simultaneously at the following outputs: 12 @ 1700 kW, 12 @ 1450 kW, and 8 @ 1100 kW.
c - NA=not applicable. These conditions were not modeled as they do not represent plausible operating scenarios for the conditions being modeled.

Table 2. Summary of Emission Characteristics – SC1

Pollutant	Stack Height (ft)	Stack Diameter (ft)	Stack Gas Temp (F)	Stack Gas Velocity (m/s)	Stack Flow (CFM)
NOx	54.5	1.5	698	17.3	10796
CO	54.5	1.5	942	28.3	17592

Notes:

Characteristics for NOx are based on nominal annual emissions while those for CO are based on very short-term theoretical maximum output conditions.

Table 3. Summary of SCREEN3 CO Results for 32 EGs at 100% Load

Pollutant	Terrain Type	Dist (m)	Predicted CO Concentration (ug/m^3)	
			1-Hr	8-hr[a]
CO	Simple Terrain	73	5,202	3,641
		CO NAAQS (ug/m^3)	40,000	10,000

Notes:
a – 8 hr avg. conc. = 1 hr avg. conc. X 0.7

Table 4. Summary of SC1 NOx SCREEN3 Results

Source	Assumed Average Hours of Operation Corresponding to Permit Limit (hrs)	SCREEN3 Modeled Worst Case 1-Hour Avg. NOx Conc. (ug/m^3) [a]	Total Predicted Annual Average NOx from SC1 (ug/m^3) [b]
SC1	216	1276	2.5

Notes:
a - Worst case concentration from SCREEN3
b - Computed as the 1-hour average concentration X 0.08 X hours of operation ÷ 8760 hours per year

APPENDIX A

SC1 SCREEN3 NOx Modeling Results

```
                                                                    11/15/07
                                                                    16:04:48
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

 SC1 NOx NAAQS Analysis - 11/15/2007  2 ft diameter engine stack

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE            =        POINT
   EMISSION RATE (G/S)    =      28.4344
   STACK HEIGHT (M)       =      16.6000
   STK INSIDE DIAM (M)    =       0.6096
   STK EXIT VELOCITY (M/S)=      17.3489
   STK GAS EXIT TEMP (K)  =     643.1500
   AMBIENT AIR TEMP (K)   =     293.1500
   RECEPTOR HEIGHT (M)    =       0.0000
   URBAN/RURAL OPTION     =        URBAN
   BUILDING HEIGHT (M)    =       7.9200
   MIN HORIZ BLDG DIM (M) =      78.0300
   MAX HORIZ BLDG DIM (M) =     334.9800

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.


BUOY. FLUX =    8.601 M**4/S**3;  MOM. FLUX =   12.745 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	0.000	1	1.0	1.1	320.0	116.33	1.73	1.71	NO
100.	1111.	3	8.0	8.9	2560.0	24.58	21.69	20.13	HS
200.	812.6	4	4.5	5.1	1440.0	37.67	31.37	27.85	NO
300.	703.9	4	3.0	3.4	960.0	48.20	46.25	41.23	NO
400.	602.8	4	2.0	2.3	640.0	64.00	60.95	54.62	NO
500.	676.2	6	1.0	1.2	10000.0	64.65	52.05	33.21	NO
600.	768.3	6	1.0	1.2	10000.0	64.65	60.84	37.43	NO
700.	800.6	6	1.0	1.2	10000.0	64.65	69.43	41.45	NO
800.	796.3	6	1.0	1.2	10000.0	64.65	77.81	45.28	NO
900.	772.0	6	1.0	1.2	10000.0	64.65	85.99	48.93	NO
1000.	737.8	6	1.0	1.2	10000.0	64.65	93.97	52.43	NO
1100.	699.7	6	1.0	1.2	10000.0	64.65	101.76	55.77	NO
1200.	661.0	6	1.0	1.2	10000.0	64.65	109.37	58.99	NO
1300.	623.5	6	1.0	1.2	10000.0	64.65	116.80	62.09	NO
1400.	587.9	6	1.0	1.2	10000.0	64.65	124.06	65.08	NO

1500.	554.8	6	1.0	1.2	10000.0	64.65	131.16	67.96	NO
1600.	524.1	6	1.0	1.2	10000.0	64.65	138.12	70.76	NO
1700.	495.8	6	1.0	1.2	10000.0	64.65	144.93	73.48	NO
1800.	469.8	6	1.0	1.2	10000.0	64.65	151.60	76.11	NO
1900.	445.8	6	1.0	1.2	10000.0	64.65	158.14	78.67	NO
2000.	423.9	6	1.0	1.2	10000.0	64.65	164.55	81.17	NO
2100.	403.6	6	1.0	1.2	10000.0	64.65	170.85	83.60	NO
2200.	385.0	6	1.0	1.2	10000.0	64.65	177.03	85.98	NO
2300.	367.8	6	1.0	1.2	10000.0	64.65	183.10	88.30	NO
2400.	351.9	6	1.0	1.2	10000.0	64.65	189.07	90.57	NO
2500.	337.2	6	1.0	1.2	10000.0	64.65	194.94	92.79	NO
2600.	323.5	6	1.0	1.2	10000.0	64.65	200.71	94.96	NO
2700.	310.8	6	1.0	1.2	10000.0	64.65	206.39	97.09	NO
2800.	299.0	6	1.0	1.2	10000.0	64.65	211.98	99.19	NO
2900.	288.0	6	1.0	1.2	10000.0	64.65	217.49	101.24	NO
3000.	277.7	6	1.0	1.2	10000.0	64.65	222.91	103.25	NO
3500.	234.9	6	1.0	1.2	10000.0	64.65	248.90	112.84	NO
4000.	203.0	6	1.0	1.2	10000.0	64.65	273.22	121.73	NO
4500.	178.4	6	1.0	1.2	10000.0	64.65	296.14	130.04	NO
5000.	158.9	6	1.0	1.2	10000.0	64.65	317.84	137.88	NO
5500.	143.2	6	1.0	1.2	10000.0	64.65	338.48	145.32	NO
6000.	130.2	6	1.0	1.2	10000.0	64.65	358.20	152.41	NO
6500.	119.3	6	1.0	1.2	10000.0	64.65	377.09	159.19	NO
7000.	110.0	6	1.0	1.2	10000.0	64.65	395.24	165.70	NO
7500.	102.1	6	1.0	1.2	10000.0	64.65	412.73	171.98	NO
8000.	95.16	6	1.0	1.2	10000.0	64.65	429.62	178.03	NO
8500.	89.12	6	1.0	1.2	10000.0	64.65	445.96	183.90	NO
9000.	83.79	6	1.0	1.2	10000.0	64.65	461.79	189.58	NO
9500.	79.05	6	1.0	1.2	10000.0	64.65	477.17	195.10	NO
10000.	74.81	6	1.0	1.2	10000.0	64.65	492.13	200.47	NO
15000.	48.59	6	1.0	1.2	10000.0	64.65	623.79	247.92	NO
20000.	35.92	6	1.0	1.2	10000.0	64.65	733.46	287.70	NO
25000.	28.48	6	1.0	1.2	10000.0	64.65	829.27	322.62	NO
30000.	23.59	6	1.0	1.2	10000.0	64.65	915.36	354.13	NO
40000.	20.12	4	1.0	1.1	320.0	111.40	1552.46	1553.40	NO
50000.	17.89	4	1.0	1.1	320.0	111.40	1745.95	1750.21	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

73.	1276.	3	8.0	8.9	2560.0	23.13	16.15	14.92	HS

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

```
****************************************
     *** REGULATORY (Default) ***
    PERFORMING CAVITY CALCULATIONS
  WITH ORIGINAL SCREEN CAVITY MODEL
          (BRODE, 1988)
****************************************
```

*** CAVITY CALCULATION - 1 *** *** CAVITY CALCULATION - 2 ***

```
  CONC (UG/M**3)     =    0.000        CONC (UG/M**3)     =    0.000
  CRIT WS @10M (M/S) =    99.99        CRIT WS @10M (M/S) =    99.99
  CRIT WS @ HS (M/S) =    99.99        CRIT WS @ HS (M/S) =    99.99
  DILUTION WS (M/S)  =    99.99        DILUTION WS (M/S)  =    99.99
  CAVITY HT (M)      =     7.92        CAVITY HT (M)      =     7.92
  CAVITY LENGTH (M)  =    50.65        CAVITY LENGTH (M)  =    39.43
  ALONGWIND DIM (M)  =    78.03        ALONGWIND DIM (M)  =   334.98

CAVITY CONC NOT CALCULATED FOR CRIT WS > 20.0 M/S.  CONC SET = 0.0

****************************************
      END OF CAVITY CALCULATIONS
****************************************


     ****************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ****************************************

 CALCULATION        MAX CONC    DIST TO   TERRAIN
  PROCEDURE        (UG/M**3)    MAX (M)    HT (M)
--------------    -----------   -------   -------
SIMPLE TERRAIN      1276.           73.        0.
```

SC1 SCREEN3 CO Modeling Results

```
                                                                    11/15/07
                                                                    16:10:06
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

SC1 CO NAAQS Analysis - 11/15/2007  - Short Term Peak Output  2 ft diam engine

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE            =        POINT
   EMISSION RATE (G/S)    =      143.527
   STACK HEIGHT (M)       =      16.6000
   STK INSIDE DIAM (M)    =       0.6096
   STK EXIT VELOCITY (M/S)=      28.3461
   STK GAS EXIT TEMP (K)  =     778.7056
   AMBIENT AIR TEMP (K)   =     293.1500
   RECEPTOR HEIGHT (M)    =       0.0000
   URBAN/RURAL OPTION     =        URBAN
   BUILDING HEIGHT (M)    =       7.9200
   MIN HORIZ BLDG DIM (M) =      78.0300
   MAX HORIZ BLDG DIM (M) =     334.9800

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.


BUOY. FLUX =   16.102 M**4/S**3;  MOM. FLUX =   28.102 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	0.000	1	1.0	1.1	320.0	176.21	2.33	2.32	NO
100.	4517.	3	10.0	11.1	3200.0	24.47	21.69	20.13	HS
200.	2731.	4	10.0	11.4	3200.0	28.77	30.99	27.42	HS
300.	2225.	4	4.5	5.1	1440.0	50.32	46.37	41.37	NO
400.	1897.	4	3.5	4.0	1120.0	59.95	60.70	54.35	NO
500.	1951.	6	1.0	1.2	10000.0	75.81	52.98	34.65	NO
600.	2417.	6	1.0	1.2	10000.0	75.81	61.64	38.72	NO
700.	2698.	6	1.0	1.2	10000.0	75.81	70.13	42.61	NO
800.	2832.	6	1.0	1.2	10000.0	75.81	78.44	46.35	NO
900.	2866.	6	1.0	1.2	10000.0	75.81	86.56	49.92	NO
1000.	2836.	6	1.0	1.2	10000.0	75.81	94.49	53.35	NO
1100.	2767.	6	1.0	1.2	10000.0	75.81	102.24	56.64	NO
1200.	2676.	6	1.0	1.2	10000.0	75.81	109.81	59.81	NO

```
  1300.   2574.        6     1.0    1.2 10000.0   75.81  117.22   62.87    NO
  1400.   2468.        6     1.0    1.2 10000.0   75.81  124.45   65.82    NO
  1500.   2362.        6     1.0    1.2 10000.0   75.81  131.54   68.68    NO
  1600.   2259.        6     1.0    1.2 10000.0   75.81  138.47   71.45    NO
  1700.   2160.        6     1.0    1.2 10000.0   75.81  145.26   74.14    NO
  1800.   2066.        6     1.0    1.2 10000.0   75.81  151.92   76.75    NO
  1900.   1978.        6     1.0    1.2 10000.0   75.81  158.45   79.29    NO
  2000.   1894.        6     1.0    1.2 10000.0   75.81  164.85   81.77    NO
  2100.   1816.        6     1.0    1.2 10000.0   75.81  171.13   84.19    NO
  2200.   1742.        6     1.0    1.2 10000.0   75.81  177.31   86.54    NO
  2300.   1674.        6     1.0    1.2 10000.0   75.81  183.37   88.85    NO
  2400.   1609.        6     1.0    1.2 10000.0   75.81  189.33   91.11    NO
  2500.   1549.        6     1.0    1.2 10000.0   75.81  195.19   93.31    NO
  2600.   1492.        6     1.0    1.2 10000.0   75.81  200.95   95.48    NO
  2700.   1439.        6     1.0    1.2 10000.0   75.81  206.63   97.60    NO
  2800.   1389.        6     1.0    1.2 10000.0   75.81  212.21   99.68    NO
  2900.   1342.        6     1.0    1.2 10000.0   75.81  217.71  101.72    NO
  3000.   1298.        6     1.0    1.2 10000.0   75.81  223.13  103.73    NO
  3500.   1112.        6     1.0    1.2 10000.0   75.81  249.09  113.27    NO
  4000.   969.3        6     1.0    1.2 10000.0   75.81  273.40  122.13    NO
  4500.   857.6        6     1.0    1.2 10000.0   75.81  296.30  130.42    NO
  5000.   768.1        6     1.0    1.2 10000.0   75.81  317.99  138.24    NO
  5500.   694.8        6     1.0    1.2 10000.0   75.81  338.63  145.66    NO
  6000.   633.9        6     1.0    1.2 10000.0   75.81  358.33  152.73    NO
  6500.   582.6        6     1.0    1.2 10000.0   75.81  377.22  159.50    NO
  7000.   538.7        6     1.0    1.2 10000.0   75.81  395.36  166.00    NO
  7500.   500.9        6     1.0    1.2 10000.0   75.81  412.85  172.26    NO
  8000.   467.9        6     1.0    1.2 10000.0   75.81  429.73  178.31    NO
  8500.   438.9        6     1.0    1.2 10000.0   75.81  446.06  184.16    NO
  9000.   413.2        6     1.0    1.2 10000.0   75.81  461.90  189.84    NO
  9500.   390.4        6     1.0    1.2 10000.0   75.81  477.28  195.35    NO
 10000.   369.8        6     1.0    1.2 10000.0   75.81  492.23  200.71    NO
 15000.   241.9        6     1.0    1.2 10000.0   75.81  623.87  248.12    NO
 20000.   179.5        6     1.0    1.2 10000.0   75.81  733.53  287.87    NO
 25000.   142.6        6     1.0    1.2 10000.0   75.81  829.33  322.77    NO
 30000.   118.3        4     1.0    1.1   320.0  168.33 1331.99 1328.86    NO
 40000.   101.5        4     1.0    1.1   320.0  168.33 1552.83 1553.77    NO
 50000.   90.27        4     1.0    1.1   320.0  168.33 1746.28 1750.54    NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND     1. M:
    73.   5202.        3    10.0   11.1  3200.0   23.03   16.15   14.91    HS

 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****************************************
     *** REGULATORY (Default) ***
    PERFORMING CAVITY CALCULATIONS
  WITH ORIGINAL SCREEN CAVITY MODEL
          (BRODE, 1988)
****************************************
```

```
 *** CAVITY CALCULATION - 1 ***        *** CAVITY CALCULATION - 2 ***
  CONC (UG/M**3)     =    0.000         CONC (UG/M**3)     =    0.000
  CRIT WS @10M (M/S) =    99.99         CRIT WS @10M (M/S) =    99.99
  CRIT WS @ HS (M/S) =    99.99         CRIT WS @ HS (M/S) =    99.99
  DILUTION WS (M/S)  =    99.99         DILUTION WS (M/S)  =    99.99
  CAVITY HT (M)      =     7.92         CAVITY HT (M)      =     7.92
  CAVITY LENGTH (M)  =    50.65         CAVITY LENGTH (M)  =    39.43
  ALONGWIND DIM (M)  =    78.03         ALONGWIND DIM (M)  =   334.98

CAVITY CONC NOT CALCULATED FOR CRIT WS > 20.0 M/S.  CONC SET = 0.0

****************************************
      END OF CAVITY CALCULATIONS
****************************************


     ****************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ****************************************

 CALCULATION        MAX CONC    DIST TO   TERRAIN
  PROCEDURE        (UG/M**3)    MAX (M)    HT (M)
--------------    -----------   -------   -------
SIMPLE TERRAIN      5202.           73.        0.
```

Appendix B

Historic Resources Evaluation

HISTORIC EVALUATION REPORT

535-555 REED STREET
CITY OF SANTA CLARA, SANTA CLARA COUNTY, CALIFORNIA

FOR

DAVID J. POWERS & ASSOCIATES
1885 The Alameda, Suite 204
San Jose, CA 95126

ATTN: Ms. Julie Mier

BY

WARD HILL
CONSULTING ARCHITECTURAL HISTORIAN
3124 Octavia Street
San Francisco, CA 94123

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Figure 1: General Project Location Map
Figure 2: Location Map
Figure 3: Sketch Map

DPR 523 Forms
Primary Record & Building, Structure & Object Record
535-555 Reed Street

I. INTRODUCTION

The proposed project would redevelop the Beaver Lumber property at 535-555 Reed Street with an Internet communications facility in warehouse type buildings. The property is near the northwest corner of Reed Street and De La Cruz Street. An Internet data center is a large building filled primarily with computer equipment and network servers. The project proposes approximately 630,000 square feet of gross building area in three, three-story buildings and one four-story parking structure on a 16-acre site. The proposed buildings would cover 79% of the site and the parking structure would cover 11 % of the site. The project would require the removal of ten buildings on the property. The site would then be redeveloped with the three industrial-style buildings, surface parking and associated landscaping. Emergency backup diesel generators and chillers are proposed at each of the three buildings. The three buildings would provide approximately 527,000 square feet for Internet data center uses and approximately 28,000 square feet for office and security services.

Mr. Ward Hill[1], consulting Architectural Historian, conducted a detailed survey of the buildings on the project site March 15, 2001. The survey identified ten buildings on the project site. The buildings on the project site are office and industrial structures. During the survey, Mr. Hill physically examined and photographed the exterior of the buildings in order to prepare written descriptions, noting exterior and interior alterations.

Mr. Hill conducted archival research conducted during March, 2001. The research concentrated on the history of the project site, the Pacific Redwood Casket Company and it precursor company, Pacific Manufacturing Company. Research was also conducted on the history of the City of Santa Clara for the historic context statement. Archival research on conducted in local repositories of historical records, including the Natural Resources Library Map Room, the Moffitt Library and the Bancroft Library, University of California, Berkeley; Local History files and the Santa Clara County Historical and Genealogical Society collection, Santa Clara City Library; Newspaper Room and the California Room at the Martin Luther King, Jr. Public Library, San Jose; the City of Santa Clara Building Department and the Assessor's Office and Office of the County Surveyor, Santa Clara County Offices, in addition to local historical materials available in Mr. Hill's personal collection of historical materials. Mr. Hill also interviewed Paul Meekins, President of the Beaver Lumber Company.

The buildings on the project site have not been previously evaluated under any local, state or federal historic designation criteria. The following historic evaluation was conducted as per the requirements of the California Environmental Quality Act (CEQA). For purposes of CEQA compliance, an historic resource is a resource listed in, or determined eligible for listing in, the California Register of Historical Resources. None of the buildings on the project site appear to be

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1. Mr. Hill (M.A. Architectural History, University of Virginia, 1983) has worked as an architectural historian and in the historic preservation field for 18 years. He has completed numerous reports evaluating historic buildings under both CEQA and Section 106 of the National Historic Preservation Act.

eligible for the California Register of Historical Resources. Consequently, the proposed project will not have a significant effect on historic resources.

II. HISTORICAL BACKGROUND

General Background

The Spanish and Mexican Period

Father Junipero Serra founded the original Mission Santa Clara de Asis on the banks of the Gaudelupe River in January, 1777. The present location is near the Central Expressway and De La Cruz Boulevard in Santa Clara. The *Pueblo de San Jose de Guadalupe* was established in November 1777 as the first civic settlement in Alta California. The mission was the eighth of the 21 missions founded during the Spanish Period. A flood in 1779 destroyed the first mission. The padre moved the mission to what is today the University of Santa Clara campus. An earthquake in 1818 destroyed the second mission. The third mission church was built in 1822 on its current site on the University of Santa Clara campus. This mission was partially rebuilt after the earthquake in 1868. Destroyed by fire in 1926, the third mission was replaced with the reconstruction extant today.

The Mexican revolt against Spain (1822) followed by the secularization of the missions (1834) changed land ownership patterns in the Santa Clara Valley. Mission Santa Clara was secularized in 1836. Only 300 Indians lived at the mission by 1839. The Spanish philosophy of government was directed at the founding of presidios, missions, and secular towns with the land held by the Crown, whereas the later Mexican policy stressed individual ownership of the land (Findlay 1980:6). During the Mexican Period, vast tracts of land were granted to individuals, including former Mission lands which had reverted to public domain. In the Santa Clara Valley, 17 parcels were granted from Pueblo Lands, and 13 from the lands of Mission Santa Clara. In 1844, James Forbes received a grant for *El Potrero de Santa Clara*, the mission land bounded by the Guadalupe River and The Alameda. The general trend for granting these lands was to give away the land farthest from the Pueblo and Mission first. Each grant also usually contained both valley and uplands acreage as well as access to a water supply (Broek 1932:44-45).

The waterfront of the *Embarcadero de Santa Clara* (later Alviso), originally developed to allow the early Spanish settlements water access, functioned as one of the foremost points of access for the trade that coursed up and down the Guadalupe River. Native Americans were employed in the trade and often manned large boats to reach ships at anchor to exchange hides and tallow, lumber, quicksilver and agricultural products for imported trade goods. Hides and tallow, and later ore from the New Almaden Mines were loaded on rafts or other flat boats and shipped down the Guadalupe.

American Period

In 1848, California became a United States territory as a result of the Treaty of Guadalupe Hidalgo ending the war with Mexico. California was not formally admitted as a state until 1850. After California was admitted as a state, Santa Clara County was one of the original 27 counties created by the California legislature. 1848 was also the year of the Gold Rush that brought a massive influx of immigrants to California from all parts of the world. California's 1848 population of less than 14,000 (exclusive of Indians) increased to 224,000 in four years. With the beginning of the American period, the population explosion resulting from the Gold Rush created a market for a wide range of agricultural products. As more and more gold seekers became discouraged with mining, they turned to farming as a livelihood. Farmers started to raise crops and livestock for sale, not just to be self-sufficient.

The population of the Santa Clara Valley expanded as a result of the Gold Rush (1848), followed later by the construction of the railroad to San Francisco (1864) and the completion of the transcontinental railroad in 1869. Throughout the late nineteenth century in the Santa Clara Valley, rancho, Pueblo, and mission lands were subdivided as the result of population growth, the Anglo-American takeover, and the confirmation of property titles. Prior to the legal resolution of titles, the transfer of real estate was extremely risky. Large cattle ranches were converted to farming varied crops, and this agricultural land-use pattern continued throughout the American Period.

Upon the transfer of California government from Mexico to the United States in 1848, American settlers in Santa Clara promoted a survey of the town on the land adjoining the mission in the typical American grid pattern. Pioneer William Campbell parceled the land into lots of 100 square yards in 1850. The grant of a lot came on the condition that a house would be built in the next three months. The area included the original grid about 2 miles long and 1.5 miles wide. The town of Santa Clara was incorporated in July, 1852. The California legislature increased Santa Clara's town limits by 1,950 acres in 1856.

Santa Clara was the site of two significant early educational institutions in the California. The Catholic Archbishop in San Francisco instructed the Jesuit priest Father Nobili to renovate the deteriorated mission buildings into a college. Santa Clara College had 12 students when it opened in 1851. The University of the Pacific opened in Santa Clara in 1852 (it moved to San Jose in 1871, than later to Stockton).

The first major business in Santa Clara was the commercial hide tanner Wampach Tannery, established in 1848. The business became Eberhard Tannery in 1866 after its purchase by Jacob Eberhard. The company made fine leather goods in Santa Clara until it closed in 1953. Santa Clara also had a number of large seed farms such as J.M Kimberlin & Company and R.W. Wilson Seed Company, later Ferry Morse, one of the world's largest seed producers. Founded in 1874, the Enterprise Mill & Lumber Company became the Pacific Manufacturing Company in 1880 after

its acquisition by James Pierce. Pacific Manufacturing was the region's largest lumber manufacturer. Other Santa Clara businesses in the 1870s included the Cameron Hotel, the Bank of Santa Clara and the town first newspaper, *The Santa Clara Echo* (Thompson & West 1876:15).

In the early American Period, the main agricultural product in California was wheat and the type grown in the Santa Clara Valley was considered to be higher quality than other areas of California. Santa Clara County's wheat production increased from 600,000 bushels to a peak of almost 3 million bushels in 1878. Wheat farming declined in California by the 1880s because yields dropped from not rotating crops and the development of competing wheat growing areas like Australia and Argentina (Hilbert and Lewis 1984:2). The development of irrigation and new transportation systems in California also led to wheat being replaced by more lucrative crops, like fruit and vegetables. The opening of the transcontinental railroad also made it easier to ship fresh and canned products to the major cities in the east coast.

The drop in wheat production coincided in Santa Clara County with a shift to fruit growing as the basis of the local agricultural economy. Horticulture had early roots in San Jose with the work of Louis Pellier, Antoine Delmas and William Daniels in developing orchards and fruit varieties for the growing conditions. The 1853 Pioneer Horticultural Society founded in San Jose provided a forum for nurseryman to meet and to promote of local horticulture. The First State Agricultural Fair was held in 1856 in San Jose with the Santa Clara County orchardists winning most of the awards. In the 1870s, prunes became the predominant crop in the Santa Clara Valley, with other fruits, like apricots and cherries, and grape vineyards, also contributing to the economy. Dried fruit production exceeded fresh fruit because of its ease of shipping and low spoilage. Both Santa Clara and Campbell vied for the title of the Prune Capitol of the World. The fruit canning industry began in 1871 when Dr. James Dawson founded the area's first commercial cannery, later known as the San Jose Fruit Packing Company. With the numerous orchards near Santa Clara, fruit canning became a major industry with A. Block Fruit Company one of the largest.

Santa Clara had a population of 3,000 in 1880. In 1885, the California Legislature established Agnew State Hospital, the first state hospital for caring for the mentally ill, just north of Santa Clara in the town of Agnew (Santa Clara annexed this area in the 1950s). In 1889, the *Santa Clara Journal* published its first newspaper and in 1891, Santa Clara completed construction on a new city hall at Benton Street and Main. The city established its own electrical utility in 1896. The population of Santa Clara increased to 3,650 by 1900. The most serious damage from the 1906 earthquake was to Agnews State Hospital where 112 patients died. The buildings had to be largely rebuilt because of earthquake damage. The Pacific Manufacturing Company, however, prospered after the earthquake, supplying lumber to rebuild the extensive devastation in San Francisco. The population of Santa Clara increased to 4,348 as many San Francisco residents fled to the surrounding towns.

In 1912, Santa Clara College changed its name to the University of Santa Clara. Santa Clara built a new Town Hall at Franklin and Washington Streets in 1913. The town library moved to the new

Town Hall. By 1920, the town of Santa Clara's population reached 5,220. In 1927, the town of Santa Clara became officially the City of Santa Clara. The City's population was 6,300 in 1930.

Food processing was still the main source of livelihood into the Depression years of the 1930s. The Santa Clara Valley had 120,000 acres in prunes worth $ 15 million, and the dehydrators produced 100 million tons a year (Christiansen et al 1996:159). The City of San Jose alone had 22 canneries in 1930, most locally owned, and 13 fruit drying plants. Migrant workers picked the fruit and seasonal cannery workers canned it for shipment all over the world. The vast majority of orchards in the valley were 100 acres or less, tended by families from Southern European countries, some of who had their fruit stands. The relationship between growers and processor was often hostile during the 1930s, with many growers forming cooperatives to negotiate prices with the canneries. In 1939, the growers went on strike against the canneries protesting the low prices offered for their fruit. The cannery workers went on strike in 1931 because of wage reductions.

A major change in the focus of the Santa Clara Valley economy occurred in 1933. When the Naval Air Station in Sunnyvale opened in 1933, a variety of other military related industries started up in the area. The military presence also helped reduce the impact of the economic downturn of the 1930s on the local populace. The beginning of World War II brought a huge influx of population and investment by the federal government because of Moffitt Field or other military research facilities. The federal government invested $ 35 billion in California during the War years. The Depression and war eras "marked the beginning of economic dependence on military contracts and the business of war" (Ignoffo 1994: 60). Originally producing equipment for the canning industry, the Food Machinery Corporation (FMC) in San Jose shifted its focus to the production of military equipment. The company remained a supplier to the Defense Department after the War.

The change in the economic focus led to eventual demise of the agricultural economy and the rise of the electronics industry in Santa Clara County. The economic changed led to the opening of the region's first major airport, San Jose Municipal Airport near Santa Clara, dedicated February 1, 1949. The expanding urbanization of Santa Clara in the 1940s and early 1950s helped spur the development of new housing for a non-farm population of working families, cannery and railroad workers, plumbers, carpenters, drivers and construction workers. In 1940, Santa Clara County had 150,000 acres of orchards and a population of 174,949; by 1950, the population rose to 289,000 while orchard acreage decreased to 86,000 (Loomis 1985:28). The population of Santa Clara was 11,700 in 1950. During the 1950s and 1960s, many of City of Santa Clara industries with roots in the 19th century, such as Eberhard Tanning and Pacific Manufacturing, closed. The population of the City of Santa Clara reached 83,500 in 1966.

In recent decades, Santa Clara has become an urban center with multi-unit housing, commercial centers, and many growing businesses, such as Intel and 3Com, in the electronics industry as "Silicon Valley" has grown. The City of Santa Clara had a population of 93,600 in 1990. The Silicon Valley boom of the 1980s and 1990s has dramatically altered the regional landscape; industrial parks, commercial districts and housing subdivisions have taken the place of the

orchards that once flourished in the project area and in the Santa Clara Valley as a whole.

III. DESCRIPTION OF HISTORIC RESOURCES

(the photos and sketch plan referenced are included with the attached DPR 523 forms)

Beaver Lumber property at 535-555 Reed Street includes 12 buildings on a flat 13.47 acre parcel bounded on the south by Reed Street and the west by Union Pacific Railroad tracks. The square plan, brick masonry building, single story at 555 Reed Street has a flat roof covered with asphalt roof paper (Photos 1 & 2). The roof has four parallel rows of 6 skylights. The simple brick walls, laid in 5-course American bond, are set on a concrete perimeter foundation. The front façade on the south has two entrance doors and a concrete ramp leading to roll-up metal door (Photo 3). The seven windows on the front façade have been replaced with pairs of modern metal sash windows. Adjacent to the west façade is an abandoned railroad spur next to a concrete loading dock below a shed roof (Photo 4). A truck loading area is at the south end of the west façade. A series of sliding wooden doors open out to the loading dock. The west façade has paired wood-sash, four over four, double-hung windows. A band of fixed pane windows are adjacent to the roof cornice. The east façade also has a series of paired, wood-sash, four over four, double-hung windows below fixed pane windows adjacent to the roof cornice. The windowless back (north) façade has three sliding wooden doors. Inside, the building has a small suite of offices at the southeast corner. The remainder of the interior is open space with an exposed wood-truss roof supported by heavy posts set on a concrete slab floor (Photos 5 & 6).

The Beaver Lumber office building at 535 Reed Street is about 200 feet east of brick building at 555 Reed Street. The office building is a modern, wood-frame structure with a gently pitched gable roof with wide eaves (Photo 7). The exterior is covered with stone facing and vertical wood siding.

A simply detailed, wood-frame lumber-storage building (#1) is just north of the office building (Photos 8 & 9). The building is divided into parallel sections (on an east/west orientation) each with a separate shed roof. The exterior walls are covered with rustic siding. The front (west) façade has double, sliding wooden doors on the north. The south façade has a single opening with a large, sliding door below a projecting shed roof. The east façade has four large openings into the interior. The west and the north façades have one over one, wood-sash, double-hung windows. The north façade also has a series of 13 six light, wood-sash windows near the roof cornice. Inside, the interior is an open space with six by six posts supporting heavy beams spanning the width of the roof below the rafters (Photo 10).

North of the lumber-storage building is the dry kiln building. The kiln has a rectangular plan, hollow tile structure and a shed roof (Photo 11). The front (east) façade has cast concrete panels above two large openings on the south half. The kiln is joined on the west to the adjacent mill building (#3) (Photo 12). The mill building is a modern steel frame structure with bolted exterior metal panels and five, roll-up metal doors on the west façade. A second larger mill building (#2 –

Photo 13 & 14) is to the west of the smaller mill adjacent to the kiln. This mill is also a steel frame structure with exterior metal panels. The gable roof building has a series of openings with metal roll-up doors on the east and west facades. A large open shed area extends from the north and east façades. West of mill buildings near the railroad tracks is a two-story, gabled building covered with corrugated metal (indicated as Shop on the site plan; Photo 15). The wood-frame shop has a sliding metal door on the south and an industrial sash window. The building has a metal roll-up door on the east. Inside, the building has an open, free-span space with heavy exposed framing members supporting a wooden roof truss (Photo 16). Three modern lumber storage buildings are to the north and east of the mill buildings (#4 – Photo 17; # 5 – Photo 18; #6-8 – Photo 19). The lumber storage buildings are also modern, gabled steel frame structure with bolted exterior metal siding.

IV. HISTORIC EVALUATION

California Register of Historical Resources

In September, 1992, Governor Wilson signed Assembly Bill 2881 which created more specific guidelines for identifying historic resources during the project review process under the California Environmental Quality Act (CEQA):

> A project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment. For purposes of this section, an historical resource is a resource listed in, or determined eligible for listing in, the California Register of Historical Resources.[2]

Consequently, under Section 21084.1, an historic resource eligible for the California Register would by definition be an historic resource for purposes of CEQA compliance. The Final Guidelines for nominating resources to the California Register were published January 1, 1998. Under the regulations, a number of historic resources are automatically eligible for the California Register if they have been listed under various state, national or local historic resource criteria.[3]

In order for a resource to be eligible for the California Register, it must satisfy all of the following three criteria:

1. A property must be significant at the local, state or national level, under one or more of the following four criteria of significance (these are essentially the same as National Register criteria with more emphasis on California history):

---

[2]. California State Assembly, Assembly Bill 2881, Frazee, 1992. An Act to Amend Sections 5020.1, 5020.4, 5020.5, 5024.6 and 21084 of, and to add Sections 5020.7, 5024.1, and 21084.1 to, the Public Resources Code, relating to historic resources.

[3]. This aspect of the California Register criteria is not relevant to the buildings affected by this project since they have not been previously listed under any historic resource designations.

a. the resource is associated with events or patterns of events that have made a significant contribution to the broad patterns of local or regional history and cultural heritage of California or the United States.
b. the resource is associated with the lives of persons important to the nation or to California's past.
c. the resource embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master, or possesses high artistic values.
d. the resource has the potential to yield information important to the prehistory or history of the state or the nation (this criteria applies primarily to archaeological sites).

2. the resource retains historic integrity (defined below); and,

3. it is 50 years old or older (except for rare cases of structures of exceptional significance).

The California Register regulations define "integrity" as ". . . the authenticity of a property's physical identity, evidenced by the survival of characteristics that existed during the property's period of significance," that is, it must retain enough of its historic character or appearance to be recognizable as an historical resource. Following the National Register integrity criteria, California Register regulations specify that integrity is a quality that applies to historic resources in seven ways: location, design, setting, materials, workmanship, feeling and association.[4] A property must retain most of these qualities to possess integrity.

The use of the phrase ". . . appears potentially eligible or not eligible" for the California Register is standard practice in an evaluation discussion. Only the State Office of Historic Preservation can make an actual determination of eligibility for the California Register.

535-555 Reed Street

The main building associated with Pacific Redwood Casket – the brick building at 555 Reed Street – appears to retain its historic integrity, the loss of the original front façade windows appearing to be the main alteration. The dry kiln, the boiler building and lumber shed also have not been considerably altered. The overall setting, however, of the Pacific Redwood Casket Company has been considerably altered since Beaver Lumber purchased the property in 1965. One of the original lumber storage buildings has been demolished, the boiler building (now a shop) has been moved, and a number of new, large buildings have been constructed on the site, including two mills, three large storage buildings and an office building. Even the complex

[4]. The definition of integrity under the California Register follows National Register of Historic Places criteria. Detailed definitions of the qualities of historic integrity are in National Register Bulletin 15, *How to Apply National Register Criteria for Evaluation*, published by the National Park Service.

retained a higher level of integrity, the Pacific Redwood Casket Company property does not appear to be a significant business in the history of Santa Clara, thus the property does not appear to be eligible under Criterion A. Although the company had associations with the historic Pacific Manufacturing Company, Pacific Redwood Casket was organized much later (1933) as a separate firm with different personnel, and the company moved to the Reed Street location relatively recently (1945). The Pacific Redwood Casket property is a considerable distance from the original Pacific Manufacturing Company location, now completely redeveloped.

The Pacific Redwood Casket Company buildings do not appear to be associated with persons of historic significance, thus property does not appear to be eligible under Criterion B. The company's President, Clyde Reynolds, does not appear to have been a historically significant person in the history of Santa Clara. The older industrial buildings on the site do not appear to be distinguished or unusual examples of their type, thus they do not appear to be eligible under Criterion C. In conclusion, 535-555 Reed Street does not appear to be eligible for the California Register because it does not appear to be significant under Criteria A, B or C.

V. IMPACTS & MITIGATION

CEQA Guidelines define a "significant effect" as a project that leads to a "substantial adverse change" such as "...demolition, destruction, relocation, or alteration that impair the significance of the historic resource" is the equivalent of a significant environmental effect.

For purposes of this project, a significant effect would occur if the project would have an effect on one or more properties listed on, or potentially eligible for inclusion on the California Register of Historical Resources. Such an effect could occur through demolition of or other substantial adverse change to an individually listed or eligible property, those properties contributory to a district or through the implementation or other adverse effects as a whole in a manner such that the district's integrity could be compromised or its eligibility diminished.

The Land Use Element of the *City of Santa Clara General Plan 1990-2005* has the following two policies regarding historic resources:

> Policy 19: Identify and formally recognize historically and architecturally significant properties and features.
>
> Policy 20: Encourage owners to rehabilitate and maintain historic properties. Consider adaptive reuse of historic structures as an alterative to demolition.

Impact 1.1-1: Under the proposed project, all the buildings within the 13 acre property at 535-555 Reed Street in the City of Santa Clara, California will be demolished for new construction.

Impacts Evaluation

The ten buildings on the project site at 535-555 Reed Street evaluated in this report do not appear to be eligible for the California Register of Historical Resources. The proposed demolition will not affect any listed, or potentially eligible National Register or the California Register properties. Under the CEQA statutes and Guidelines, no mitigation measures are required.

Mitigation

Although mitigation measures are not required under CEQA, the following condition of approval is recommended. Because of the association of the Pacific Redwood Casket Company with the Pacific Manufacturing Company - an important early industry in Santa Clara – it is recommended that a copy of this report and related documentation are donated to the local history collection at the City of Santa Clara Main Library.

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FIGURES

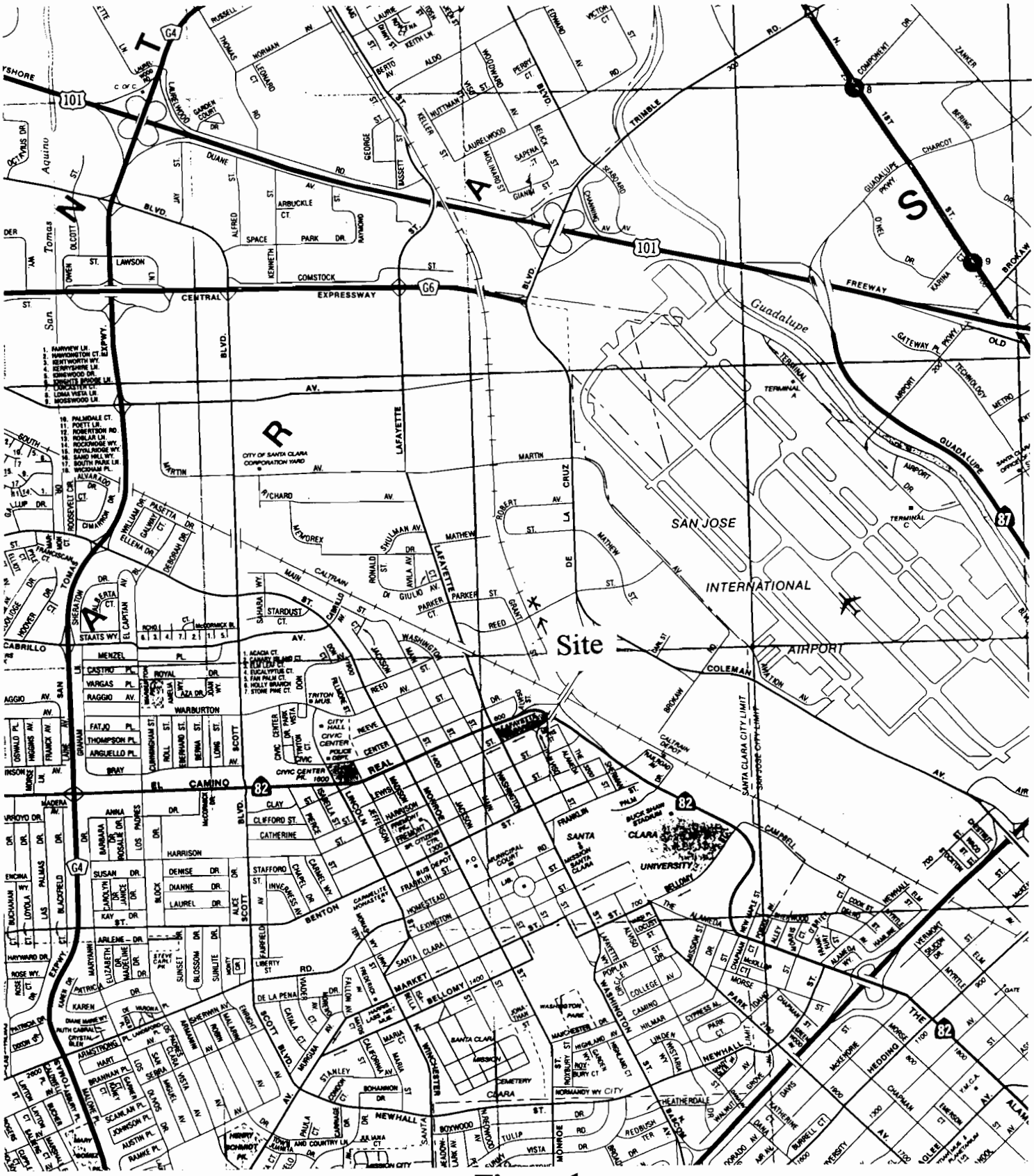


Figure 1

Vicinity Map: 535-555 Reed Street

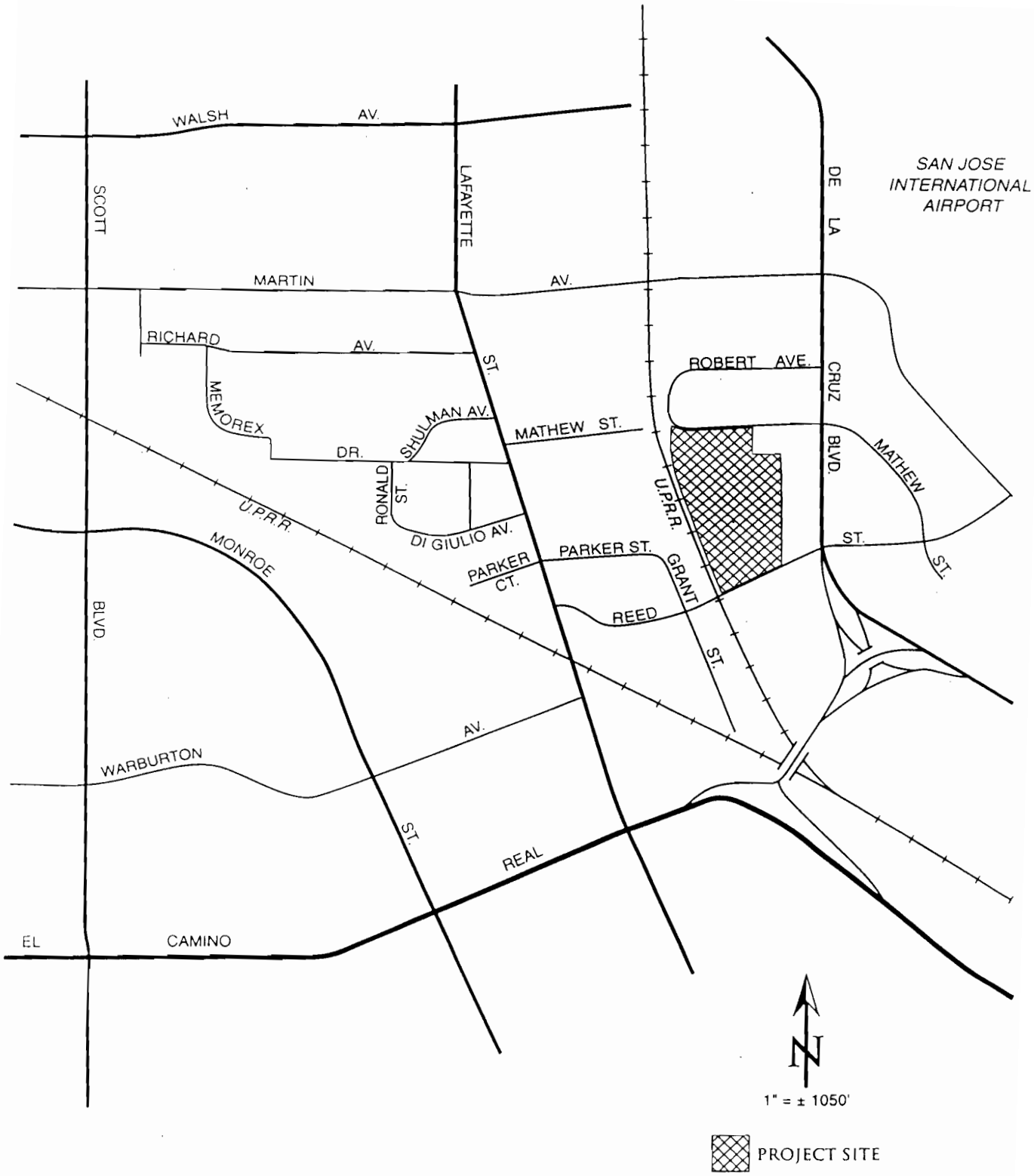


Figure 2

Location Map: 535-555 Reed Street

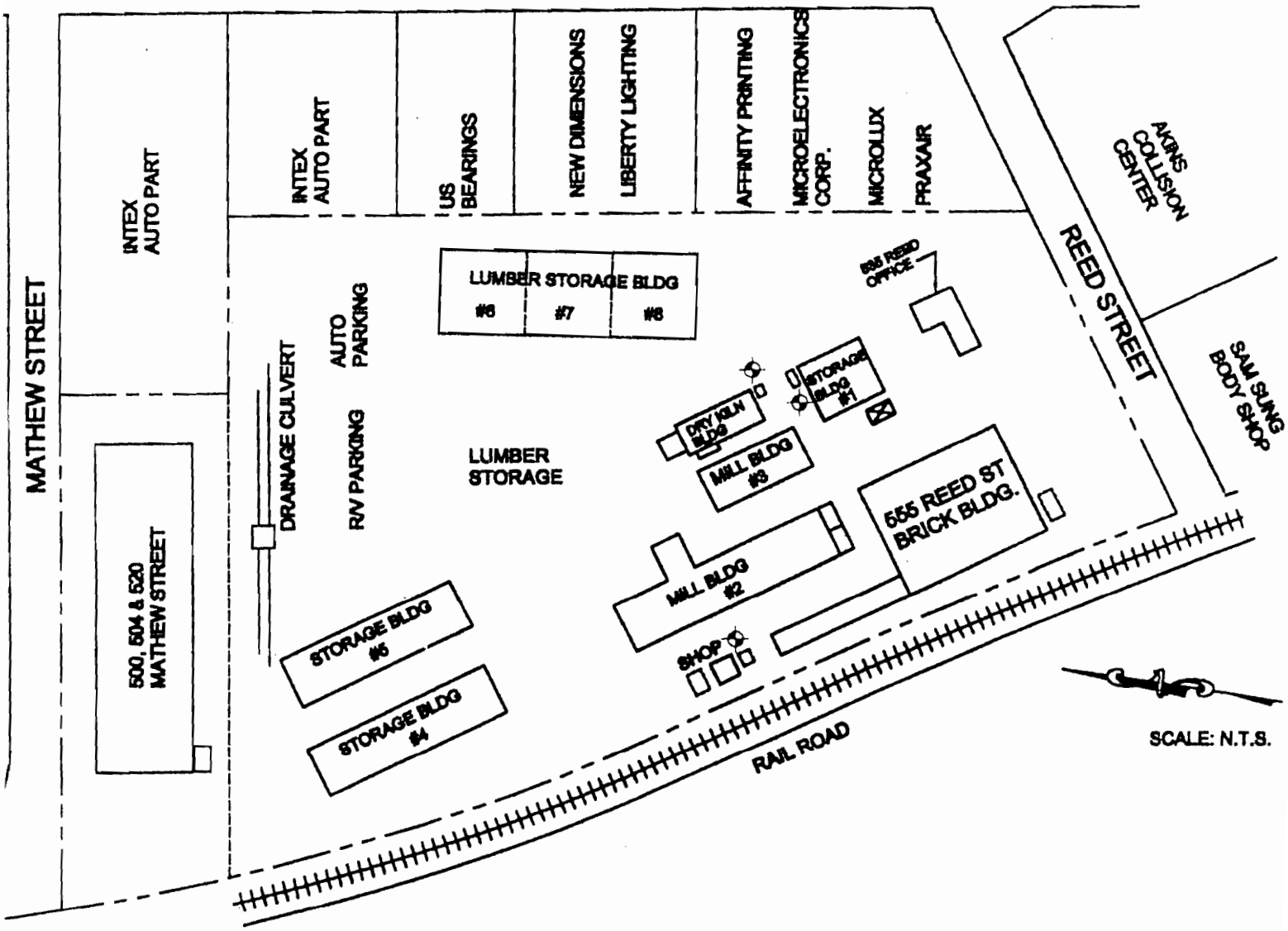


Figure 3

Sketch Map: 535-555 Reed Street

DPR 523 Forms
Primary Record & Building, Structure and Object Record
535-555 Reed Street, Santa Clara

State of California – The Resource s Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #_____
HRI #_____
Trinomial_____
NRHP Status Code_____

Other Listings
Review Code _____Reviewer _____Date_____

 *Resource Name or #: 535-555 Reed Street

P1. Other Identifier: NA
*P2. Location: Not for Publication Unrestricted X *a. County Santa Clara
and (P2b and P2c or P2d. Attach a Location Map as necessary)
b. USGS 7.5' Quad _____ Date ____ T__ ; R __ ; _____; B.M.
c. Address 535-555 Reed Street City Santa Clara Zip 95052
d. UTM: Zone ; mE/ mN
e. Other Location Data: (e.g. parcel #, directions to resource, elevation, etc. as appropriate)
This trapezium shaped parcel is near the northwest corner of De La Cruz Boulevard at Reed Street and the Union Pacific Railroad tracks, City of Santa Clara, Santa Clara County, California (APN 230-03-080).

*P3a. Description (Describe the resource and its major elements. Include design, materials, condition, alterations, size, setting & boundaries):

Beaver Lumber property at 535-555 Reed Street includes 12 buildings on a flat 13.47 acre parcel bounded on the south by Reed Street and the west by Union Pacific Railroad tracks. The square plan, brick masonry building, single story at 555 Reed Street has a flat roof covered with asphalt roof paper (Photos 1 & 2). The roof has four parallel rows of 6 skylights. The simple brick walls, laid in 5-course American bond, are set on a concrete perimeter foundation. The front façade on the south has two entrance doors and a concrete ramp leading to roll-up metal door (Photo 3). The seven windows on the front façade have been replaced with pairs of modern metal sash windows. Adjacent to the west façade is an abandoned railroad spur next to a concrete loading dock below a shed roof (Photo 4). A truck loading area is at the south end of the west façade. A series of sliding wooden doors open out to the loading dock. The west façade has paired wood-sash, four over four, double-hung windows. A band of fixed pane windows are adjacent to the roof cornice. The east façade also has a series of paired, wood-sash, four over four, double-hung windows below fixed pane windows adjacent to the roof cornice. (see continuation sheet)

*P3b. Resource Attributes: HP8
*P4. Resources present: X Building ____Structure____ Object ___ Site __District__ Element of District___ Other

P5a. Photo or Drawing

SEE CONTINUATION SHEET

P5b. Description of Photo:

*P6. Date Constructed/Age and Sources: X Historic ____Prehistoric _____Both 1945, 1965, 1970

*P7. Owner and Address
Winkel Properties et. al.
535 Reed Street
San Jose, CA 95110

*P8. Recorded by: (Name, affiliation, and address) Ward Hill, Architectural Historian, 3124 Octavia Street, San Francisco, CA 94123

*P9. Date Recorded March, 2001

*P10. Survey Type: (Describe)
Intensive

*P11. Report Citation (Cite survey report and other sources, or enter none)
Historic Architecture Report for the 535-555 Reed Street

Attachments: ____NONE X Location Map X Sketch Map X Continuation Sheet X Building, Structure and Object Record___ Archaeological Record ___ District Record____ Linear Feature Record____ Milling Station Record _____Rock Art Record _____ Artifact Record _____ Photograph Record _____ Other (List)

Primary #_____
HRI #_____

BUILDING, STRUCTURE AND OBJECT RECORD

*NRHP Status Code 6

*Resource Name or # (assigned by recorder) 535-555 Reed Street

B1. Historic Name: Pacific Redwood Casket Company
B2. Common Name: Beaver Lumber Company
B3. Original Use: Industrial B4. Present Use Industrial
***B5. Architectural Style:** Industrial
***B6. Construction History:** (Construction date, alterations, and date of alterations)
The original four buildings date from 1945; the other six buildings date from 1965-70 since Beaver Lumber purchased the property.

***B7. Moved?** X **No** __ **Yes** __ **Unknown Date:** NA **Original Location:** NA

***B8. Related Features:** railroad tracks

B9a. Architect NA b. Builder: NA

***B10. Significance: Theme** Industrial **Area** Santa Clara
Period of Significance 1945 **Property Type** Industrial **Applicable Criteria** A
(Discuss importance in terms of historical or architectural context as defined by theme, period and geographic scope. Also address integrity.)

The Pacific Redwood Casket Company originally developed the property at 535-555 Reed Street in 1945. The Pacific Redwood Casket Company had its roots in the coffin making division of the Pacific Manufacturing Company, incorporated in 1880 and the largest lumber manufacturer in the region. The precursor company to the Pacific Manufacturing Company was the Enterprise Mill & Lumber Company founded in 1874 and located at Bellomy Street and The Alameda in Santa Clara (Thompson & West 1876:43). James Pierce purchased the Enterprise Mill in 1879 and changed its name to Pacific Manufacturing Company. Born in 1824, James Pierce came to California in 1854. Pierce engaged in hydraulic mining in Yuba County until 1878. He also owned the famous Empire Mine in Grass Valley, sold in 1872 to Bourn family. In 1866, Pierce had purchased a home in Santa Clara on 88 acres (which later became the Carmelite Monastery). (see continuation sheet)

B11. Additional Resource Attributes: (List attributes and codes) HP8 - Industrial

***B12. References:** (see continuation sheets)
B13. Remarks:
***B14. Evaluator** Ward Hill, Architectural Historian

***Date of Evaluation:** March, 2001

Sketch map with north arrow required
(see attached)

(This space reserved for official comments)

* Required information

Item P3a. continued:

The windowless back (north) façade has three sliding wooden doors. Inside, the building has a small suite of offices at the southeast corner. The remainder of the interior is open space with an exposed wood-truss roof supported by heavy posts set on a concrete slab floor (Photos 5 & 6).

The Beaver Lumber office building at 535 Reed Street is about 200 feet east of brick building at 555 Reed Street. The office building is a modern, wood-frame structure with a gently pitched gable roof with wide eaves (Photo 7). The exterior is covered with stone facing and vertical wood siding. A simply detailed, wood-frame lumber-storage building (#1) is just north of the office building (Photos 8 & 9). The building is divided into parallel sections (on an east/west orientation) each with a separate shed roof. The exterior walls are covered with rustic siding. The front (west) façade has double, sliding wooden doors on the north. The south façade has a single opening with a large, sliding door below a projecting shed roof. The east façade has four large openings into the interior. The west and the north façades have one over one, wood-sash, double-hung windows. The north façade also has a series of 13 six light, wood-sash windows near the roof cornice. Inside, the interior is an open space with six by six posts supporting heavy beams spanning the width of the roof below the rafters (Photo 10).

North of the lumber-storage building is the dry kiln building. The kiln has a rectangular plan, hollow tile structure and a shed roof (Photo 11). The front (east) façade has cast concrete panels above two large openings on the south half. The kiln is joined on the west to the adjacent mill building (#3) (Photo 12). The mill building is a modern steel frame structure with bolted exterior metal panels and five, roll-up metal doors on the west façade. A second larger mill building (#2 – Photo 13 & 14) is to the west of the smaller mill adjacent to the kiln. This mill is also a steel frame structure with exterior metal panels. The gable roof building has a series of openings with metal roll-up doors on the east and west facades. A large open shed area extends from the north and east façades. West of mill buildings near the railroad tracks is a two-story, gabled building covered with corrugated metal (indicated as Shop on the site plan; Photo 15). The wood-frame shop has a sliding metal door on the south and an industrial sash window. The building has a metal roll-up door on the east. Inside, the building has an open, free-span space with heavy exposed framing members supporting a wooden roof truss (Photo 16). Three modern lumber storage buildings are to the north and east of the mill buildings (#4 – Photo 17; # 5 – Photo 18; #6-8 – Photo 19). The lumber storage building are also modern, gabled steel frame structure with bolted exterior metal siding.

Item B10. continued:

Pierce also bought timberland in the Santa Cruz Mountains and he built a sawmill at Ben Lomond. Pacific Manufacturing produced lumber, doors, sash, blinds and caskets. The company purchased the Pacific Casket Company in San Francisco in 1888. In addition to Santa Clara, the company had offices in San Francisco, Oakland and later in Sacramento. When Pierce died in 1897, Frank Madison became the company President.

The company expanded east of The Alameda from the original Enterprise Mill site until it had 15 acres in Santa Clara employing over 500 men by the turn of the century. The sprawling facility of brick buildings is pictured on page 70 of the 1896 book *Santa Clara County and its Resources*. After a month of repairs because of damage from the 1906 earthquake, the Pacific Manufacturing Santa Clara factory operated 16 hours a day supplying lumber for temporary buildings for displaced San Francisco residents and businesses (Hayward 1962:3). The company opened a branch in Los Angeles in 1920 in response to the building boom after World War I.

In 1933, the casket business merged with the casket business of the Pacific Lumber Company to become the Pacific Redwood Casket Company with Claude B. Reynolds, President. The casket company had a separate office at 2698 The Alameda from Pacific Manufacturing at 2610 The Alameda. In 1944, Pacific Manufacturing needed more warehouse space at the Santa Clara mill. Consequently the casket company was sold to a newly organized corporation that built the plant at 555 Reed Street, an area known as the Laurelwood Farm subdivision. The original $ 50,000 plant included two lumber storage buildings and the brick manufacturing/office building at 555 Reed Street. The hollow tile, drying kiln and boiler were constructed in 1951 according to the 1961 Santa Clara Sanborn Map. In August, 1960, Pacific Manufacturing Company was dissolved and liquidated by its Board of Directors, their property was subdivided and most of the buildings were demolished. The site of the mill is now a Safeway shopping center. The old mill office was demolished in 1986 for a bypass of The Alameda around Santa Clara University.

The Pacific Redwood Casket Company sold their 23 acre facility on Reed Street to Beaver Lumber Company in 1965. The parcels adjacent to Mathew Street and De La Cruz Boulevard were sold off in the 1960s. Beaver Lumber moved to Santa Clara after their San Leandro facility (acquired in 1947) burned in May, 1965. Fran Winkel was the President of Beaver Lumber until the current owners, Paul Meekins and David Nicolaysen, bought the company in 1990. In 1966, Beaver Lumber has constructed a number of new buildings on the site including their offices at 535 Reed Street, a mill building and metal lumber storage building (# 2 & # 3 on the attached sketch plan). A second mill building was added in 1968 (#5) and one of the original lumber storage buildings was demolished. The original corrugated metal boiler room for the dry kiln was moved near the railroad tracks and reused as a shop building. In 1970, another lumber storage building (# 8- later expanded in 1976, # 6 & #7) and a second mill building (#3) were constructed. The brick warehouse at 555 Reed Street has been rented to a variety of different tenants during the last 20 years.

Evaluation

The main building associated with Pacific Redwood Casket – the brick building at 555 Reed Street – appears to retain its historic integrity, the loss of the original front façade windows appearing to be the main alteration. The dry kiln, the boiler building and lumber shed also have not been considerably altered. The overall setting, however, of the Pacific Redwood Casket Company has been considerably altered since Beaver Lumber purchased the property in 1965. One of the original lumber storage buildings has been demolished, the boiler building (now a shop) has been moved, and a number of new, large buildings have been constructed on the site, including two mills, three large storage buildings and an office building. Even the complex retained a higher level of integrity, the Pacific Redwood Casket Company property does not appear to be a significant business in the history of Santa Clara, thus the property does not appear to be eligible under Criterion A. Although the company had associations with the historic Pacific Manufacturing Company, Pacific Redwood Casket was organized much later (1933) as a separate firm with different personnel, and the company moved to the Reed Street location relatively recently (1945). The Pacific Redwood Casket property is a considerable distance from the original Pacific Manufacturing Company location, now completely redeveloped. The Pacific Redwood Casket Company buildings do not appear to be associated with persons of historic significance, thus property does not appear to be eligible under Criterion B. The company's President, Clyde Reynolds, does not appear to have been a historically significant person in the history of Santa Clara. The older industrial buildings on the site do not appear to be distinguished or unusual examples of their type, thus they do not appear to be eligible under Criterion C. In conclusion, 535-555 Reed Street does not appear to be eligible for the California Register because it does not appear to be significant under Criteria A, B or C.

Item B12. continued:

Personal communication with Paul Meekins, Beaver Lumber Company, March 15, 2001.
"Beaver Revamps Old Plant to House Modern Facility," *The Merchant Magazine*, November, 1966.
"Historic P.M. Goes to Auction Block," *San Jose Mercury*, September 19, 1960, p. 8.
"Old PM Company Once a Key SC Industry; Opened Here in 1874," *Santa Clara Journal*, November 7, 1962, p. 10.
Soares, Steve, "P.M Mill History Part of S.C. Heritage," *San Jose Mercury*, July 15, 1976.
Hayward, William, "History of the Pacific Manufacturing Company", 1962. Typewritten manuscript on file at the Santa Clara City Library (Hayward was the company treasurer).
"James Pieronnet Pierce" in Sawyer, Eugene, *History of Santa Clara County, California*, 1922.
"Last Moments of a Santa Clara Landmark," *San Jose Mercury*, June 6, 1986, p.12.
Loomis, Patricia, "Jim Pierce Pioneered with Fervor," *San Jose News*, October 5, 1973, p. 41.
Sanborn Fire Insurance Maps, San Jose, 1961, 1966.
Cheek, Martin. *Silicon Valley Handbook*. Moon Travel Handbooks, 2000.
San Jose Mercury. *Santa Clara County and its Resources*. San Jose Mercury, 1896.
Thompson & West. *New Historical Atlas of Santa Clara County*. 1876.
San Jose City Directories, 1940-1970.
"Three new industrial plants," *San Jose Mercury*, December 21, 1944.

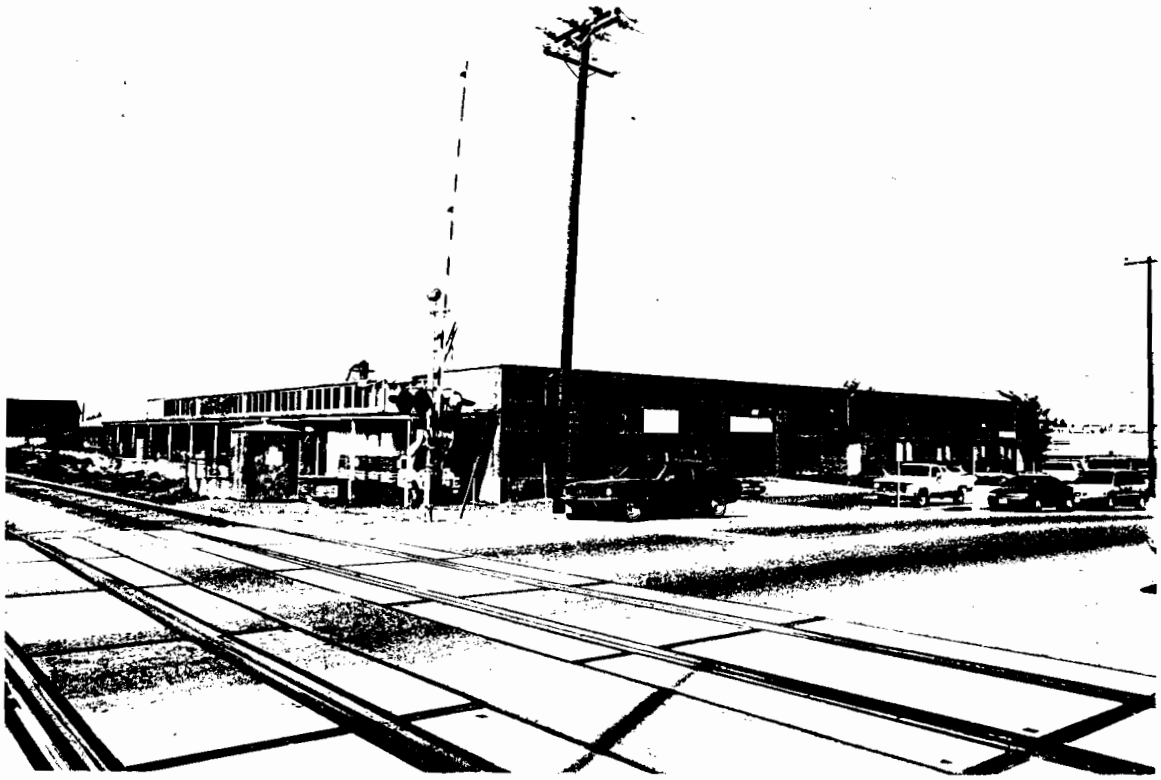


Photo 1: 555 Reed Street
(view from southwest)

Photo 2: 555 Reed Street
(view from southeast)

Photo 3: 555 Reed Street (view from southeast)

Photo 4: 555 Reed Street
(view from southwest)

Photo 5: 555 Reed Street
(view of interior)

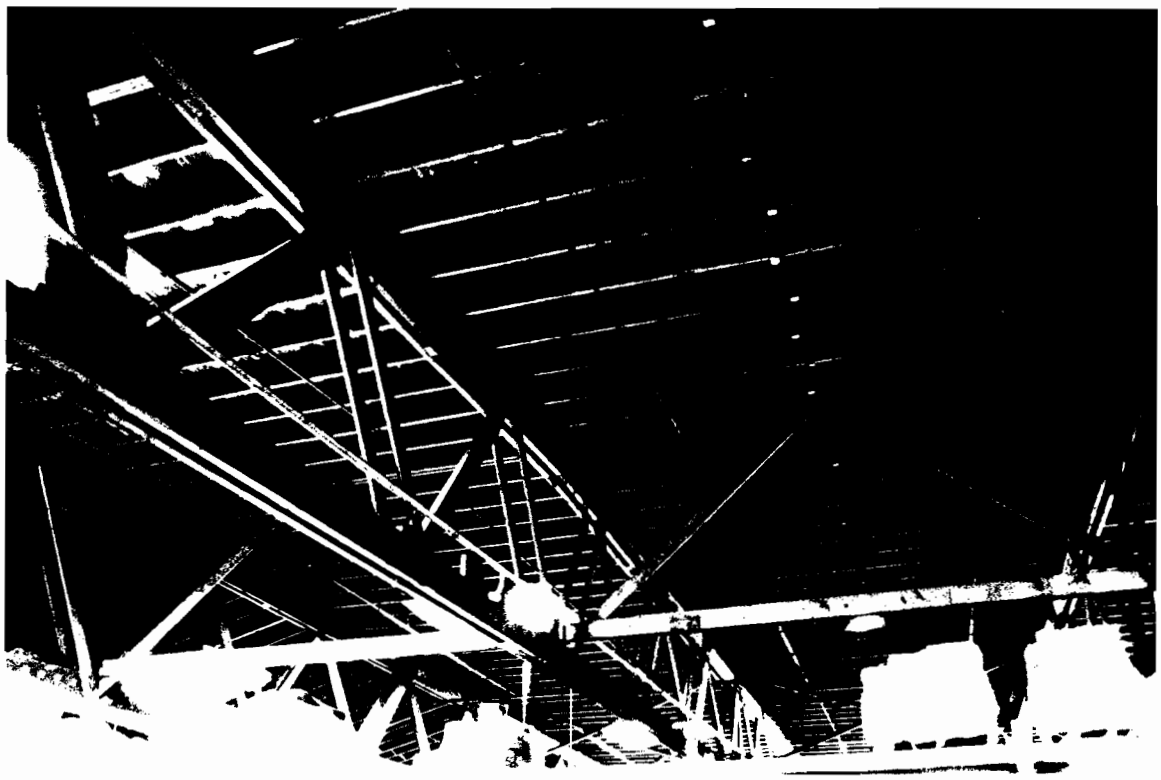


Photo 6: 555 Reed Street
(detail view of roof trusses)

Photo 7: 535 Reed Street - Office
(view from southwest)

Photo 8: 535 Reed Street – Lumber Storage (view from northwest)

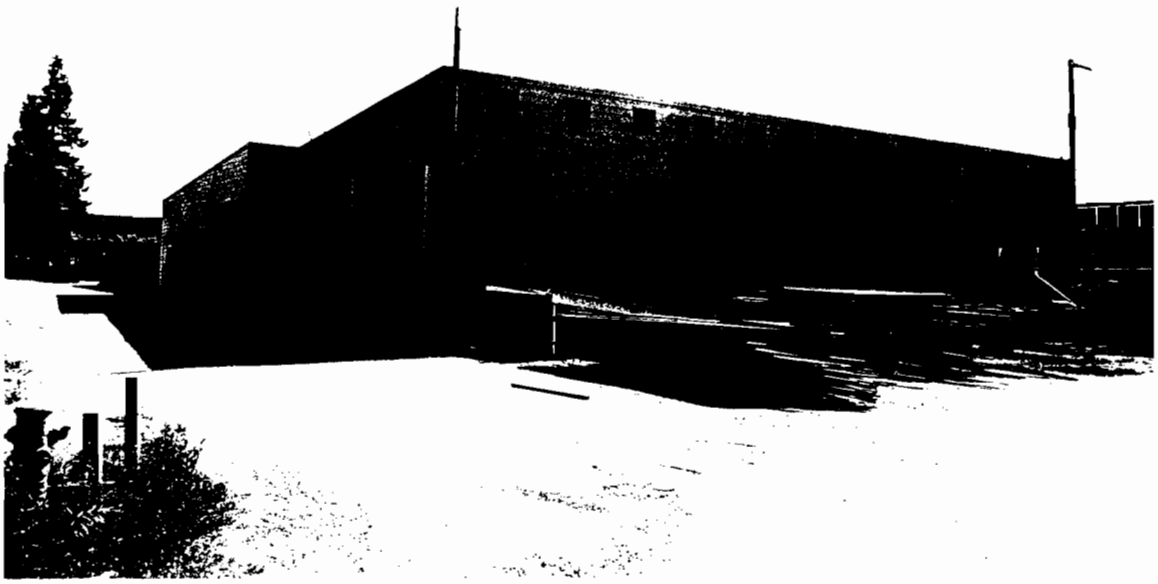


Photo 9: 555 Reed Street – Lumber Storage (view from northeast)

Photo 10: 535 Reed Street – Lumber Storage (view of interior)

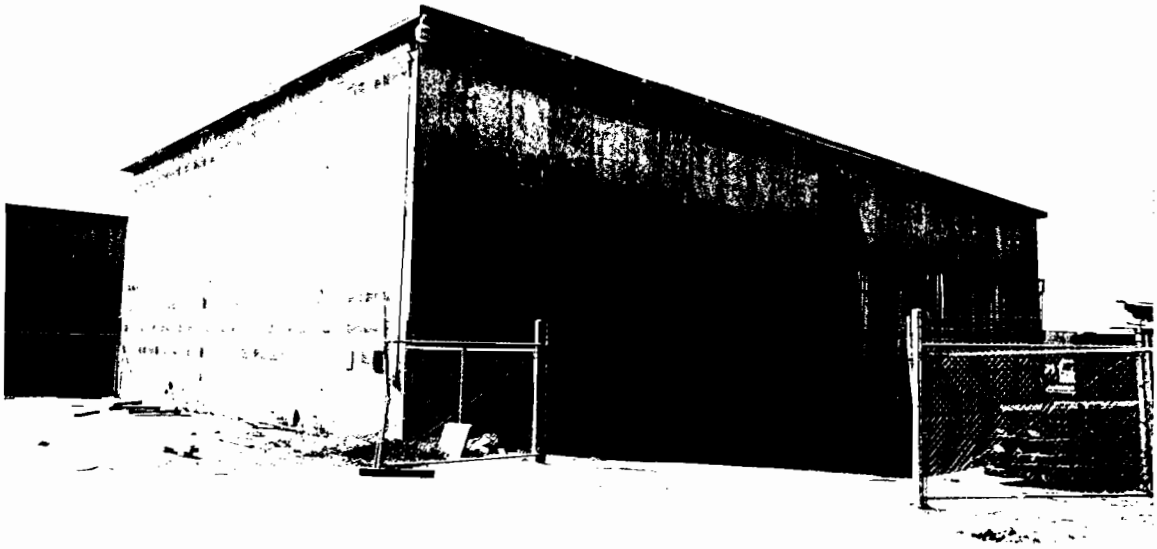


Photo 11: 535 Reed Street – Dry Kiln (view from southeast)

Photo 12: 555 Reed Street – Mill Building 1
(view from southwest)

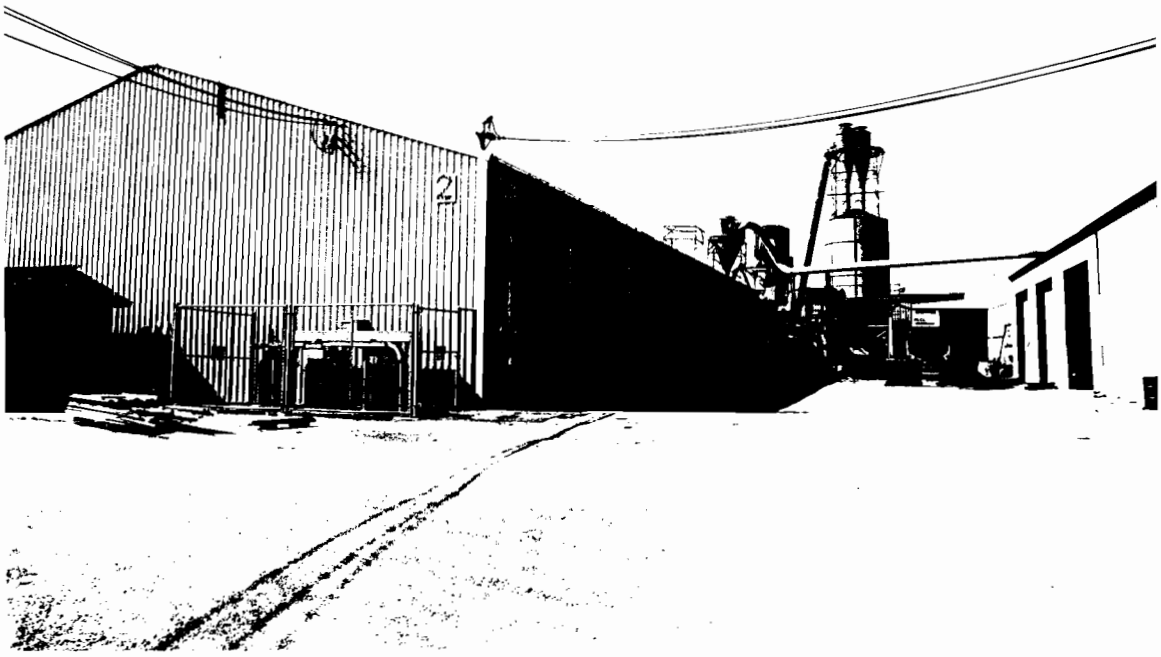


Photo 13: 535 Reed Street – Mill Building 2
(view from southeast)

Photo 14: 535 Reed Street – Mill Building 2 (view from northwest)

Photo 15: 535 Reed Street – Shop
(view from southeast)

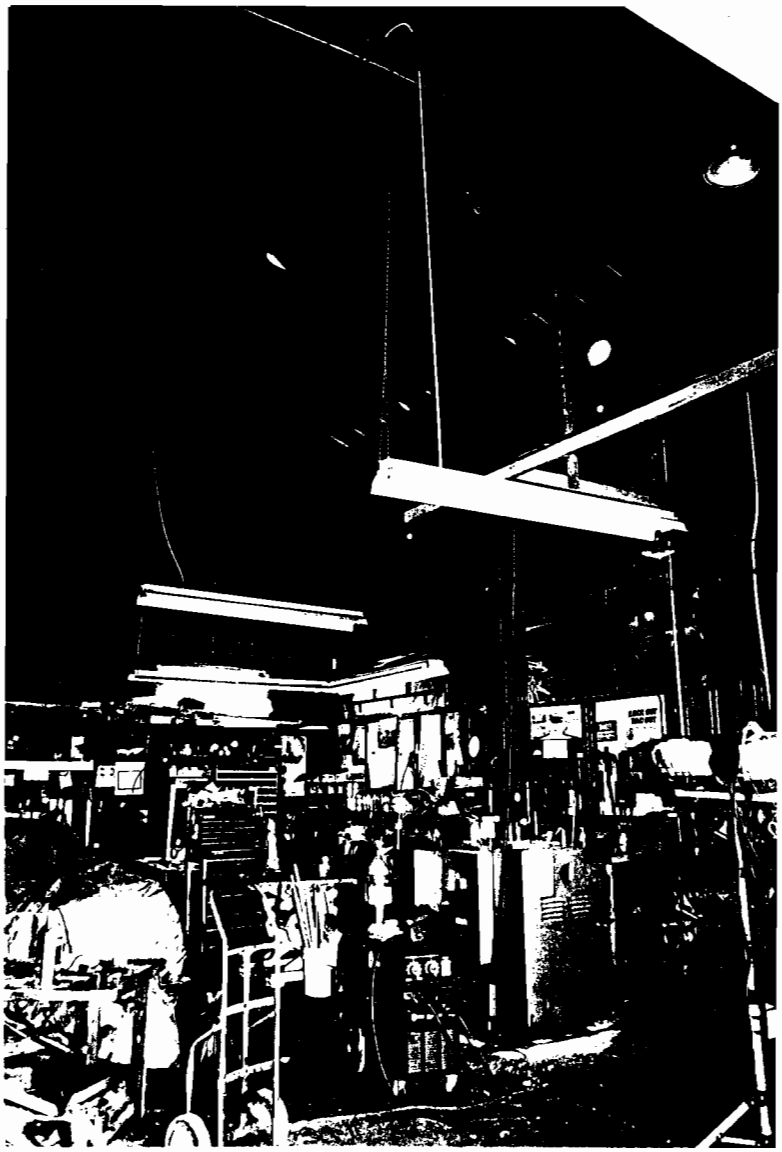


Photo 16: 535 Reed Street – Shop (view of interior)

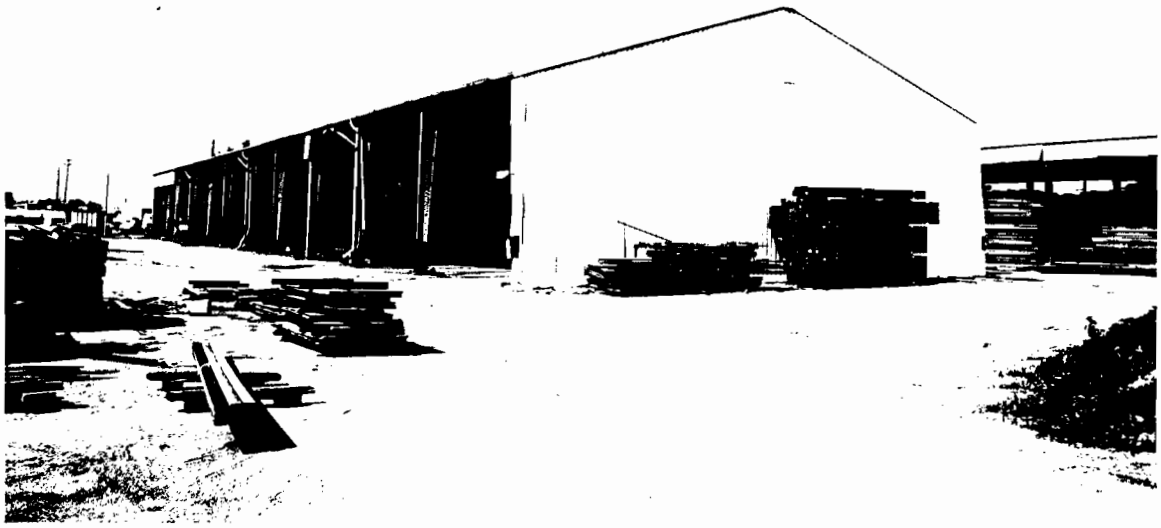


Photo 17: 535 Reed Street – Lumber Storage (view from southwest)

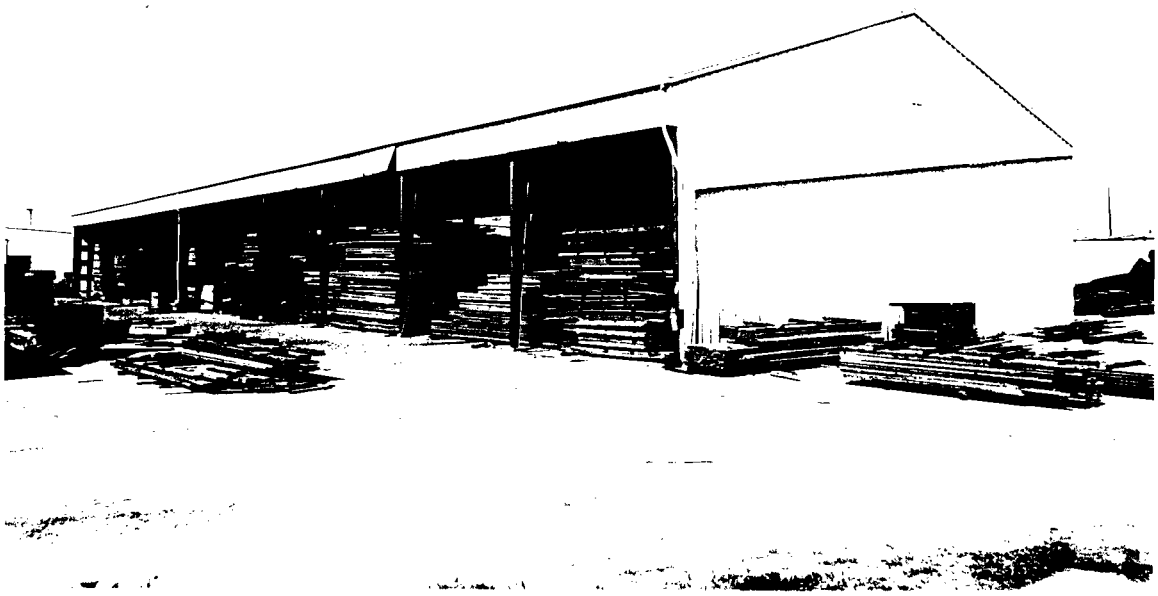


Photo 18: 535 Reed Street – Lumber Storage (view from southwest)

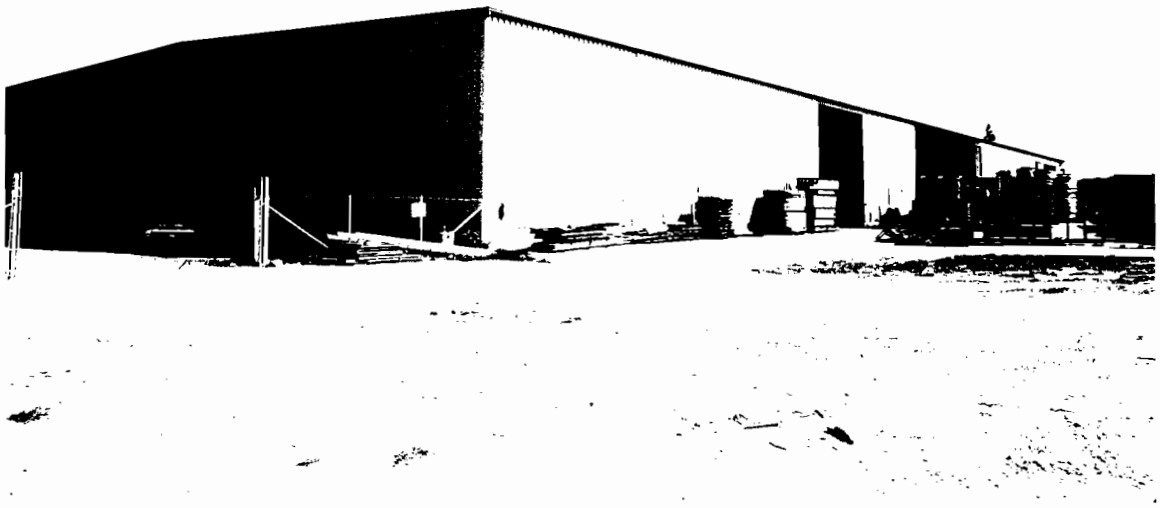


Photo 19: 535 Reed Street – Lumber Storage (view from northwest)

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

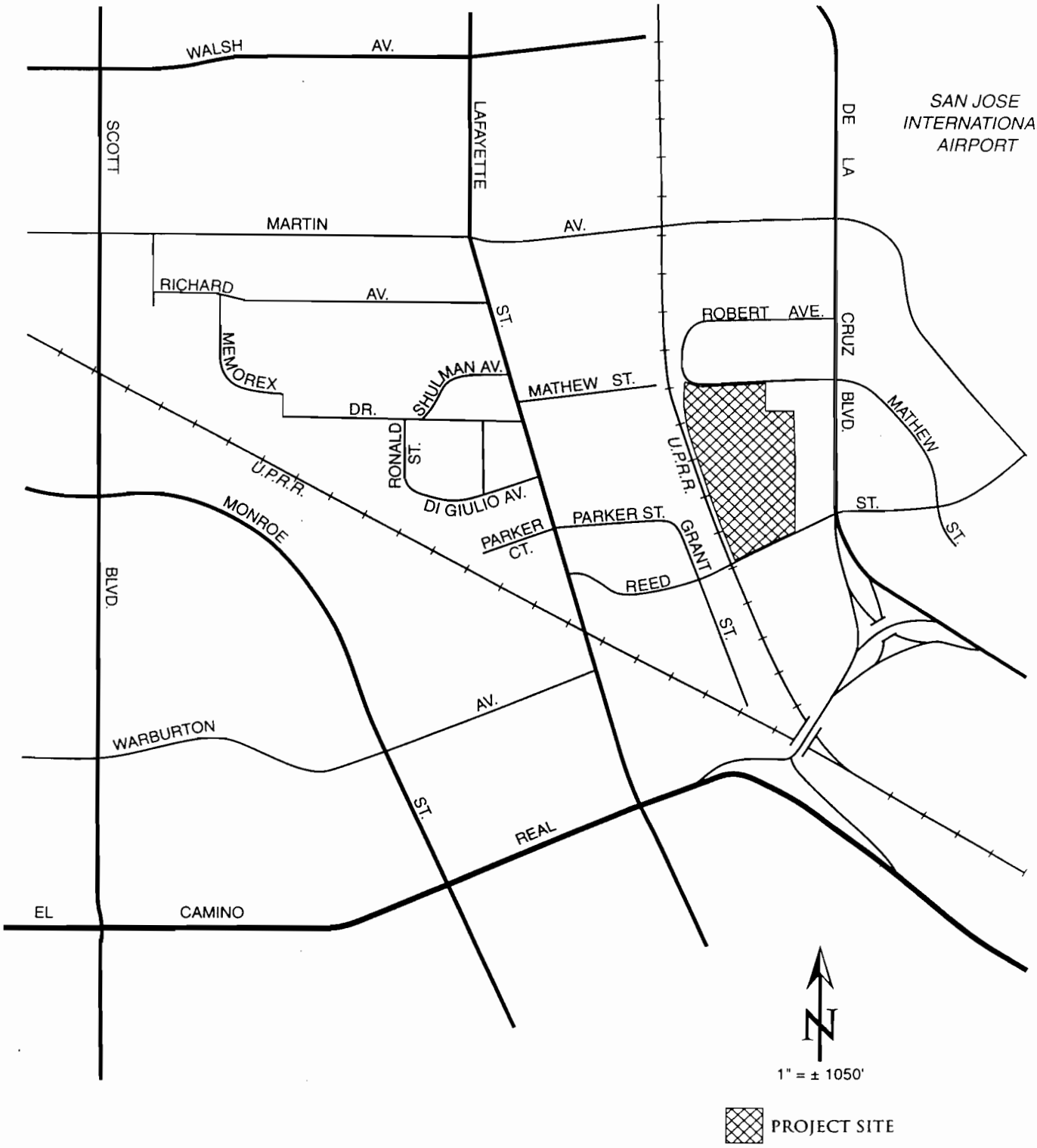
LOCATION MAP

Primary #_____
HRI #_____
Trinomial_____

Page 24 of 25

*Resource Name of # (assigned by recorder) 535-555 Reed Street

*Drawn By not applicable *Date: March, 2001



DPR 523L(1/95)

* Required information

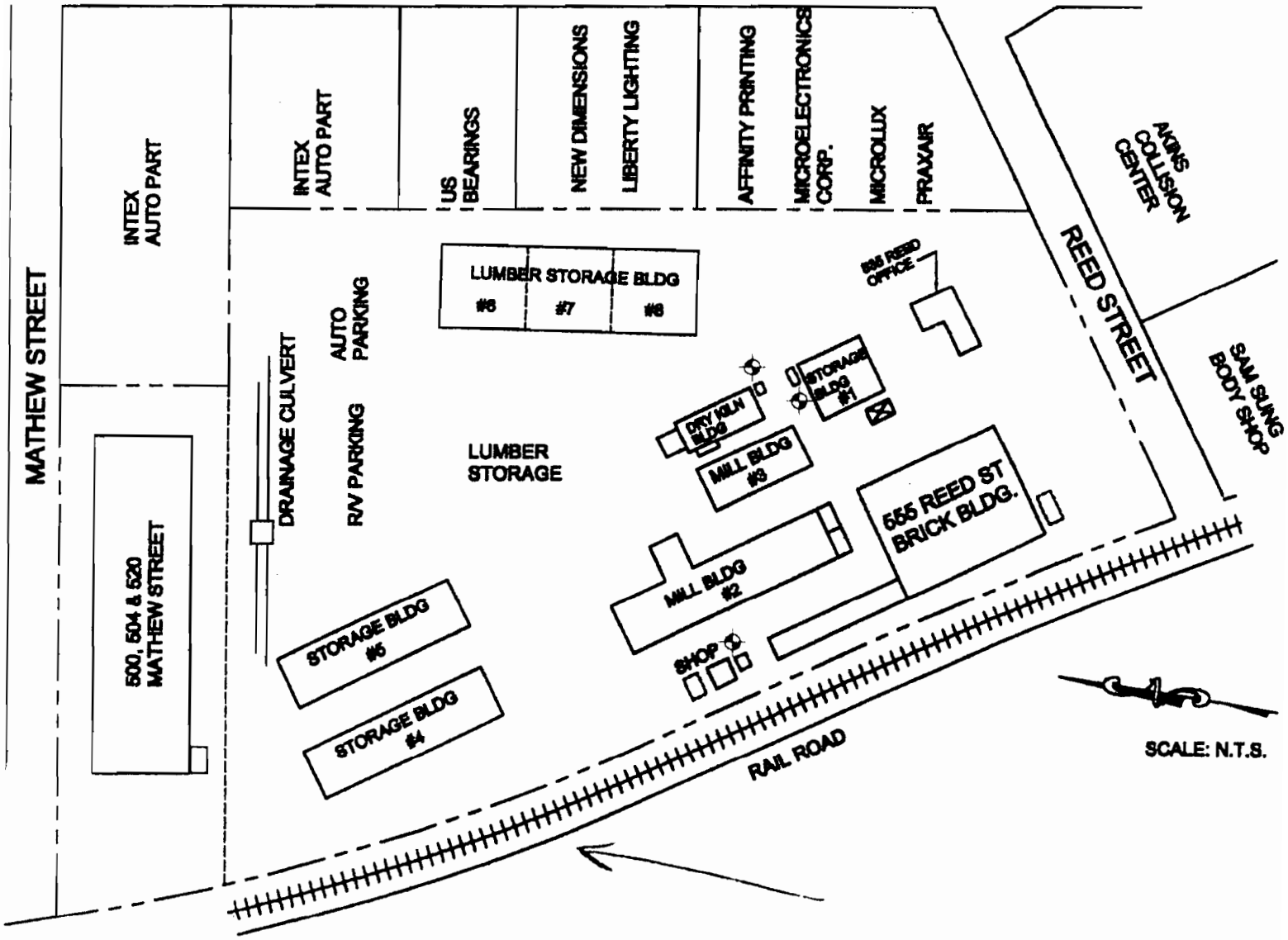
State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary #_____
HRI #_____
Trinomial_____

Page 25 of 25 *Resource Name of # (assigned by recorder) 535-555 Reed Street

*Drawn By _____ *Date: March, 2001



DPR 523L (1/95)

* Required Information

Appendix C

C-1 Phase I
535-555 Reed Street

C-2 Phase I
500-520 Mathew Street

Appendix C-1

Phase I Environmental Site Assessment
535-555 Reed Street

May 31, 2007

PHASE I
ENVIRONMENTAL SITE ASSESSMENT

535-555 Reed Street
Santa Clara, California 95050

AEI Project No. 272331

Prepared For

DuPont Fabros Development LLC
Attention: Mr. Lammot J. Du Pont
1212 New York Avenue, Suite 900
Washington, DC 20005

Prepared By

AEI CONSULTANTS
1140 Lake Street, Suite 501
Oak Park, Illinois 60301
(708) 386-6140

AEI

EXECUTIVE SUMMARY

AEI Consultants (AEI) was retained by DuPont Fabros Development LLC to conduct a Phase I Environmental Site Assessment (ESA), in conformance with the scope and limitations of ASTM Standard Practice E1527-05 and the Environmental Protection Agency Standards and Practices for All Appropriate Inquiries (40 CFR Part 312) for the property located at 535-555 Reed Street in the City of Santa Clara, Santa Clara County, California. Any exceptions to, or deletions from, this practice are described in Section 1.2 of this report.

Property Description

The subject property is located on the north side of Reed Street in a mixed commercial and industrial area of Santa Clara. The property totals approximately 6.9 acres and is improved with eight (8) one-story warehouse/storage buildings, one (1) one-story office building, and one (1) one-story equipment building totaling approximately 800,000 square feet. The buildings are vacant; excluding one warehouse building located on the eastern boundary of the property, which is utilized for vehicle parking by Avis Rental Cars. In addition to the subject property buildings, the property is improved with asphalt-paved parking areas. The property was developed with the office building, the equipment building, and three of the warehouses in the late 1940s. The five remaining warehouse buildings were constructed in phases in the late 1960s and early 1970s.

Based on a review of historical sources, the subject property was formerly developed with agricultural land since at least 1939 until the late 1940s. The site was occupied by the Pacific Redwood Casket Company from the late 1940s until approximately 1966 on the southern portion of the property. The site was occupied by Beaver Lumber from at least 1970 until the early 2000s. Several commercial/industrial tenants have additionally occupied the property, including Variety Merchandising in 1970, Sports Boats, Inc. in 1990, Renewed Truck and Trailer from at least 1989 until 1991, and Cope & McPhetres Marine in 1999. According to a previous Phase I ESA, the operations by these later tenants consisted of office activities, warehouse storage activities, truck and truck accessory sales, and boat sales. Environmental concerns associated with the historical occupancy of the property are further discussed below and in Sections 3.2.1, 4.2.6 and 5.3.

The immediately surrounding properties consist of a multi-tenant industrial building and AMI Recycling to the north; Harrington Industrial Plastics and three multi-tenant retail centers to the east; Reed Street followed by Enterprise Rental Cars and Akins Collision Center to the south; and a multi-tenant commercial building, a vacant industrial/commercial building, and Kapa Auto Supply Wholesaler to the west beyond railroad tracks.

Based upon groundwater monitoring data, the direction of groundwater flow beneath the subject property is inferred to be to the north-northeast and present at a depth of approximately five feet below ground surface (bgs).

Findings

Recognized environmental conditions (RECs) are defined by the ASTM Standard Practice E1527-05 as the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. AEI's investigation has revealed the following recognized environmental conditions associated with the subject property or nearby properties:

- No on-site recognized environmental conditions were identified during the course of this investigation.

Historical recognized environmental conditions (HRECs) are defined by the ASTM Standard Practice E1527-05 as an environmental condition which in the past would have been considered a recognized environmental condition, but which may or may not be considered a recognized environmental condition currently. AEI's investigation has revealed the following historical recognized environmental conditions associated with the subject property or nearby properties:

- The subject property was formerly developed with an aboveground Pentachlorophenol (PCP) tank. The tank was located on the north side of the former equipment repair building on the west side of the property. The PCP tank was utilized by Beaver Lumber Company from approximately 1965 until the late 1980s for the lumber treating process. Wood products were dipped into the tank and were hung over the tank for a few hours. The wood products were then placed on unpaved ground until they dried. During the removal of a nearby waste oil UST in 1985 (discussed in next paragraph), PCP was detected in a soil sample collected during installation of groundwater monitoring well MW-3 (subsequently referred to as MW-1). In the late 1980s, the PCP dipping tank was removed. From October 2000 until March 2006, several investigations and remedial actions took place on the subject property. These actions included the advancement of more than 30 soil borings, the installation of 18 additional wells (three remained from Leaking Underground Storage Tank Assessments, which are discussed below), excavation of the dipping tank source area along with off-site contaminated soil disposal, the application of Oxygen Release Compound™ (ORC™) into the excavation, stockpiled soil sampling from the excavation, white rot fungus treatment of the soil stockpile, cone penetrometer tests (CPTs), and the injection of Hydrocarbon Release Compound™ (HRC™) in barrier configurations along the plume of contamination. In June 2003, the source area excavation was backfilled with 40 percent of the soil stockpile (the portion meeting reuse criteria) and the remaining portion of the excavation was backfilled with imported clean fill. The soil stockpile that did not meet re-use criteria (60 percent) was transported to a non-hazardous landfill for disposal. According to the San Francisco Bay Regional Water Quality Board (SFBRWQB) Geotracker website, the site received closure for the PCP contamination on March 9, 2006. Based on the remedial activities performed onsite and the closure granted by the SFBRWQB, no further investigation in connection with the former PCP tank is required.

- The subject property was formerly developed with five underground storage tanks (USTs), including one 550-gallon waste oil UST, one 1,000-gallon gasoline UST, one 2,000-gallon gasoline UST, and two 10,000-gallon gasoline USTs. On February 20, 1992 and April 16, 1992, the USTs were removed. Confirmation samples were analyzed for Total Petroleum Hydrocarbons as gasoline and diesel (TPH-g and TPH-d), Benzene, Toluene, Ethylbenzene, and Xylene (BTEX), Total Oil and Grease (TOG), lead, and Halogenated Volatile Organic Compounds (HVOCs). TPH diesel and gasoline concentrations were found in two samples that were above action levels, and several other samples detected concentrations below action levels. HVOC concentrations were not detected. Concentrations of lead below action levels were detected in samples collected in the vicinity of the waste oil UST. A release was reported on the same date as the second removal. Beaver Lumber Company was identified as the responsible party. In addition, a 200-gallon waste oil UST was removed in 1985, in which sampling and removal procedures were not adequately documented. Due to the lack of sampling, the UST removed in 1985 was included in the 1992 release incident.

  On March 31, 2000, five exploratory soil borings were drilled in the vicinity of the USTs and soil and groundwater samples were collected. TPH-g and TPH-d and MTBE were discovered in the soil samples, and elevated levels of benzene and TPH-g and TPH-d were found in one groundwater sample. Three monitoring wells (MW-1 through MW-3) were installed on the subject property in the vicinity of the former USTs in June 1992. In January 2001, six exploratory borings were conducted further downgradient from the UST area. Soil and groundwater samples were analyzed for TPH-g, TPH-d, MTBE, and BTEX. TPH and MTBE were detected in several borings. Benzene was detected in one sample.

  In February 2001, several previously installed monitoring wells were sampled, which yielded concentrations of contaminants that appeared to be at lower levels than previous sampling events. According to a *Fuel Leak Site Case Closure Report* issued by the Santa Clara Valley Water District (SCVWD) on February 7, 2002, it was determined that onsite contaminant levels significantly attenuated since 1992, and that a majority of the remaining contamination appeared to be located in the vicinity of the former UST area located on the eastern portion of property. It was determined that all required corrective action activities have been performed onsite in relation to the 1992 UST removal and subsequent release. The SCVWD concluded that the remaining onsite contamination does not pose a threat to the regional groundwater, human health, or the environment and that no further action was necessary. Based on the regulatory status, no further investigation in connection with the former LUST case is required.

Environmental issues include environmental concerns identified by AEI that warrant discussion but do not qualify as recognized environmental conditions, as defined by the ASTM Standard Practice E1527-05. AEI's investigation has revealed the following environmental issues associated with the subject property or nearby properties:

- On August 12, 1993, a 10,000-gallon UST was installed at the subject property. The UST consisted of a vaulted 10,000-gallon UST that contained one 4,000-gallon diesel fuel chamber and one 6,000-gallon gasoline chamber. The UST was double-walled and was constructed of fiberglass-reinforced plastic. On April 29, 2001, Alpha Geo Services (AGS)

removed the UST. The tank was cleaned onsite and was transported to a different Beaver Lumber Company site. After the removal, samples were taken from the walls and floors of the tank cavity and a water sample was taken from the tank pit. The samples were analyzed for TPH-d, TPH-g, BTEX, and MTBE. Concentrations of TPH-d were found in two samples, which were well below action limits. In addition, the water sample yielded concentrations of TPH-d that were well below action limits. The consultant concluded that no further investigations were necessary for the UST removal. The removal was documented and approved by the Santa Clara Fire Department on July 30, 2001, and the UST received closure. Based on the confirmation sampling results and the closure from the Santa Clara Fire Department, no further investigation in connection with the former UST is required.

- According to a *Documentation Report for Destruction of 10 A-Zone Monitoring Wells* issued by Stellar Environmental Solutions, Inc. (Stellar) on March 23, 2006, the SFRWCB granted closure to the site concerning the onsite PCP contamination on March 9, 2006. The SFRWCB requested that eleven (11) on-site monitoring wells be properly decommissioned. Stellar reported that it could not access one of the onsite monitoring wells, MW-16S, due to a large pile of construction debris being located on top of the well. However, Stellar properly decommissioned ten (10) remaining wells and included regulatory documentation in the appendices of their report. Based on the fact that the site has received closure for the PCP contamination, AEI recommends that MW-16S be decommissioned according to federal and local regulations.

- A large construction debris pile is located on top of the onsite monitoring well. AEI recommends that this pile be removed immediately in order for the monitoring well to be properly decommissioned. A second pile was observed just north of the larger debris pile on the property. The source of the debris is unknown. AEI also recommends that this material be properly disposed offsite in the event that it is related to the former excavation activities conducted on the property.

- A concrete wash pad is located on the southwestern section of the subject property. No stains, or pools of liquid were observed in the vicinity of the wash pad, and it is no longer in use. According to a *Phase I Environmental Site Assessment performed by* E2C, Inc. on September 18, 2000, stained surfaces and oily water was observed in the vicinity of the wash pad. Further investigation was warranted for the concrete wash pad at the time. According to a *Site Closure Report* submitted on May 31, 2001 to the Santa Clara Fire Department (SCFD), two soil borings were advanced in the vicinity of the concrete wash area. Samples were taken at 6 and 8 inches bgs. Samples were analyzed for Total Oil and Grease. Both samples yielded results that were below detection limits. No documentation concerning the closure response was available at the SCFD. However; based on the sampling results, the concrete wash pad is not expected to represent a significant environmental concern.

- Two automobile engines were observed on the southeastern portion of the subject property. The pavement below the engines was stained. AEI recommends that the engines be removed immediately in order to prevent a significant release of motor oil in to the subsurface.

- The subject property was historically used for agricultural purposes. There is a potential that agricultural chemicals, such as pesticides, herbicides and fertilizers, were used onsite. The entire area of the subject property is either paved over or covered by improvements that make direct contact with any potential remaining concentrations in the soil unlikely. Furthermore, the subject property is developed and used for commercial/light industrial purposes and thus no further action related to the former agricultural use of the subject property is warranted at this time. If redevelopment of the subject property is planned for residential use, the owner/user of the report should contact the local planning department to determine whether sampling relating to the former agricultural use of the subject property is required.

Conclusions, Opinions, and Recommendations

We have performed a Phase I Environmental Site Assessment for the property located at 535-555 Reed Street in the City of Santa Clara, Santa Clara County, California, in conformance with the scope and limitations of ASTM Standard Practice E1527-05 and the Environmental Protection Agency Standards and Practices for All Appropriate Inquiries (40 CFR Part 312). Any exceptions to, or deletions from, this practice are described in Section 1.2 of this report.

This assessment has revealed no evidence of recognized environmental conditions in connection with the property. AEI recommends no further investigations for the subject property at this time. However, AEI recommends that the abandoned vehicle engines be removed from the site, and that the remaining on-site groundwater monitoring well be accessed and properly decommissioned.

In addition, due to the presence of low levels of constituents of concern detected in the soil and groundwater on the property, any redevelopment activities should include health and safety plans to address potential worker contact with these areas. Engineering controls or higher construction costs may result from the low levels that remain in place.

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1.0 INTRODUCTION

This report documents the methods and findings of the Phase I Environmental Site Assessment (ESA) performed in conformance with the scope and limitations of ASTM Standard Practice E1527-05 and the Environmental Protection Agency Standards and Practices for All Appropriate Inquiries (40 CFR Part 312) for the property located at 535-555 Reed Street in the City of Santa Clara, Santa Clara County, California (Figure 1: Site Location Map, Figure 2: Site Map, and Appendix A: Property Photographs).

1.1 Scope of Work

The purpose of the Phase I Environmental Site Assessment is to identify potential environmental liabilities associated with the presence of hazardous materials, their use, storage, and disposal at and in the vicinity of the subject property, as well as regulatory non-compliance that may have occurred at the subject property. Property assessment activities focused on: 1) a review of federal, state, tribal and local databases that identify and describe underground fuel tank sites, leaking underground fuel tank sites, hazardous waste generation sites, and hazardous waste storage and disposal facility sites within the ASTM approximate minimum search distance; 2) a property and surrounding site reconnaissance, and interviews with the past and present owners and current occupants and operators to identify potential environmental contamination; and 3) a review of historical sources to help ascertain previous land use at the site and in the surrounding area.

The goal of AEI Consultants in conducting the environmental site assessment was to identify the presence or likely presence of any hazardous substances or petroleum products on the property that may indicate an existing release, a past release, or a material threat of a release of any hazardous substance or petroleum product into the soil, groundwater, or surface water of the property.

1.2 Significant Assumptions

The following assumptions are made by AEI Consultants in this report. AEI Consultants relied on information derived from secondary sources including governmental agencies, the client, designated representatives of the client, property contact, property owner, property owner representatives, computer databases, and personal interviews. Except as set forth in this report, AEI Consultants has made no independent investigation as to the accuracy and completeness of the information derived from secondary sources including government agencies, the client, designated representatives of the client, property contact, property owner, property owner representatives, computer databases, or personal interviews and has assumed that such information is accurate and complete. AEI Consultants assumes information provided by or obtained from governmental agencies including information obtained from government websites is accurate and complete. Groundwater flow and depth to groundwater, unless otherwise specified by on-site well data, or well data from adjacent sites are assumed based on contours depicted on the United States Geological Survey topographic maps. AEI Consultants assumes

the property has been correctly and accurately identified by the client, designated representative of the client, property contact, property owner, and property owner's representatives.

1.3 Limitations

Property conditions, as well as local, state, tribal and federal regulations can change significantly over time. Therefore, the recommendations and conclusions presented as a result of this study apply strictly to the environmental regulations and property conditions existing at the time the study was performed. Available information has been analyzed using currently accepted assessment techniques and it is believed that the inferences made are reasonably representative of the property. AEI Consultants makes no warranty, expressed or implied, except that the services have been performed in accordance with generally accepted environmental property assessment practices applicable at the time and location of the study.

Considerations identified by ASTM as beyond the scope of a Phase I ESA that may affect business environmental risk at a given property include the following: asbestos-containing materials, radon, lead-based paint, lead in drinking water, wetlands, regulatory compliance, cultural and historic resources, industrial hygiene, health and safety, ecological resources, endangered species, indoor air quality, mold, vapor intrusion, and high voltage lines. These environmental issues or conditions may warrant assessment based on the type of the property transaction; however, they are considered non-scope issues under ASTM Standard Practice E1527-05.

If requested by the client, these non-scope issues are discussed in Section 6.2. Otherwise, the purpose of this investigation is solely to satisfy one of the requirements for qualification of the innocent landowner defense, contiguous property owner or bona fide prospective purchaser under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). ASTM Standard Practice E1527-05 and the EPA Standards and Practices for All Appropriate Inquiries (40 CFR Part 312) constitute the "all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice" as defined in:

1) 42 U.S.C § 9601(35)(B), referenced in the ASTM Standard Practice E1527-05.

2) Sections 101(35)(B) (ii) and (iii) of CERCLA and referenced in the EPA Standards and Practices for All Appropriate Inquiries (40 CFR Part 312).

3) 42 U.S.C. 9601(40) and 42 U.S.C. 9607(q).

The Phase I Environmental Site Assessment is not, and should not be construed as, a warranty or guarantee about the presence or absence of environmental contaminants that may affect the property. Neither is the assessment intended to assure clear title to the property in question. The sole purpose of investigation into property title records is to ascertain a historical basis of prior land use. All findings, conclusions, and recommendations stated in this report are based upon facts, circumstances, and industry-accepted procedures for such services as they existed at the time this report was prepared (i.e., federal, state, and local laws, rules, regulations, market

conditions, economic conditions, political climate, and other applicable matters). All findings, conclusions, and recommendations stated in this report are based on the data and information provided, and observations and conditions that existed on the date and time of the property visit. Responses received from local, state, or federal agencies or other secondary sources of information after the issuance of this report may change certain facts, findings, conclusions, or circumstances to the report. A change in any fact, circumstance, or industry-accepted procedure upon which this report was based may adversely affect the findings, conclusions, and recommendations expressed in this report.

1.4 Data Gap and Data Failure

According to ASTM E1527-05, data gaps occur when the Environmental Professional is unable to obtain information required, despite good faith efforts to gather such information.

Data failure is one type of data gap. According to ASTM E1527-05 "data failure occurs when all of the standard historical sources that are reasonably ascertainable and likely to be useful have been reviewed and yet the objectives have not been met". Pursuant to ASTM Standards, historical sources are required to document property use back to the property's first developed use or back to 1940, whichever is earlier.

The following data gaps were identified during the course of this investigation.

- On May 11, 2007, the Santa Clara County Environmental Health Department (SCCEHD) was contacted to review files on the subject property and nearby sites of concern. Due to the time constraints associated with this report, AEI was not able to obtain records from the SCCEHD. However, the Santa Clara Fire Department handles all records in relation to hazardous materials, and therefore, files concerning the subject property at the SCCEHD are not likely to provide any further information than what has been obtained.

- Interviews with past owners and occupants regarding historical onsite operations were not reasonably ascertainable and therefore, this constitutes a data gap. However, based on information obtained from other sources including, historical aerial photographs and previous environmental investigations, this data gap is not expected to significantly alter the overall findings of this investigation.

Due to time constraints, the client has requested that AEI issue this report despite the above-listed limitations.

1.5 Reliance

This investigation was prepared for the sole use and benefit of DuPont Fabros Development LLC. Neither this report, nor any of the information contained herein shall be used or relied upon for any purpose by any person or entity other than DuPont Fabros Development LLC.

2.0 SITE AND VICINITY DESCRIPTION

2.1 Site Location and Description

The subject property is located on the north side of Reed Street in a mixed commercial and industrial area of Santa Clara. The property totals approximately 6.9 acres and is improved with eight (8) one-story warehouse/storage buildings, one (1) one-story office building, and one (1) one-story equipment building totaling approximately 800,000 square feet. The buildings are vacant; excluding one warehouse building located on the eastern boundary of the property, which is utilized for vehicle parking by Avis Rental Cars. In addition to the subject property buildings, the property is improved with asphalt-paved parking areas. The property was developed with the office building, the equipment building, and three of the warehouses in the late 1940s. The five remaining warehouse buildings were constructed in phases in the late 1960s and early 1970s.

The subject property was identified in the regulatory database as a Leaking Underground Storage Tank (LUST) site, a California Facility Index Database (FID) UST site, a HAZNET waste manifest site, a Cortese Hazardous Waste and Substance Site, a Spills, Leaks, Investigations and Cleanups (SLIC) site, a Historical Underground Storage Tank (UST) site, a Historical LUST site, and a SWEEPS UST site.

The Assessor's Parcel Number (APN) for the subject property is 230-03-080. Heating and cooling systems on the subject property are fueled by natural gas and electricity provided by Pacific Gas & Electric, respectively. Potable water and sewage disposal are provided by municipal services.

Refer to Figure 1: Site Location Map, Figure 2: Site Map, and Appendix A: Property Photographs for site location.

2.2 Site and Vicinity Characteristics

The subject property is located in a mixed commercial and industrial area of Santa Clara. The immediately surrounding properties consist of a multi-tenant industrial building and AMI Recycling to the north; Harrington Industrial Plastics and three multi-tenant retail centers to the east; Reed Street followed by Enterprise Rental Cars and Akins Collision Center to the south; and a multi-tenant commercial building, a vacant industrial/commercial building, and Kapa Auto Supply Wholesaler to the west beyond railroad tracks.

Two east adjacent properties, a north adjacent property, and a west adjacent property were identified as small quantity generators of hazardous waste. A west adjacent property was identified as an ENVIROSTOR and a LUST site. These listings are further discussed in Section 5.3.

2.3 Geology and Hydrogeology

According to information obtained from the US Geological Survey (USGS), the area surrounding the subject property is underlain by sedimentary deposits of the Cenozoic-era. Based on a review of the USDA Soil Survey for the area of the subject property, the soils in the vicinity of the subject property are classified as the Botella Series. According to subsurface investigations performed on the property, the soils underneath the subject property consist of silty and sandy clays up to a depth of 11 and ½ feet below ground surface (bgs), followed by clayey silt.

Based on a review of the USGS San Jose West, California Quadrangle Topographic Map, the subject property is situated approximately 53 feet above mean sea level, and the local topography is relatively flat. The nearest surface water is Coyote Creek, located approximately 3/4–mile to the northeast. Based on groundwater monitoring data obtained from previous subsurface investigations performed at the subject property, the direction of groundwater flow beneath the subject property is inferred to be to the north-northeast and is expected to be encountered at 5 feet bgs.

3.0 HISTORICAL REVIEW OF SITE AND VICINITY

Based on a review of historical sources, the subject property was formerly developed with agricultural land since at least 1939 until the late 1940s. The site was occupied by the Pacific Redwood Casket Company from the late 1940s until approximately 1966 on the southern portion of the property. The site was occupied by Beaver Lumber from at least 1970 until the early 2000s. Several commercial/industrial tenants have additionally occupied the property, including Variety Merchandising in 1970, Sports Boats, Inc. in 1990, Renewed Truck and Trailer from at least 1989 until 1991, and Cope & McPhetres Marine in 1999. According to a previous Phase I ESA, the operations by these later tenants consisted of office activities, warehouse storage activities, truck and truck accessory sales, and boat sales. Environmental concerns associated with the historical occupancy of the property are further discussed below and in Sections 3.2.1, 4.2.6 and 5.3.

The subject property was historically used for agricultural purposes. There is a potential that agricultural chemicals, such as pesticides, herbicides and fertilizers, were used onsite. The entire area of the subject property is either paved over or covered by improvements that make direct contact with any potential remaining concentrations in the soil unlikely. Furthermore, the subject property is developed and used for commercial/light industrial purposes and thus no further action related to the former agricultural use of the subject property is warranted at this time. If redevelopment of the subject property is planned for residential use, the owner/user of the report should contact the local planning department to determine whether sampling relating to the former agricultural use of the subject property is required.

3.1 Aerial Photograph Review

On May 14, 2007, AEI Consultants reviewed aerial photographs of the subject property and surrounding area. Aerial photographs were reviewed for the following years:

Date: 1939	Date: 1982
Scale: 1" = xxx' OR 1:xxxx	Scale: 1" = xxx' OR 1:xxxx
Date: 1956	Date: 1993
Scale: 1" = xxx' OR 1:xxxx	Scale: 1" = xxx' OR 1:xxxx
Date: 1965	Date: 1999
Scale: 1" = xxx' OR 1:xxxx	Scale: 1" = xxx' OR 1:xxxx
Date: 1974	Date: 2005
Scale: 1" = xxx' OR 1:xxxx	Scale: Unknown

In the 1939 aerial photograph, the subject property and all of the adjacent properties appear to be agricultural land. Reed Street and the west adjacent railroad tracks appear to be developed.

In the 1956 aerial photograph, the subject property appears to be developed with five of the current structures that are located towards the southwestern portion of the property. The northern portion of the property and the north adjacent property appear to be agricultural land. The east adjacent property appears to be a storage area for the subject property tenant. The west and south adjacent properties appear to be developed with several industrial/commercial structures. No other significant changes were noted.

No significant changes were noted in the 1965 aerial photograph.

In the 1974 aerial photograph, the subject property and the east, south, and north adjacent properties are developed as they are today, with the exception of one current storage building located on the eastern section of the subject property. No other significant changes were noted.

In the 1982 aerial photograph, the previously discussed storage building appears developed on the subject property. No other significant changes were noted.

No significant changes were noted in the 1993 and 1999 aerial photographs.

In the 2005 aerial photograph, the west adjacent properties appear to be developed with the current commercial/industrial structures.

If available, high-quality copies of reviewed aerial photographs are included as Figure 3.

3.2 Regulatory Agencies

Local and state agencies, such as environmental health departments, fire prevention bureaus, and building and planning departments are contacted to identify any current or previous reports of hazardous materials use, storage, and/or unauthorized releases that may have impacted the subject property. In addition, information pertaining to Activity and Use Limitations (AULs), defined as legal or physical restrictions, or limitations on the use of, or access to, a site or facility, is requested. Specifically AULs are comprised of engineering controls (EC) and institutional controls (IC).

Engineering Controls are defined as physical modifications to a site or facility to reduce or eliminate the potential for exposure to hazardous substances or petroleum products in the soil or ground water on the property. *Institutional Controls* are defined as a legal or administrative restriction on the use of, or access to, a site or facility to 1) reduce or eliminate the potential for exposure to hazardous substances or petroleum products in the soil or ground water on the property, or 2) to prevent activities that could interfere with the effectiveness of a response action, in order to ensure maintenance of a condition of no significant risk to public health or the environment.

3.2.1 Health Department

On May 11, 2007, the Santa Clara County Environmental Health Department (SCCEHD) was contacted to review files on the subject property and nearby sites of concern. Files at the

SCCEHD may contain information regarding hazardous materials storage, as well as information regarding unauthorized releases of petroleum hydrocarbons or other contaminants that may affect the soil or groundwater in the area. Due to the time constraints associated with this report, AEI was not able to obtain records from the SCCEHD. However, the Santa Clara Fire Department handles all records in relation to hazardous materials, and therefore, files concerning the subject property at the SCCEHD likely would not provide any further information than what has been obtained.

3.2.2 Fire Department

On May 18, 2007, the Santa Clara Fire Department (SCFD) was contacted for information on the subject property to identify any evidence of previous or current hazardous material usage.

AEI was provided the following documentation:

Soil Sampling Below Underground Storage Tanks, Soil Tech Engineering (STE) (April 23, 1992)

STE conducted sampling after the removal of one 550-gallon waste oil UST, one 1,000-gallon gasoline UST, one 2,000-gallon gasoline UST, and two 10,000-gallon gasoline USTs. A total of nine samples were taken from the tank walls and cavities. Contaminated soil was observed during the removal activities. Samples were analyzed for TPH gasoline and diesel, Benzene, Toluene, Ethylbenzene, and Xylene (BTEX), Total Oil and Grease, lead, and Halogenated Volatile Organics. TPH diesel and gasoline concentrations were found in two samples that were above action levels, and several other samples detected concentrations below action levels. Concentrations of lead below action levels were detected in samples performed in the vicinity of the waste oil UST. STE recommended that further investigation be conducted and that a leaking tank incident be reported to the proper agencies. In addition, a 200-gallon waste oil UST was removed in 1985, in which sampling and removal procedures were not adequately documented. Due to these facts, the UST removed in 1985 was included in the 1992 release incident as a concern.

Underground Storage Tank Removal Permit, SCFD (March 3, 1993)

The permit is for the removal of one 550-gallon waste oil UST, one 1,000-gallon gasoline UST, one 2,000-gallon gasoline UST, and two 10,000-gallon gasoline USTs. All of the tanks were single-walled. No further information was provided. AEI presumes this permit is related to the tank removal activities detailed above.

Underground Storage Tank Unauthorized Release (Leak) Report, SCFD (March 9, 1993)

According to the document, three USTs were removed from the site on February 20, 1992 and two USTs were removed on April 16, 1992. Analysis for TPH gasoline and diesel revealed elevated concentrations that were indicative of a release. Beaver Lumber Company is addressed as the responsible party.

Underground Storage Tank Installation Permit, SCFD (August 12, 1993)

The permit is for the installation of one vaulted 10,000-gallon UST, that contains one 4,000-gallon diesel fuel chamber and one 6,000-gallon gasoline chamber.

Underground Storage Tank Permit, SCFD (September 23, 1994)

The document indicated that a permit issued for a 10,000-gallon split gasoline UST was to be renewed. The UST is listed as containing diesel fuel and gasoline in two 4,000 and 6,000-gallon separated chambers. The UST is double-walled and was constructed of fiberglass-reinforced plastic. Several renewal permits were additionally issued for this UST from 1994 until 2004.

UST Removal Report, Alpha Geo Services (AGS) and Enviro Soil Tech Consultants (ESTC) (May 14, 2001)

On April 29, 2001, AGS removed one 10,000-gallon split UST (vaulted 4,000-gallon diesel fuel and 6,000-gallon gasoline USTs). The tank was cleaned onsite and was transported to a different Beaver Lumber Company site. After the removal, samples were taken from the walls and floors of the tank cavity and a water sample was taken from the tank pit. The samples were analyzed for TPH diesel and gasoline, BTEX, and MTBE. Concentrations of TPH diesel were found in two samples, which were well below action limits. In addition, the water sample yielded concentrations of TPH diesel that were well below action limits. ESTC concluded that no further investigations were necessary for the UST removal.

Site Closure, ESTC (May 31, 2001)

In response to a request made by the SCFD, two samples were taken in the vicinity of the former maintenance building. Two borings were advanced on the southwestern corner of the building and in a concrete wash area. Samples were taken at 6 and 8 inches bgs. Samples were analyzed for Total Oil and Grease. Both samples yielded results that were below detection limits. ESTC concluded that the area is not a concern and that the site should reach full closure. No documentation concerning the closure was available at the SCFD.

Hazardous Waste Tank Closure Certification, SCFD (July 30, 2001)

The document indicates that two USTs (one vaulted UST with 4,000 and 6,000-gallon chambers) were removed from the subject property and that contamination was not discovered through confirmation samples. No further information was listed.

3.2.3 Building Department

On May 18, 2007, the Santa Clara Building Department (SCBD) was visited for information on the subject property in order to identify historical tenants and property use. Please refer to the following table for a listing of permits reviewed:

Building Permits Reviewed

Year(s)	Owner/Applicant	Description of Permit / Building Use
1956	W.J. Nicholson	Construction Permit – Storage Building (535)
1958	Pacific Redwood Casket Company	Certificate of Occupancy (535)
1965	Beaver Lumber Company	Construction Permit – Industrial Building (555)
1966	Beaver Lumber Company	Construction Permit – Office Building (535)
1969	Beaver Lumber Company	Construction Permit – Shed (535)
1974	Beaver Lumber Company	Construction Permit – Industrial Warehouse (535)
1977	Beaver Lumber Company	Addition Permit – Warehouse Building (535)

In addition to the above-listed permits, over 100 permits were issued for minor remodeling/alteration work starting in the 1960s. Environmental concerns associated with the former tenants are further discussed in Sections 4.2.5 and 3.2.2.

3.2.4 Planning Department

On May 18, 2007, the Santa Clara County Planning Department (SCCPD) was contacted for information on the subject property in order to identify AULs associated with the subject property.

No information indicating the existence of AULs was on file for the subject property with the SCCPD.

3.2.5 Department of Toxic Substances Control

On May 11, 2007, the Department of Toxic Substances Control (DTSC) was contacted was contacted for information on the subject property to identify any evidence of previous or current hazardous material usage.

No information indicating current or prior use or storage of hazardous materials, or the existence of AULs was on file for the subject property with the DTSC.

3.2.6 Regional Water Quality Control Board

On May 11, 2007, the San Francisco Regional Water Quality Control Board (SFRWQCB) was contacted was contacted for information on the subject property to identify any evidence of previous or current hazardous material usage.

AEI received several documents from the SFRWQCB and from the client concerning the corrective action activities for the former PCP tank. The following documents were provided:

Adoption of Site Cleanup Requirements for Beaver Lumber Company Site, SFRWQCB (July 11, 2001)

The letter was issued in order to address the onsite contamination caused by a former Pentachlorophenol (PCP) tank. The PCP tank was located on the north side of the former equipment repair building on the west side of the property. The PCP tank was utilized by Beaver Lumber Company from approximately 1965 until the late 1980s for the lumber treating process. Wood products were dipped into the tank and were hung over the tank for a few hours. The wood products were then placed on unpaved ground until they dried. The report noted that PCP contaminants were discovered in samples taken in the vicinity of the former waste oil tank (removed, sampled, and closed in 1985) located on the south side (approximately 90 feet to the south of the PCP tank) of the equipment repair building. In October 2000, E2C Consultants reportedly collected soil and groundwater samples in the vicinity of the PCP tank. Soil in the area of concern contained concentrations of PCP up to 40 mg/l. Additional investigations performed in February through April of 2001 yielded groundwater concentrations up to 750 micrograms/Liter. Soil contamination was determined to be limited to a small, shallow area in the vicinity of the former PCP tank. Groundwater contamination was determined to have migrated approximately 250 to the north-northeast of the former tank. The vertical extent of the contamination was not yet defined. The SFRWQCB noted that the proper measures must be taken by the subject property owner in order to properly remediate the onsite contamination.

Year 2005 Groundwater Monitoring Documentation Report and Petition for Case Closure, Stellar (December 19, 2005)

The report documented the following activities concerning the PCP contamination:

In May 1985, PCP was detected in a soil sample collected during installation of groundwater monitoring well MW-3 (subsequently referred to as MW-1) associated with a former waste oil underground storage tank (UST). In the late 1980s, the PCP dipping tank was removed. In May 1991, PCP was detected in an exploratory borehole soil sample beneath a former waste oil UST and in a composite sample of surficial soil near the former dipping tank. In 1992, the waste oil UST was removed (Refer to Section 3.2.4). In September 2000, a Phase I Environmental Site Assessment was conducted, which included a recommendation to evaluate PCP contamination extent (Refer to Section 4.2.5).

From October 2000 until October 2001, several borings were advanced onsite, three monitoring wells were installed, and one previously installed monitoring well was sampled in order to address the PCP contamination issue. Two groundwater monitoring events occurred. In January 2002, the PCP dipping tank source area was excavated (and offsite disposal conducted), followed by confirmation soil and grab-groundwater sampling, then application of Oxygen Release Compound™ (ORC™) into the excavation as an interim remedial action. In January 2002, baseline sampling of the stockpiled soil began., followed by the implementation of white rot fungus treatment of the stockpile. Between February and March of 2002, two more groundwater sampling events took place, and post-ORC™ treatment grab-groundwater sampling in the PCP dipping tank source area excavation occurred.

In April 2002, Well MW-1 was decommissioned. In May 2002, groundwater monitoring wells MW-5, MW-6, and MW-7 were installed, and a cone penetrometer test (CPT) remediation

program (14 boreholes, 20 groundwater samples) was conducted. In June 2002-November 2002, groundwater sampling events No. 5-6 were conducted. In November 2002, soil stockpile sampling event No. 5 was conducted. From January 13 through 17, 2003, twelve site groundwater monitoring wells (MW-8-S through MW-19-S) were installed in the three water-bearing zones. From January 22 through 27, 2003, a corrective action program including the injection of Hydrocarbon Release Compound™ (HRC™) in a barrier configuration was conducted (SES, 2003a).

On January 30, 2003, the final soil stockpile sampling event was conducted. In April 2003, site well MW-20-S was installed on the north adjacent property, followed by groundwater sampling event No. 8. In June 2003, the source area excavation was backfilled with 40 percent of the soil stockpile (the portion meeting reuse criteria); remaining portion of the excavation backfilled with imported clean fill. The soil stockpile that did not meet re-use criteria (60 percent) was transported to a nonhazardous landfill for disposal. From January 2003-April 2004, groundwater sampling events No. 7-12 were conducted.

Figures and laboratory analysis concerning each sampling event, remedial activities, and detailing the contamination plume are located in Appendix C: References.

According to the SFRWQCB Geotracker website, the depth to groundwater is approximately 5 feet bgs, and flows in a north-northeasterly direction. The most recent groundwater monitoring report performed on July 28, 2005 indicated that PCP levels were between 0.99 and 13 mg/l in all wells tested. According to the Geotracker website, the site reportedly reached closure for the PCP contamination on March 9, 2006. Based on the remedial activities that took place onsite, and the closure granted, the no further investigation regarding the former PCP Tank is required. A closure letter was not obtained. However, the Geotracker website confirmed that the site is currently classified as “Case Closed.”

3.3 Sanborn Fire Insurance Maps

Sanborn Fire Insurance maps were developed in the late 1800s and early 1900s for use as an assessment tool for fire insurance rates in urbanized areas. A search was made of Environmental Data Resource’s collection of Sanborn Fire Insurance maps on May 14, 2007.

Sanborn maps were available and reviewed for the years 1961 and 1966.

In the 1961 map, the subject property is occupied by the Pacific Redwood Casket Company, which occupies the southern portion of the subject property. Six structures are developed onsite, including a casket manufacturing building, a lumber shed, a lumber storage building, a steam dry kiln building, a sawdust bin, and an unnamed warehouse structure. The northern and eastern sections of the property are undeveloped, but are utilized for lumber storage. The north and west adjacent properties are vacant land. The south and east adjacent properties are not depicted.

In the 1966 map, the subject property is additionally developed with another lumber storage building and two storage sheds. No other significant changes were noted.

3.4 City Directories

A search of historic city directories was conducted for the subject property at through Environmental Data Resources and the Santa Clara Public Library on May 18, 2007. Directories were available and reviewed for the years 1922, 1925, 1926, 1930, 1931, 1935, 1936, 1940, 1942, 1946, 1946, 1950, 1955, 1957, 1960, 1962, 1963, 1966, 1968, 1970, 1974, 1975, 1978, 1980, 1982, 1985, 1986, 1991, 1996, 2000, 2001 and 2006. The following table summarizes the results of the city directory search.

City Directory Search Results

Year(s)	Occupant Listed
1922-1955	Addresses Not Listed in Research Source
1957-1966	Pacific Redwood Casket Company (555), Remaining Address Not Listed in Research Source
1970-1974	Beaver Lumber (535), Variety Merchandising Company (555)
1975	Beaver Lumber, Wilson Wholesale Frames (535), Remaining Address Not Listed in Research Source
1978-1986	Beaver Lumber (535), Remaining Address Not Listed in Research Source
1991	Beaver Lumber (535), Sports Boats, Inc. (555)
1996	Beaver Lumber, Pacific Trench Safety Inc. (535), Remaining Address Not Listed in Research Source
2001-2006	Addresses Not Listed in Research Source

Environmental concerns associated with the former occupants of the property are further discussed in Sections 3.2.2, 3.2.6 and 4.2.5.

4.0 INTERVIEWS AND USER PROVIDED INFORMATION

4.1 Interviews

Pursuant to ASTM E1527-05, the following interviews were performed during this investigation in order to obtain information indicating RECs in connection with the subject property.

4.1.1 Interview with Owner

The subject property owner, Mr. Alan Ream, was not aware of any pending, threatened, or past litigation relevant to hazardous substances or petroleum products in, on, or from the subject property; any pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on, or from the subject property; or any notices from a governmental entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products.

4.1.2 Interview with Report User

The report user, DuPont Fabros Development, LLC, was not aware of any pending, threatened, or past litigation relevant to hazardous substances or petroleum products in, on, or from the subject property; any pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on, or from the subject property; or any notices from a governmental entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products.

4.1.3 Interview with Key Site Manager

The key site manager, Mr. Ream, was not aware of any pending, threatened, or past litigation relevant to hazardous substances or petroleum products in, on, or from the subject property; any pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on, or from the subject property; or any notices from a governmental entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products.

4.1.4 Past Owners, Operators and Occupants

Interviews with past owners and occupants regarding historical onsite operations were not reasonably ascertainable and therefore, this constitutes a data gap. However, based on information obtained from other sources including, historical aerial photographs and previous environmental investigations, this data gap is not expected to significantly alter the overall findings of this investigation.

4.1.5 Interview with Others

Information obtained during interviews with local government officials is incorporated into the appropriate segments of this section.

4.2 User Provided Information

User provided information is intended to help identify the possibility of RECs in connection with the subject property. In addition, pursuant to ASTM E1527-05, the User completed the *ASTM User Questionnaire*. Please refer to Appendix C: References for a copy of the questionnaire.

4.2.1 Title Records/Environmental Liens/AULs

The User did not provide any title records, AULs or documentation indicating environmental liens encumbering the subject property or any information regarding previous uses or ownership of the subject property that indicated recognized environmental conditions.

4.2.2 Specialized Knowledge

AEI was not informed by the User of any specialized knowledge or experience related to the subject property or nearby properties.

4.2.3 Valuation Reduction for Environmental Issues

The User did not indicate to AEI any information to suggest that the valuation of the subject property is significantly less than the valuation for comparable properties due to environmental factors.

4.2.4 Commonly Known or Reasonably Ascertainable Information

The User did not inform AEI of any commonly known or reasonably ascertainable information about that the subject property which aided AEI in identifying conditions indicative of a release or threatened release.

4.2.5 Previous Reports and Other Provided Documentation

Documentation was provided to AEI by the Client during this investigation. A summary of this information follows:

Phase I Environmental Site Assessment, E2C, Inc. (September 18, 2000)

The report was performed for the subject property as well a north adjacent property. The report confirmed that the subject property was formerly developed agriculturally since at least 1939 until the late 1940s. The site was occupied by the Pacific Redwood Casket Company from the

late 1940s until approximately 1966 on the southern portion of the property. The site was occupied by Beaver Lumber since at least 1970 until the early 2000s. Several commercial/industrial tenants have additionally occupied the property, including Variety Merchandising in 1970, Sports Boats, Inc. in 1990, Renewed Truck and Trailer from at least 1989 until 1991, and Cope & McPhetres Marine in 1999. At the time of the report, the site was occupied by Beaver Lumber Company (535 Reed Street), True Blue Sales (555 Reed Street) and Intext Auto Parts (555 Reed Street). According to the report, Sports Boats, Inc., Renewed Truck and Trailer, and Cope & McPhetres Marine utilized one storage/warehouse building located on the eastern section of the property as well as the onsite office building. The operations consisted of office activities, warehouse storage activities, truck and truck accessory sales, and boat sales. Based on these facts, these former tenants weren't addressed as significant environmental concerns.

The report noted that six USTs were known to have existed onsite. Five of those USTs were removed from the site in 1992 and one waste oil UST was removed in 1986. The report mentions that a release was reported during the 1992 removal event for all six USTs, which is further discussed in Section 3.2.2. Three monitoring wells were installed in 1992 to further delineate the onsite contamination. TPH gasoline and diesel, and BTEX concentrations were detected. Another sampling event took place in 1997, and all analytes were below action limits. At the time of the report, the Santa Clara Valley Water District (SCVWD) requested that further sampling be conducted onsite to further delineate the onsite contamination.

A PCP aboveground tank was noted to have been developed on the north side of the equipment building. The PCP tank was utilized for the lumber treating process. Wood products were dipped into the tank and were hung over the tank for a few hours. The wood products were then placed on unpaved ground until they dried. E2C noted that previous sampling events performed on the subject property yielded the presence of low concentrations of PCP, and that a focused subsurface investigation should be performed in the vicinity of the tank.

The report noted that a concrete wash pad was located on the southwestern portion of the subject property. E2C observed stained surfaces and oily water in the vicinity of the wash pad. Further investigation was warranted for the concrete wash pad.

The property was developed with a 10,000-gallon split UST at the time of the report, which is further discussed in Section 3.2.2.

Three active monitoring wells, at least one inactive monitoring well, and several boring caps were observed onsite. E2C recommended that all inactive features be properly closed.

No other significant concerns were identified.

Fuel Leak Site Case Closure – Case No. 14-197, Santa Clara Valley Water District (February 7, 2002)

The letter indicates that all corrective action activities have been performed onsite in relation to the 1992 UST removal and subsequent release. The SCVWD requested that three monitoring

wells be properly closed. The document included a timeline of the corrective action activities that took place onsite. Activities that were not previously discussed in this Section or in Section 3.2.2 included:

On March 31, 2000, five exploratory soil borings were drilled and sampled in the vicinity of the USTs for soil and groundwater. TPH gas and diesel and MTBE were discovered in the soil samples, and elevated levels of benzene and TPH gas and diesel were found in one groundwater sample.

In January 2001, six exploratory borings were conducted further downgradient from the UST area. Soil and groundwater samples were analyzed for TPH gas and diesel, MTBE, and BTEX. TPH gas and diesel and MTBE were detected in several borings. Benzene was detected in one sample.

In February 2001, several previously installed monitoring wells were sampled, which yielded concentrations of contaminants that appeared to be at lower levels than previous sampling events.

The SCVWD concluded that contaminant levels have significantly attenuated, and that a majority of the remaining contamination appeared to be located in the vicinity of the former UST area located on the eastern portion of property. The SCVWD concluded that the onsite contamination does not pose a threat to the regional groundwater, human health, or the environment.

Figures displaying the locations of the former USTs and the samples are included in Appendix C: References. Based on the closure granted by the SCVWD, no further investigation in connection with the onsite LUST incident is required.

Documentation Report for Destruction of 10 A-Zone Monitoring Wells, Stellar Environmental Solutions, Inc. (Stellar) (March 23, 2006)

According to the report, the site has undergone remedial activities concerning the former PCP tank since 1985. The SFRWCB granted closure to the site on March 9, 2006, and requested that eleven (11) installed monitoring wells be properly decommissioned. Stellar reported that it could not access one of the onsite monitoring wells, MW-16S, due to a large pile of construction debris being located on top of the well. However, Stellar properly decommissioned ten (10) remaining wells and included regulatory documentation in the appendices of their report.

Based on the fact that the site has received a comprehensive NFR Letter indicating that no further remedial action is necessary at the site, AEI recommends that MW-16S be decommissioned according to federal and local regulations.

5.0 REVIEW OF REGULATORY AGENCY RECORDS

The following information was obtained through a search of electronically compiled federal, state, county, and city databases provided by Environmental Data Resources, Inc. (EDR). The database search includes regulatory agency lists of known or potential hazardous waste sites, landfills, hazardous waste generators, and disposal facilities in addition to sites under investigation. The information provided in this report was obtained from publicly available sources. The locations of the sites listed in this report are plotted with a geographic information system utilizing geocoding of site addresses. The accuracy of these locations is generally +/- 300 feet. AEI's field representative has attempted to confirm the locations of listings on or adjacent to the subject property. Refer to the radius map (Appendix B: Regulatory Database Review Report) for the locations of the sites in relation to the subject property.

5.1 Records Summary

DATABASE REVIEWED	SUBJECT PROPERTY	ADJACENT PROPERTY
Identification as National Priorities List (NPL) "Superfund" site	No	No
Identification as a Federal Delisted NPL site	No	No
Identification as CERCLIS and/or CERCLIS/NFRAP site	No	No
Identification as hazardous waste handler and/or generator (RCRA-TSD, LG-GEN and/or SM-GEN)	No	**Yes**
Identification as RCRA CORRACTS site	No	No
Identification in Federal Institutional Control/Engineering Control Registries	No	N/A
Identification as an Emergency Response Notification Systems (ERNS) site	No	N/A
Identification as Historical State (Historical CalSites SPL/SCL) site	No	No
Identification as an ENVIROSTOR site	No	**Yes**
Identification as SLIC Site	**Yes**	No
Identification as solid waste landfill (SWLF)	No	No
Identification as HAZNET site	**Yes**	No
Identification as registered underground/aboveground storage tanks (UST/AST)	No	No
Identification as leaking underground storage tanks (LUST) site	**Yes**	**Yes**

Identification as a State DEED Restriction site	No	N/A
Identification as a State Voluntary Cleanup Program (VCP) site	No	No
Identification as Federal Land Use/Indian Lands of the U.S. sites	No	No
Identification as State/Tribal Brownfields site	No	No
Cortese Hazardous Waste and Substance Sites	**Yes**	N/A
Historical Underground Storage Tanks (HIST UST) List	**Yes**	N/A
SWEEPS UST List	**Yes**	N/A
CA FID Facility Inventory Database UST	**Yes**	N/A

The subject property was identified as a LUST, HAZNET, Cortese, SLIC, Historical UST, Historical LUST, CA FID UST, and SWEEPS UST site. Two east adjacent properties, a north adjacent property, and a west adjacent property were identified as small quantity generators of hazardous waste. A west adjacent property was identified as an ENVIROSTOR and a LUST site. These listings are further discussed in Section 5.3.

5.2 Contaminant Migration

Migration of petroleum hydrocarbon or volatile organic compound (VOC) contamination is generally via groundwater. Therefore, only those contaminant release sites located hydrologically upgradient relative to the subject property are expected to represent a potential environmental concern to the subject property. Contaminated sites located hydrologically downgradient of the subject property are not expected to represent a potential threat to the groundwater quality beneath the subject property. Sites that are situated hydrologically cross-gradient relative to the subject property are not expected to represent a concern unless close proximity allows for the potential of lateral migration. As discussed in Section 2.3, groundwater in the vicinity of the subject property is assumed to flow to the north-northeast. Migration of VOC contaminants in the vapor phase have also been documented which have the potential to impact the subject property; however, evaluation of vapor phase migration and intrusion is beyond the scope of this assessment.

5.3 Record Details

National Priorities List (NPL) is EPA's national listing of contaminated sites targeted for cleanup because they pose a threat to human health and the environment. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) authorizes and requires the EPA to investigate, categorize, and enforce the cleanup of hazardous waste sites on the NPL. An NPL site on or near a particular property may threaten the environmental integrity of the property or affect its marketability.

No sites within a 1-mile radius of the subject property were identified during the NPL database search.

Federal Delisted NPL List consists of sites that no longer require further response actions as determined by the EPA.

No sites within a ½-mile radius of the subject property were identified during the Delisted NPL database search.

CERCLIS and CERCLIS/NFRAP List consists of sites that the EPA has investigated or is presently investigating for release or threatened release of hazardous substances, which may be subject to review in accordance with the terms and conditions of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, also known as Superfund). Sites listed on the "No Further Remedial Action Planned" (NFRAP) database are sites where, following an initial investigation, no contamination was found, contamination was removed quickly, or the contamination was not serious enough to require federal Superfund or NPL consideration.

Nine sites within a ½-mile radius of the subject property were identified during the CERCLIS/NFRAP database search. Eight of these sites are identified on the NFRAP database, indicating that no further remedial action is necessary at these sites. The remaining site is plotted as being located in excess of 1/4-mile from the subject property in a cross-gradient position. Based on regulatory status, relative distance, and the direction of groundwater flow, these sites are not considered to be an environmental concern.

Resource Conservation and Recovery Act (RCRA) Program identifies and tracks hazardous waste from the point of generation to the point of disposal. Information from the RCRA database is divided into three categories: TSD, LG GEN and SM GEN. The TSD category is searched to a 1-mile radius and tracks facilities which treat, store and/or dispose of hazardous waste. LG GEN, or large generators, are facilities that generate more than 1000 kg of hazardous waste per month. SM GEN, or small generators, are facilities that generate between 100 and 1000 kg of hazardous waste per month. The LG-GEN and SM-GEN databases are searched up to a ⅛-mile radius from the subject property.

One site within a 1-mile radius of the subject property was identified during the RCRA-TSD database search.

- The All Metals DBA ECS Refinery site, located at 705 Reed Street, is located approximately 346 feet to the west-southwest (hydrologically cross-gradient) of the subject property. The site is listed as TSD site with several violations on file that are limited to paperwork issues. Based on the lack of a documented release, this site is not expected to represent a significant environmental concern.

Thirty-five sites within a $^{1}/_{8}$-mile radius of the subject property were identified during the RCRA (LG-and SM-GEN) database search.

- The Akins Collision Center site, located at 530 Reed Street, is located on the easternmost south adjacent property. The site is located hydrologically upgradient from the subject property. The site is listed as a SM-GEN site with no violations on file. Based on the lack of a documented release, this site is not expected to represent a significant environmental concern.

- The America Camper site, located at 504 Matthew Street, is located on the westernmost north adjacent property. The site is located hydrologically downgradient from the subject property. The site is listed as a SM-GEN site with no violations on file. Based on the lack of a documented release, this site is not expected to represent a significant environmental concern.

- The Nashua Computer Products Corp site, located at 2070 De La Cruz Boulevard, is located on the southernmost east adjacent property. The site is located hydrologically cross-gradient from the subject property. The site is listed as a SM-GEN site with no violations on file. Based on the lack of a documented release, this site is not expected to represent a significant environmental concern.

- The SB Power Tool Company Corp site, located at 2130 De La Cruz Boulevard, is located on an east adjacent property. The site is located hydrologically cross-gradient from the subject property. The site is listed as a SM-GEN site with no violations on file. Based on the lack of a documented release, this site is not expected to represent a significant environmental concern.

The storage, treatment, disposal and/or generation of hazardous materials at the remaining sites is not a significant environmental concern based on the lack of a documented release or factors discussed in prior segments of Section 5.3.

CORRACTS is an EPA-maintained database of Resource Conservation and Recovery Act (RCRA) facilities undergoing "corrective action". A "corrective action order" is issued when there has been a release of hazardous waste or constituents into the environment from a RCRA facility. Corrective actions may be required beyond the facility's boundary and can be required regardless of when the release occurred, even if it predates RCRA.

Two sites within a 1-mile radius of the subject property were identified during the CORRACTS database search.

- The All Metals DBA ECS Refinery site, located at 705 Reed Street, is located approximately 346 feet to the west-southwest (hydrologically cross-gradient) of the subject property. The site is listed as a Materials Recovery Facility and has been assigned a low corrective action

priority. Based on the direction of groundwater flow and the regulatory status, this site is not expected to represent a significant environmental concern.

The remaining site is located in excess of ½-mile from the subject property in a cross-gradient position. Based on the distance from the subject property and the direction of groundwater flow, this site is not expected to represent a significant environmental concern.

Federal Institutional Control (IC)/Engineering Control (EC) Registries consist of sites with institutional controls (administrative measures such as land use restrictions, deed restrictions and post remediation requirements intended to prevent exposure to contaminants remaining on site), and engineering controls (physical methods to create pathway elimination for regulated substances to enter environmental media or effect human health).

The subject property was not identified in the Federal IC/EC database search.

Emergency Response Notification Systems (ERNS) List is EPA's database of emergency response actions.

The subject property was not identified during the ERNS database search.

Historical California Sites (CalSites) are provided by the California Environmental Protection Agency (EPA), Department of Toxic Substances Control (DTSC) and include state equivalent NPL (SPL) and CERCLIS (SCL) sites. The CalSites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the CalSites database. The database is no longer updated by the state agency and has been replaced by EnviroStor.

One site within a 1-mile radius of the subject property were identified during the Historical CalSites database search.

This site is located in excess of ½-mile from the subject property in a downgradient position. Based on the distance from the subject property and the direction of groundwater flow, this site is not expected to represent a significant environmental concern.

ENVIROSTOR is a database maintained by the DTSC Site Mitigation and Brownfields Reuse Program, which identifies sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (NPL); States Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Fifteen sites within a 1-mile radius of the subject property were identified during the Envirostor database search.

- The Lombardo Diamond Core Drilling site, located at 585 Roberts Avenue, is located approximately 130 feet to the north (hydrologically down-gradient) of the subject property. Metal coating and galvanizing has historically occurred onsite. The SFRWQCB is currently overseeing remedial activities at the property. Based on the direction of groundwater flow, this site is not expected to represent a significant environmental concern.

- The 600 Matthew Street site is located approximately 168 feet to the northwest of the subject property. The site is located hydrologically cross-gradient from the subject property. The site is currently enrolled in the Voluntary Cleanup Program, and is listed as a No Further Action site. Based on the direction of groundwater flow and the regulatory status, this site is not expected to represent a significant environmental concern. Refer to the VCP segment of this Section for more information concerning this site.

The remaining sites are located in excess of ¼-mile from the subject property in either cross- or downgradient positions. Based on the distance and direction of groundwater flow, these sites are not expected to represent a significant environmental concern.

SLIC sites are provided by the Regional Water Quality Control Board (RWQCB). This list includes sites that have recorded spills, leaks, investigations, and cleanups.

Eleven sites, including the subject property, within a $^{1}/_{8}$-mile radius of the subject property were identified during the SLIC database search.

- The subject property, identified as Beaver Lumber Company at 535 Reed Street, was identified in the SLIC database. The site was monitored by the SFRWQCB and is listed as closed. This listing is in relation to onsite PCP contamination. No further information was provided. Refer to Sections 3.2.6 and 4.2.5 for more information concerning this listing.

- The Lombardo Diamond Core Drilling site, located at 585 Roberts Avenue, is located approximately 130 feet to the north (hydrologically down-gradient) of the subject property. Metal coating and galvanizing has historically occurred onsite. The SFRWQCB is currently overseeing remedial activities at the property. Based on the direction of groundwater flow, this site is not expected to represent a significant environmental concern.

The remaining sites are located in excess of ¼-mile from the subject property in either cross- or downgradient positions. Based on the distance and the direction of groundwater flow, the remaining sites are not expected to represent a significant environmental concern.

Solid Waste Landfills (SWLF) is a database generated by the State of California Solid Waste Information System (SWIS), which includes active and inactive landfills and transfer stations within the state maintained by the California Integrated Waste Management Board.

One site within a ½-mile radius of the subject property was identified during the SWLF database search. This site is located in excess of ¼-mile from the subject property in a cross-gradient position. Based on the distance and the direction of groundwater flow, this site is not expected to represent a significant environmental concern.

HAZNET Sites database consists of data that is extracted from the copies of hazardous waste manifests received each year by the DTSC.

The subject property, identified as Beaver Lumber Company at 535 Reed Street, was identified in the HAZNET database. The former tenant is listed as having recycled approximately 0.25 tons of oil-containing wastes. No further information was provided. Based on the waste oil UST removal and closure discussed in Sections 3.2.4 and 4.2.5, this listing is not expected to represent a significant environmental concern.

Leaking Underground Storage Tanks (LUST) List is a list produced by the Regional Water Quality Control Board (RWQCB) of known sites with current or former leaking underground storage tanks on the premises.

One-hundred and twenty eight sites, including the subject property, within a ½-mile radius of the subject property were identified during the LUST database search.

- The subject property, identified as Beaver Lumber Company at 535 Reed Street, was identified twice in the LUST database. The site received closure for both incidents on February 7, 2002, one of which took place in May 29, 1985. No further information was provided. Refer to Sections 3.2.2, 3.2.6 and 4.2.5 for more information concerning this listing.

- The California Paperboard site, located at 525 Mathew Street, is located approximately 50 feet to the north (hydrologically down-gradient) of the subject property. The site is listed twice. On January 8, 1991, a release of an unknown quantity of gasoline was reported. No information concerning the second listing was listed. The site is currently undergoing pollution characterization for both incidents. Based on the direction of groundwater flow, this site is not expected to represent a significant environmental concern.

- The Nelson Brothers Trucking site, located at 600 Mathew Street, is located on the northernmost west adjacent property. The site is located hydrologically cross-gradient from the subject property. The site is listed three times. On January 29, 1992, a release of an unknown quantity of gasoline was reported. This incident received case closure on December 22, 2000. No information concerning the second and third listings was listed, excluding a Case Closed status that was granted on December 22, 2000. Based on the regulatory status and the direction of groundwater flow, this site is not expected to represent a significant environmental concern.

- The Intex Auto Parts site, located at 2290 De La Cruz Boulevard, is located approximately 274 feet to the east (hydrologically cross-gradient) of the subject property. On January 1, 1992, a release of an unknown quantity of gasoline was reported. Pollution characterization activities are currently ongoing. Based on the direction of groundwater flow, this site is not expected to represent a significant environmental concern.

- The Jenic site, located at 448 Robert Avenue, is located approximately 44 feet to the north (hydrologically downgradient) of the subject property. The site is listed twice for the same release. On January 7, 1991, a release of an unknown quantity of gasoline was reported. Pollution Characterization is currently ongoing at the site. Based on the direction of groundwater flow, this site is not expected to represent a significant environmental concern.

The remaining sites are located in excess of 1/8-mile from the subject property, have received case closed status, and/or are located in cross- or downgradient positions. Based on the regulatory status, the distance, and/or the direction of the groundwater flow, these sites are not expected to represent a significant environmental concern.

State Deed Restriction (DEED) List is maintained by the DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) and Hazardous Waste Management Program (HWMP). The SMBRP list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. The HWMP has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

The subject property was not identified during the DEED database search.

State Voluntary Cleanup Program (VCP) Sites are incorporated in the DTSC SMBRPD database which identifies sites that have known contamination, or those properties undergoing voluntary investigation and/or cleanup and which are listed in the VCP program.

One site within a ½-mile radius of the subject property was identified during the State VCP database search.

- The 600 Matthew Street site is located approximately 168 feet to the northwest of the subject property. The site is located hydrologically cross-gradient from the subject property. The site reached closure on March 21, 2001. Based on the presumed direction of groundwater flow and the regulatory status, this site is not expected to represent a significant environmental concern.

Federal Land Use/Indian Lands of the U.S. is a database of areas administered by the Bureau of Indian Affairs which include areas of 640 acres or more. Included in the database are Federally-administered lands within a reservation which may or may not be considered part of the reservation. Hazardous materials use/storage permits, LUSTs and USTs on Indian Lands may also be incorporated in the State database listings.

No sites within a ½-mile radius of the subject property were identified during the Federal Land Use/Indian Lands Use database search.

State/Tribal Brownfields is a database of abandoned or underused industrial and/or commercial properties that are contaminated (or thought to be contaminated) and have an active potential for redevelopment. Various states do not have specific Brownfields programs, and thus the information may also be incorporated in the State database listings.

No sites within a ½-mile radius of the subject property were identified during the Brownfields database search.

Cortese Hazardous Waste and Substance Sites List is provided by the California EPA Office of Emergency Information. The sites listed in this database are designated by the SWRCB as LUST sites, Integrated Waste Board as SWF/LS sites, and DTSC as Cal Sites. This list is not longer updated by the State Agency.

The subject property, identified as Beaver Lumber Company at 535 Reed Street, was identified in the Cortese database. This listing is presumed to be a duplicate of the LUST listing. Refer to other segments of this Section for information concerning the site's status as a LUST site.

Historical Underground Storage Tanks (HIST UST) List is a comprehensive listing of registered underground and aboveground storage tanks located within the State of California.

The subject property, identified as Beaver Lumber Company at 535 Reed Street, was identified in the HIST UST Database. The site reportedly was developed with one 1,000-gallon gasoline UST, one 10,000-gallon diesel fuel UST, and one 1,000-gallon diesel fuel UST. In addition, the site was developed with one 5,000-gallon "product" tank (assumingly the PCP tank), installed in 1969, and one 200-gallon waste oil UST, installed in 1974. Refer to Section 3.2.4 regarding the former USTs at the subject property.

SWEEPS UST List is a comprehensive listing of registered underground storage tanks located within the State of California.

The subject property, identified as Beaver Lumber Company at 535 Reed Street, was identified in the SWEEPS UST Database. The site reportedly was developed with one 4,000-gallon diesel fuel UST and one 6,000-gallon gasoline UST. Refer to Section 3.2.4 concerning the former onsite vaulted UST.

CA FID UST Facility Inventory Database contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board.

The subject property, identified as Beaver Lumber Company at 535 Reed Street, was identified in the CA FID UST Database. No information regarding the listing was listed. Refer to Section 3.2.4 and other segments of this Section for more information concerning the former USTs at the subject property.

Underground/Aboveground Storage Tanks (UST/AST) List is a comprehensive listing of registered underground and aboveground storage tanks located within the State of California.

Four sites within a ¼-mile radius of the subject property were identified during the UST/AST database search. None of these sites are located on or adjacent to the subject property. Due to the lack of a documented release or factors discussed in the LUST segment of Section 5.3, the storage of hazardous materials within registered tanks is not a significant environmental concern.

6.0 SITE INSPECTION AND RECONNAISSANCE

On May 18, 2007, a site reconnaissance of the subject property and adjacent properties was conducted by Neil Yodnane of AEI in order to obtain information indicating the likelihood of recognized environmental conditions at the subject property and adjacent properties as specified in ASTM Standard Practice E1527-05 §8.4.2, 8.4.3 and 8.4.4.

6.1 On-Site Observations

Identified Yes	Identified No	Observation
☐	☒	Hazardous Substances and/or Petroleum Products in Connection with Property Use
☐	☒	Aboveground & Underground Hazardous Substance or Petroleum Product Storage Tanks (ASTs / USTs)
☐	☒	Hazardous Substance and Petroleum Product Containers and Unidentified Containers not in Connection with Property Use
☐	☒	Unidentified Substance Containers
☒	☐	Electrical or Mechanical Equipment Likely to Contain Fluids
☐	☒	Interior Stains or Corrosion
☐	☒	Strong, Pungent or Noxious Odors
☐	☒	Pools of Liquid
☐	☒	Drains, Sumps and Clarifiers
☐	☒	Pits, Ponds and Lagoons
☒	☐	Stained Soil or Pavement
☐	☒	Stressed Vegetation
☐	☒	Solid Waste Disposal or Evidence of Fill Materials
☐	☒	Waste Water Discharges
☒	☐	Wells
☐	☒	Septic Systems
☒	☐	Other

The subject property is vacant; excluding one warehouse building located on the eastern boundary of the property, which is occupied by Avis Rental Cars. Onsite operations consist of vehicle storage.

Electrical or Mechanical Equipment Likely to Contain Fluids

Toxic polychlorinated biphenyls (PCBs) were commonly used historically in electrical equipment such as transformers, fluorescent lamp ballasts, and capacitors. According to United States EPA regulation 40 CFR, Part 761, there are three categories for classifying such equipment: <50 ppm of PCBs is considered “Non-PCB”; between 50 and 500 ppm is considered “PCB-Contaminated”; and >500 ppm is considered “PCB-Containing”. Pursuant to 15 U.S.C. 2605(e)(2)(A), the manufacture, process, or distribution in commerce or use of any polychlorinated biphenyl in any manner other than in a totally enclosed manner was prohibited after January 1, 1977.

Transformers

The management of potential PCB-containing transformers is the responsibility of the local utility or the transformer owner. Actual material samples need to be collected to determine if transformers are PCB-containing.

Several pole-mounted and/ornd pad-mounted transformers were observed on the subject property during the site inspection. The transformers are owned and operated by Pacific Gas & Electric, and based on the presumed date of installation, may be PCB containing. According to PG&E, 99% of transformers in the PG&E service area have been replaced with non-PCB containing units; however, sampling of the fluid within the transformers would be required to rule out the presence of PCBs. No spills, staining or leaks were observed on or around the transformers. Based on the good condition of the equipment, the transformers are not expected to represent a significant environmental concern.

Stained Soil or Pavement

Two automobile engines were observed on the southeastern portion of the subject property. The pavement below the engines was stained. AEI recommends that the engines be removed immediately in order to prevent a significant release of motor oil in to the subsurface.

Wells

According to an *A-Zone Well Closure* report performed for the subject property by Stellar Environmental Solutions, Inc. on March 24, 2006, one inactive monitoring well is located on the property on the north side of the equipment repair building. AEI did not observe the monitoring well during the site visit, as it was covered with a large pile of construction debris. As mentioned in Section 4.2.5, AEI recommends that the monitoring well be decommissioned in accordance with all federal and state regulations.

Other

A concrete wash pad is located on the southwestern section of the subject property. No stains, or pools of liquid were observed in the vicinity of the wash pad nad it is no longer in use. According to a *Phase I Environmental Site Assessment performed by* E2C, Inc. on September 18, 2000, stained surfaces and oily water was observed in the vicinity of the wash pad. Further investigation was warranted for the concrete wash pad at the time. According to a *Site Closure Report* submitted by ESTC on May 31, 2001 to the Santa Clara Fire Department, two soil borings were advanced in the vicinity of the concrete wash area. Samples were taken at 6 and 8 inches bgs. Samples were analyzed for Total Oil and Grease. Both samples yielded results that were below detection limits. Based on the sampling results, the concrete wash pad is not expected to represent a significant environmental concern.

A large construction debris pile is located on top of the onsite monitoring well. AEI recommends that this pile be removed immediately in order for the monitoring well to be properly decommissioned. A second pile was observed just north of the larger debris pile on the

property. The source of the debris is unknown. AEI also recommends that this material be properly disposed offsite in the event that it is related to the former excavation activities conducted on the property.

6.2 Non-ASTM Services

Building Components

In general, building components that are in good condition are not expected to represent a health and safety concern to the occupants of a property. Please refer to the table below for a general description of the building components observed during AEI's site inspection.

Observed Building Components

Material	Location	Condition
Drywall Systems	Throughout Office Building	Good
Acoustical Ceiling Tiles	Throughout Office Building	Good
Roofing Systems	Roof	Fair

Building components were observed to be in good to fair condition during AEI's site inspection.

Asbestos-Containing Building Materials

For buildings constructed prior to 1980, the Code of Federal Regulations (29 CFR 1926.1101) states that all thermal system insulation (boiler insulation, pipe lagging, and related materials) and surface materials must be designated as "presumed asbestos-containing material" (PACM) unless proven otherwise through sampling in accordance with the standards of the Asbestos Hazard Emergency Response Act.

Regardless of building construction date, the EPA's National Emission Standards for Hazardous Air Pollutants (NESHAP) requires that an asbestos survey adhering to AHERA sampling protocol be performed prior to demolition or renovation activities that may disturb ACMs. This requirement is typically enforced by the local air pollution control or air quality management district, and specifies that all suspect asbestos-containing materials (ACMs) be sampled to determine the presence or absence of asbestos prior to any renovation or demolition activities to prevent potential exposure to workers and/or building occupants.

In general, the following commonly-encountered building components are considered to be friable materials: acoustical plaster, fireproofing, drywall systems, ceiling tiles, wall and ceiling texturing, thermal systems insulation (TSI), various mastics, and roofing products. The following commonly-encountered building materials are considered to be non-friable: vinyl floor tile, sheet vinyl flooring, and asbestos-cement products.

Lead-Based Paint

Lead-based paint is defined as any paint, varnish, stain, or other applied coating that has 1 mg/cm^2 (or 5,000 ug/g by dry weight) or more of lead. Section 1017 of the Housing and Urban Development Guidelines, Residential Lead-Based Paint Hazard Reduction Act of 1992, otherwise known as "Title X", defines a lead-based paint hazard is "any condition that causes exposure to lead that would result in adverse human health effects" resulting from lead-contaminated dust, bare, lead-contaminated soil, and/or lead-contaminated paint that is

deteriorated or present on accessible, friction, or impact surfaces. Therefore, under Title X, intact lead-based paint on most walls and ceilings would not be considered a "hazard", although the paint should be maintained and its condition monitored to ensure that it does not deteriorate and become a hazard. Additionally, Section 1018 of this law directed HUD and EPA to require the disclosure of known information on lead-based paint and lead-based paint hazards before the sale or lease of most housing built before 1978. Most private housing, public housing, Federally owned housing, and housing receiving Federal assistance are affected by this rule.

In buildings constructed after 1978, it is very unlikely that lead-based paint is present. Due to the age of the subject property buildings, there is a potential that lead-based paint is present. Both interior and exterior painted surfaces were observed to be in good condition and are not expected to pose a health and safety concern to the occupants of the subject property at this time.

Local regulations may apply to lead-based paint in association with building renovation/demolition and worker/occupant protection. Actual material samples would need to be collected in order to determine if lead-based paint is present.

Radon

Radon is a naturally-occurring, odorless, invisible gas. Natural radon levels vary and are closely related to geologic formations. Radon may enter buildings through basement sumps or other openings.

The US EPA has prepared a map to assist National, State, and local organizations to target their resources and to implement radon-resistant building codes. The map divides the country into three Radon Zones, Zone 1 being those areas with the average predicted indoor radon concentration in residential dwellings exceeding the EPA Action limit of 4.0 picoCuries per Liter (pCi/L). It is important to note that the EPA has found homes with elevated levels of radon in all three zones, and the EPA recommends site specific testing in order to determine radon levels at a specific location. However, the map does give a valuable indication of the propensity of radon gas accumulation in structures.

Radon sampling was not requested as part of this investigation. According to the US EPA, the radon zone level for the area is Zone 2, which has a predicted average indoor screening level between 2 pCi/L and 4 pCi/L, below the action level of 4.0 pCi/L set forth by the EPA.

Drinking Water Sources and Lead in Drinking Water

Santa Clara County supplies potable water to the subject property. The most recent water quality report states that lead levels in the areas water supply were not detected and therefore are well within standards established by the EPA.

Mold/Indoor Air Quality Issues

Molds are simple, microscopic organisms, which can often be seen in the form of discoloration, frequently green, gray, white, brown or black. When excessive moisture or water accumulates

indoors, mold growth will often occur, particularly if the moisture problem remains undiscovered or is not addressed. As such, interior areas of buildings characterized by poor ventilation and high humidity are the most common locations of mold growth. Building materials including drywall, wallpaper, baseboards, wood framing, insulation, and carpeting often play host to such growth. Mold spores primarily cause health problems through the inhalation of mold spores or the toxins they emit when they are present in large numbers. This can occur primarily when there is active mold growth within places where people live or work.

Mold, if present, may or may not visually manifest itself. Neither the individual completing this inspection, nor AEI has any liability for the identification of mold-related concerns except as defined in applicable industry standards. In short, this Phase I ESA should not be construed as a mold survey or inspection.

AEI Consultants observed interior areas of the subject buildings in order to identify the significant presence of mold. AEI did not note obvious visual or olfactory indications of the presence of mold, nor did AEI observe obvious indications of significant water damage. As such, no bulk sampling of suspect surfaces was conducted as part of this assessment and no additional action with respect to mold appears to be warranted at this time.

This activity was not designed to discover all areas which may be affected by mold growth on the Property. Rather, it is intended to give the client an indication if significant (based on observed areas) mold growth is present at the Property. Additional areas of mold not observed as part of this limited assessment, possibly in pipe chases, HVAC systems and behind enclosed walls and ceilings, may be present on the Property.

6.3 ADJACENT PROPERTY RECONNAISSANCE FINDINGS

Identified Yes	Identified No	Observation
☐	☒	Hazardous Substances and/or Petroleum Products in Connection with Property Use
☐	☒	Aboveground & Underground Hazardous Substance or Petroleum Product Storage Tanks (ASTs / USTs)
☐	☒	Hazardous Substance and Petroleum Product Containers and Unidentified Containers not in Connection with Property Use
☐	☒	Unidentified Substance Containers
☒	☐	Electrical or Mechanical Equipment Likely to Contain Fluids
☐	☒	Interior Stains or Corrosion
☐	☒	Strong, Pungent or Noxious Odors
☐	☒	Pool of Liquid
☒	☐	Drains and Sumps
☐	☒	Pits, Ponds and Lagoons
☐	☒	Stained Soil or Pavement
☐	☒	Stressed Vegetation
☐	☒	Solid Waste Disposal or Evidence of Fill Materials
☐	☒	Waste Water Discharges
☐	☒	Wells
☐	☒	Septic Systems
☐	☒	Other

Electrical or Mechanical Equipment Likely to Contain Fluids

Several pole-mounted and pad-mounted transformers were observed on the adjacent sites during the site inspection. No spills, staining or leaks were observed on or around the transformers. Based on the good condition of the equipment, the transformers are not expected to represent a significant environmental concern.

Railroad tracks are located adjacent to the west of the subject property. Railroad spurs represent environmental concerns due to the historical application of oils containing polychlorinated biphenyls (PCBs), herbicides, and arsenic for pest and weed control, as well as the potential presence of creosote on the rail ties, and the historical common practice of using coal cinders for track fill material. The railroad tracks located adjacent to the west of the subject property are surrounded by gravel. Based on the presence of gravel, the use of oils, arsenic, and herbicides associated with weed or pest control is expected to be minimal, and therefore does not represent a significant environmental concern.

Drains and Sumps

Several storm drains were observed in the parking areas of the adjacent properties. No hazardous substances or petroleum products were noted in the vicinity of the drains. Based on

the use of the drains solely for storm water runoff, the presence of the drains is not expected to represent a significant environmental concern.

7.0 FINDINGS AND CONCLUSIONS

Findings

Recognized environmental conditions (RECs) are defined by the ASTM Standard Practice E1527-05 as the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. AEI's investigation has revealed the following recognized environmental conditions associated with the subject property or nearby properties:

- No on-site recognized environmental conditions were identified during the course of this investigation.

Historical recognized environmental conditions (HRECs) are defined by the ASTM Standard Practice E1527-05 as an environmental condition which in the past would have been considered a recognized environmental condition, but which may or may not be considered a recognized environmental condition currently. AEI's investigation has revealed the following historical recognized environmental conditions associated with the subject property or nearby properties:

- The subject property was formerly developed with an aboveground Pentachlorophenol (PCP) tank. The tank was located on the north side of the former equipment repair building on the west side of the property. The PCP tank was utilized by Beaver Lumber Company from approximately 1965 until the late 1980s for the lumber treating process. Wood products were dipped into the tank and were hung over the tank for a few hours. The wood products were then placed on unpaved ground until they dried. During the removal of a nearby waste oil UST in 1985 (discussed in next paragraph), PCP was detected in a soil sample collected during installation of groundwater monitoring well MW-3 (subsequently referred to as MW-1). In the late 1980s, the PCP dipping tank was removed. From October 2000 until March 2006, several investigations and remedial actions took place on the subject property. These actions included the advancement of more than 30 soil borings, the installation of 18 additional wells (three remained from Leaking Underground Storage Tank Assessments, which are discussed below), excavation of the dipping tank source area along with off-site contaminated soil disposal, the application of Oxygen Release Compound™ (ORC™) into the excavation, stockpiled soil sampling from the excavation, white rot fungus treatment of the soil stockpile, cone penetrometer tests (CPTs), and the injection of Hydrocarbon Release Compound™ (HRC™) in barrier configurations along the plume of contamination. In June 2003, the source area excavation was backfilled with 40 percent of the soil stockpile (the portion meeting reuse criteria) and the remaining portion of the excavation was backfilled with imported clean fill. The soil stockpile that did not meet re-use criteria (60 percent) was transported to a non-hazardous landfill for disposal. According to the San Francisco Bay Regional Water Quality Board (SFBRWQB) Geotracker website, the site received closure for the PCP contamination on March 9, 2006. Based on the remedial activities performed

onsite and the closure granted by the SFBRWQB, no further investigation in connection with the former PCP tank is required.

- The subject property was formerly developed with five underground storage tanks (USTs), including one 550-gallon waste oil UST, one 1,000-gallon gasoline UST, one 2,000-gallon gasoline UST, and two 10,000-gallon gasoline USTs. On February 20, 1992 and April 16, 1992, the USTs were removed. Confirmation samples were analyzed for Total Petroleum Hydrocarbons as gasoline and diesel (TPH-g and TPH-d), Benzene, Toluene, Ethylbenzene, and Xylene (BTEX), Total Oil and Grease (TOG), lead, and Halogenated Volatile Organic Compounds (HVOCs). TPH diesel and gasoline concentrations were found in two samples that were above action levels, and several other samples detected concentrations below action levels. HVOC concentrations were not detected. Concentrations of lead below action levels were detected in samples collected in the vicinity of the waste oil UST. A release was reported on the same date as the second removal. Beaver Lumber Company was identified as the responsible party. In addition, a 200-gallon waste oil UST was removed in 1985, in which sampling and removal procedures were not adequately documented. Due to the lack of sampling, the UST removed in 1985 was included in the 1992 release incident.

  On March 31, 2000, five exploratory soil borings were drilled in the vicinity of the USTs and soil and groundwater samples were collected. TPH-g and TPH-d and MTBE were discovered in the soil samples, and elevated levels of benzene and TPH-g and TPH-d were found in one groundwater sample. Three monitoring wells (MW-1 through MW-3) were installed on the subject property in the vicinity of the former USTs in June 1992. In January 2001, six exploratory borings were conducted further downgradient from the UST area. Soil and groundwater samples were analyzed for TPH-g, TPH-d, MTBE, and BTEX. TPH and MTBE were detected in several borings. Benzene was detected in one sample.

  In February 2001, several previously installed monitoring wells were sampled, which yielded concentrations of contaminants that appeared to be at lower levels than previous sampling events. According to a *Fuel Leak Site Case Closure Report* issued by the Santa Clara Valley Water District (SCVWD) on February 7, 2002, it was determined that onsite contaminant levels significantly attenuated since 1992, and that a majority of the remaining contamination appeared to be located in the vicinity of the former UST area located on the eastern portion of property. It was determined that all required corrective action activities have been performed onsite in relation to the 1992 UST removal and subsequent release. The SCVWD concluded that the remaining onsite contamination does not pose a threat to the regional groundwater, human health, or the environment and that no further action was necessary. Based on the regulatory status, no further investigation in connection with the former LUST case is required.

Environmental issues include environmental concerns identified by AEI that warrant discussion but do not qualify as recognized environmental conditions, as defined by the ASTM Standard Practice E1527-05. AEI's investigation has revealed the following environmental issues associated with the subject property or nearby properties:

- On August 12, 1993, a 10,000-gallon UST was installed at the subject property. The UST consisted of a vaulted 10,000-gallon UST that contained one 4,000-gallon diesel fuel chamber and one 6,000-gallon gasoline chamber. The UST was double-walled and was constructed of fiberglass-reinforced plastic. On April 29, 2001, Alpha Geo Services (AGS) removed the UST. The tank was cleaned onsite and was transported to a different Beaver Lumber Company site. After the removal, samples were taken from the walls and floors of the tank cavity and a water sample was taken from the tank pit. The samples were analyzed for TPH-d, TPH-g, BTEX, and MTBE. Concentrations of TPH-d were found in two samples, which were well below action limits. In addition, the water sample yielded concentrations of TPH-d that were well below action limits. The consultant concluded that no further investigations were necessary for the UST removal. The removal was documented and approved by the Santa Clara Fire Department on July 30, 2001, and the UST received closure. Based on the confirmation sampling results and the closure from the Santa Clara Fire Department, no further investigation in connection with the former UST is required.

- According to a *Documentation Report for Destruction of 10 A-Zone Monitoring Wells* issued by Stellar Environmental Solutions, Inc. (Stellar) on March 23, 2006, the SFRWCB granted closure to the site concerning the onsite PCP contamination on March 9, 2006. The SFRWCB requested that eleven (11) on-site monitoring wells be properly decommissioned. Stellar reported that it could not access one of the onsite monitoring wells, MW-16S, due to a large pile of construction debris being located on top of the well. However, Stellar properly decommissioned ten (10) remaining wells and included regulatory documentation in the appendices of their report. Based on the fact that the site has received closure for the PCP contamination, AEI recommends that MW-16S be decommissioned according to federal and local regulations.

- A large construction debris pile is located on top of the onsite monitoring well. AEI recommends that this pile be removed immediately in order for the monitoring well to be properly decommissioned. A second pile was observed just north of the larger debris pile on the property. The source of the debris is unknown. AEI also recommends that this material be properly disposed offsite in the event that it is related to the former excavation activities conducted on the property.

- A concrete wash pad is located on the southwestern section of the subject property. No stains, or pools of liquid were observed in the vicinity of the wash pad, and it is no longer in use. According to a *Phase I Environmental Site Assessment performed by* E2C, Inc. on September 18, 2000, stained surfaces and oily water was observed in the vicinity of the wash pad. Further investigation was warranted for the concrete wash pad at the time. According to a *Site Closure Report* submitted on May 31, 2001 to the Santa Clara Fire Department (SCFD), two soil borings were advanced in the vicinity of the concrete wash area. Samples were taken at 6 and 8 inches bgs. Samples were analyzed for Total Oil and Grease. Both samples yielded results that were below detection limits. No documentation concerning the closure response was available at the SCFD. However; based on the sampling results, the concrete wash pad is not expected to represent a significant environmental concern.

- Two automobile engines were observed on the southeastern portion of the subject property. The pavement below the engines was stained. AEI recommends that the engines be removed immediately in order to prevent a significant release of motor oil in to the subsurface.

- The subject property was historically used for agricultural purposes. There is a potential that agricultural chemicals, such as pesticides, herbicides and fertilizers, were used onsite. The entire area of the subject property is either paved over or covered by improvements that make direct contact with any potential remaining concentrations in the soil unlikely. Furthermore, the subject property is developed and used for commercial/light industrial purposes and thus no further action related to the former agricultural use of the subject property is warranted at this time. If redevelopment of the subject property is planned for residential use, the owner/user of the report should contact the local planning department to determine whether sampling relating to the former agricultural use of the subject property is required.

Conclusions, Opinions, and Recommendations

We have performed a Phase I Environmental Site Assessment for the property located at 535-555 Reed Street in the City of Santa Clara, Santa Clara County, California, in conformance with the scope and limitations of ASTM Standard Practice E1527-05 and the Environmental Protection Agency Standards and Practices for All Appropriate Inquiries (40 CFR Part 312). Any exceptions to, or deletions from, this practice are described in Section 1.2 of this report.

This assessment has revealed no evidence of recognized environmental conditions in connection with the property. AEI recommends no further investigations for the subject property at this time. However, AEI recommends that the abandoned vehicle engines be removed from the site, and that the remaining on-site groundwater monitoring well be accessed and properly decommissioned.

In addition, due to the presence of low levels of constituents of concern detected in the soil and groundwater on the property, any redevelopment activities should include health and safety plans to address potential worker contact with these areas. Engineering controls or higher construction costs may result from the low levels that remain in place.

8.0 SIGNATURE OF ENVIRONMENTAL PROFESSIONALS

By signing this report, the senior author declares that, to the best of his or her professional knowledge and belief, he or she meets the definition of *Environmental Professional* as defined in §312.10 of 40 CFR Part 312.

The senior author has the specific qualifications based on education, training, and experience to assess a property of the nature, history and setting of the subject property. The senior author has developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40CFR Part 312.

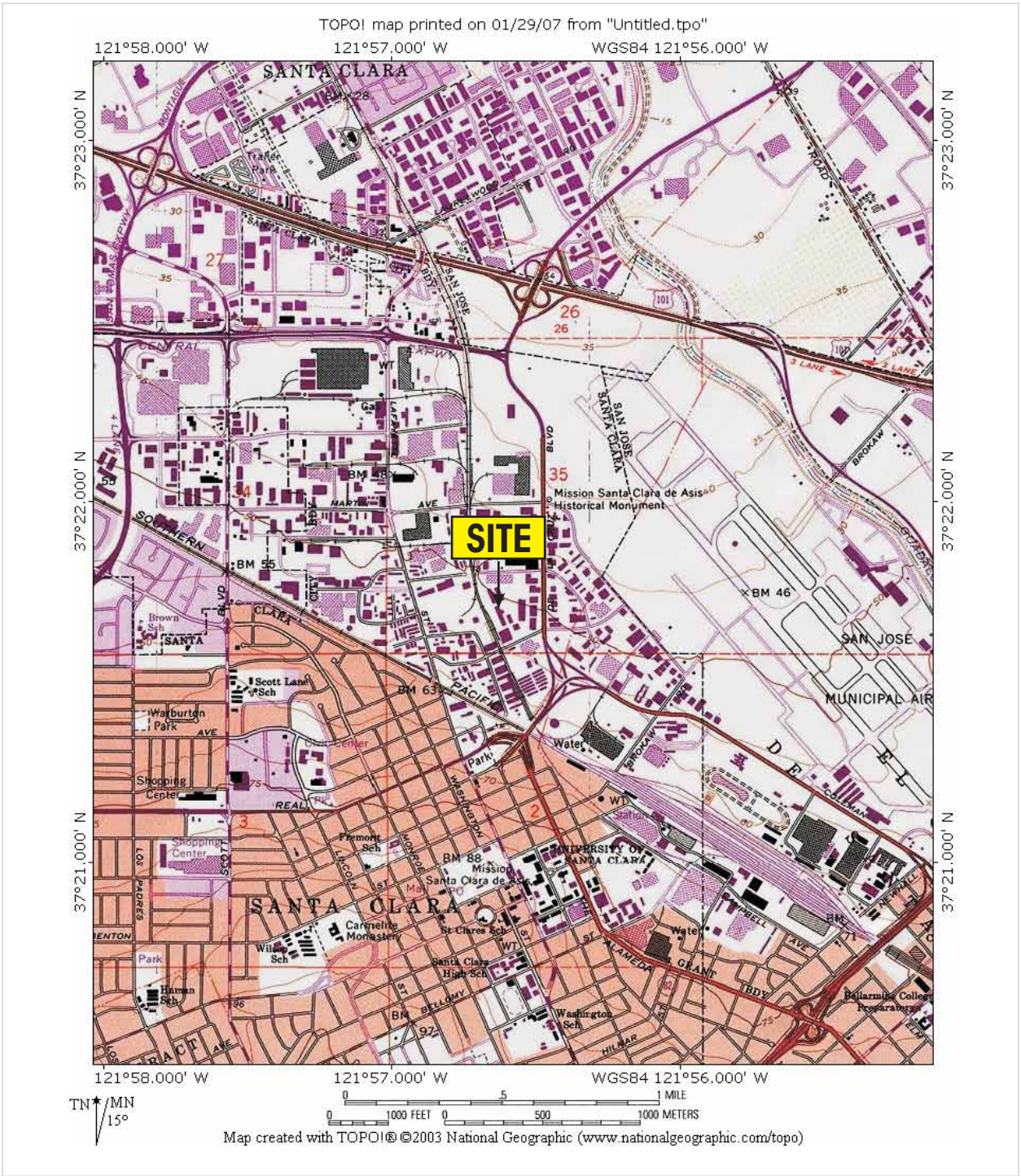
Prepared By:

Neil Yodnane
Senior Project Manager

Reviewed By:

Holly Neber
Senior Author, REA

FIGURES



N

USGS TOPOGRAPHIC MAP
SAN JOSE WEST, CALIFORNIA
QUADRANGLE
Created 1992

SITE LOCATION MAP

535-555 Reed Street
Santa Clara, California 95050

FIGURE 1
Job No: 272331

AEI

LEGEND

N

Subject Property Line

Former PCP Tank

Former UST

Vehicle Engines

SITE MAP

535-555 Reed Street
Santa Clara, California 95050

FIGURE 2
Job No: 272331

AEI

N

SOURCE: EDR
YEAR: 1939

AERIAL PHOTOGRAPH

535-555 Reed Street
Santa Clara, California 95050

FIGURE 3
Job No: 272331

AEI

N

SOURCE: EDR
YEAR: 1956

AERIAL PHOTOGRAPH

535-555 Reed Street
Santa Clara, California 95050

FIGURE 3
Job No: 272331

AEI

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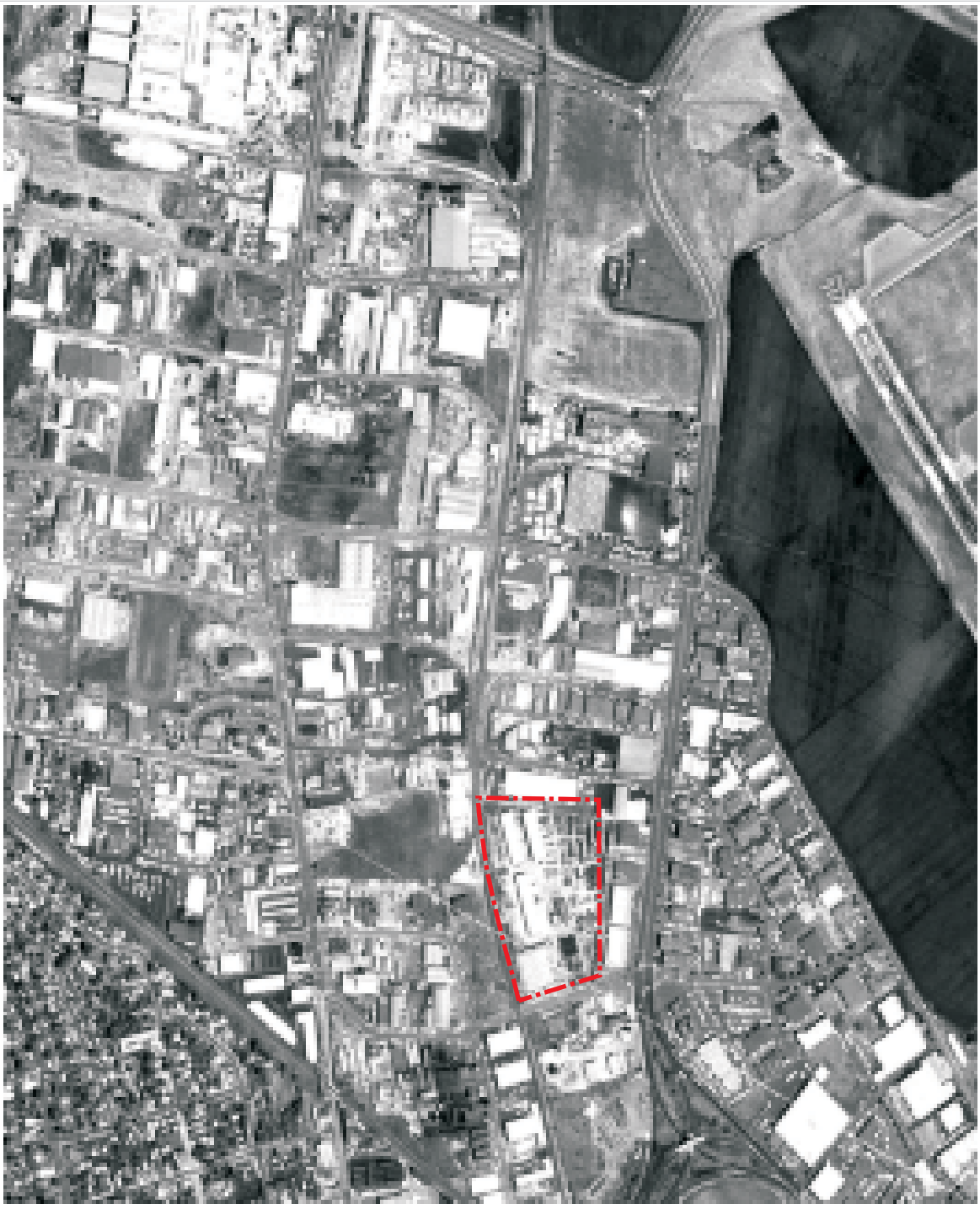
SOURCE: EDR
YEAR: 1965

AERIAL PHOTOGRAPH

535-555 Reed Street
Santa Clara, California 95050

FIGURE 3
Job No: 272331

AEI



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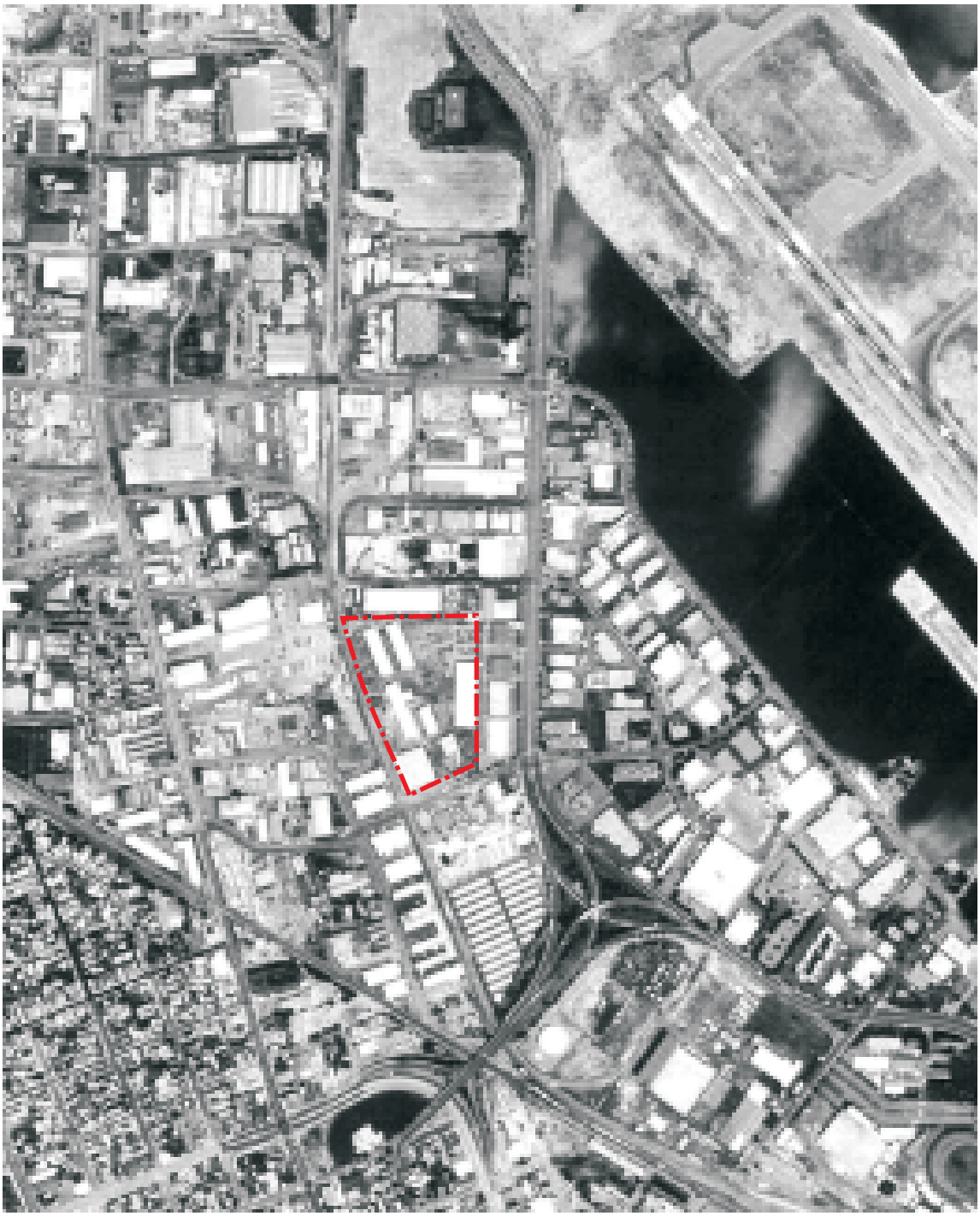
SOURCE: EDR
YEAR: 1974

AERIAL PHOTOGRAPH

535-555 Reed Street
Santa Clara, California 95050

FIGURE 3
Job No: 272331

AEI



N

SOURCE: EDR
YEAR: 1982

AERIAL PHOTOGRAPH

535-555 Reed Street
Santa Clara, California 95050

FIGURE 3
Job No: 272331

AEI

N

SOURCE: EDR
YEAR: 1993

AERIAL PHOTOGRAPH

535-555 Reed Street
Santa Clara, California 95050

FIGURE 3
Job No: 272331

AEI

N

SOURCE: Google Earth
YEAR: 2005

AERIAL PHOTOGRAPH

535-555 Reed Street
Santa Clara, California 95050

FIGURE 3
Job No: 272331

AEI

Appendix C-2

Phase I Environmental Site Assessment
500-520 Mathew Street

May 31, 2007

PHASE I
ENVIRONMENTAL SITE ASSESSMENT

500-520 Mathew Street
Santa Clara, California 95050

AEI Project No. 272330

Prepared For

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AEI

EXECUTIVE SUMMARY

AEI Consultants (AEI) was retained by DuPont Fabros Development LLC to conduct a Phase I Environmental Site Assessment (ESA), in conformance with the scope and limitations of ASTM Standard Practice E1527-05 and the Environmental Protection Agency Standards and Practices for All Appropriate Inquiries (40 CFR Part 312) for the property located at 500-520 Mathew Street in the City of Santa Clara, Santa Clara County, California. Any exceptions to, or deletions from, this practice are described in Section 1.2 of this report.

Property Description

The subject property is located on the south side of Mathew Street in a mixed commercial and industrial area of Santa Clara. The property totals approximately two acres and is improved with a one-story warehouse building totaling approximately 49,000 square feet. The building is occupied by Premier Auto Body Shop, Complete RV Repair Shop, and the California Paper Storage Center. On-site operations consist of auto body work, motor home repair, paper roll storage, and office activities. In addition to the subject property building, the property is improved with asphalt-paved parking areas and associated landscaping.

According to historical sources, portions of the current subject property building were constructed in 1968 by Beaver Lumber Company for use as a warehouse/storage facility. Two additions were made to the building in the 1970s to complete the current configuration. the subject property has been occupied by several commercial/industrial tenants since at least 1970, including Simpson Building Supply and Timber since 1970 until 1986, Northern Hardwood, Inc. since at least 1991 until 2001. Prior to the construction of the building, the property was agricultural land.

The immediately surrounding properties consist of Mathew Street followed by the California Paper Processing Facility to the north, AMI Recycling to the east, railroad tracks followed by a vacant industrial/commercial building to the west, and a vacant industrial property to the south.

Based on groundwater monitoring data from subsurface investigations performed on the south adjacent property, the direction of groundwater flow beneath the subject property is inferred to be to the north-northeast, and present at a depth of five feet below ground surface (bgs).

Findings

Recognized environmental conditions (RECs) are defined by the ASTM Standard Practice E1527-05 as the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. AEI's investigation has revealed the following recognized environmental conditions associated with the subject property or nearby properties:

- No on-site recognized environmental conditions were identified during the course of this investigation.

Historical recognized environmental conditions (HRECs) are defined by the ASTM Standard Practice E1527-05 as an environmental condition which in the past would have been considered a recognized environmental condition, but which may or may not be considered a recognized environmental condition currently. AEI's investigation has revealed the following historical recognized environmental conditions associated with the subject property or nearby properties:

- According to an *Underground Storage Tank Removal Permit* issued by the Santa Clara Fire Department (SCFD), one (1) 10,000-gallon diesel fuel underground storage tank (UST) was removed from the subject property on November 4, 1986. The owner is listed as Beaver Lumber. Confirmation samples were taken from the tank excavation walls and floor, which were analyzed for Total Volatile Hydrocarbons (TVH). Concentrations of TVH were not detected, and it was determined by the SCFD that a release did not occur. Based on the result of the confirmation sampling, the historical presence of the UST is not expected to represent a significant environmental concern.

- The south adjacent property, identified as Beaver Lumber Company at 535 Reed Street, was identified in the Spills, Leaks, Investigations, and Cleanups database. The site is located hydrologically upgradient from the subject property. The site was monitored by the San Francisco Regional Water Quality Control Board (SFRWQCB) and is listed as closed. This listing is in relation to onsite pentachlorophenol (PCP) contamination from a PCP aboveground storage tank located at the site. Beaver Lumber Company reportedly utilized a portion of the subject property during the 1970s and 1980s as a storage facility and shipping receiving area, in which a UST was utilized for refueling trucks (discussed above). The plume of PCP contamination appears to have reached the subject property. According to the SFRWQCB Geotracker website, two monitoring wells were installed on the subject property in order to determine if contamination was present. The most recent groundwater monitoring event prior to closure took place on July 28, 2005. During that event, MW-5, located on the southern boundary of the subject property, yielded non-detectable concentrations of PCP. MW-20S, also located along the southern boundary, yielded 11 milligrams per liter (mg/L) of PCP. The SFRWQCB determined that PCP levels had significantly attenuated and would continue to do so in the future, and the south adjacent property reached closure on March 9, 2006. Both of the wells located on the subject property were decommissioned in 2006. Based on this information and the nature of former subject property use, no further action or investigation appears to be warranted at this time. However, any proposed disturbance of the subsurface for construction or other purposes would require the implementation of engineering controls to protect the health and safety of workers involved with subsurface activities.

Environmental issues include environmental concerns identified by AEI that warrant discussion but do not qualify as recognized environmental conditions, as defined by the ASTM Standard Practice E1527-05. AEI's investigation has revealed the following environmental issues associated with the subject property or nearby properties:

- The subject property was historically used for agricultural purposes. There is a potential that agricultural chemicals, such as pesticides, herbicides and fertilizers, were used onsite. However, the entire area of the subject property is either paved over or covered by improvements that make direct contact with any potential remaining concentrations in the soil unlikely. Furthermore, the subject property is developed and used for commercial/light industrial purposes and thus no further action related to the former agricultural use of the subject property is warranted at this time. If redevelopment of the subject property is planned for residential use, the owner/user of the report should contact the local planning department to determine whether sampling relating to the former agricultural use of the subject property is required.

Conclusions, Opinions, and Recommendations

We have performed a Phase I Environmental Site Assessment for the property located at 500-520 Mathew Street in the City of Santa Clara, Santa Clara County, California, in conformance with the scope and limitations of ASTM Standard Practice E1527-05 and the Environmental Protection Agency Standards and Practices for All Appropriate Inquiries (40 CFR Part 312). Any exceptions to, or deletions from, this practice are described in Section 1.2 of this report. This assessment has revealed no evidence of recognized environmental conditions in connection with the property. AEI recommends no further investigations for the subject property at this time.

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1.0 INTRODUCTION

This report documents the methods and findings of the Phase I Environmental Site Assessment (ESA) performed in conformance with the scope and limitations of ASTM Standard Practice E1527-05 and the Environmental Protection Agency Standards and Practices for All Appropriate Inquiries (40 CFR Part 312) for the property located at 500-520 Mathew Street in the City of Santa Clara, Santa Clara County, California (Figure 1: Site Location Map, Figure 2: Site Map, and Appendix A: Property Photographs).

1.1 Scope of Work

The purpose of the Phase I Environmental Site Assessment is to identify potential environmental liabilities associated with the presence of hazardous materials, their use, storage, and disposal at and in the vicinity of the subject property, as well as regulatory non-compliance that may have occurred at the subject property. Property assessment activities focused on: 1) a review of federal, state, tribal and local databases that identify and describe underground fuel tank sites, leaking underground fuel tank sites, hazardous waste generation sites, and hazardous waste storage and disposal facility sites within the ASTM approximate minimum search distance; 2) a property and surrounding site reconnaissance, and interviews with the past and present owners and current occupants and operators to identify potential environmental contamination; and 3) a review of historical sources to help ascertain previous land use at the site and in the surrounding area.

The goal of AEI Consultants in conducting the environmental site assessment was to identify the presence or likely presence of any hazardous substances or petroleum products on the property that may indicate an existing release, a past release, or a material threat of a release of any hazardous substance or petroleum product into the soil, groundwater, or surface water of the property.

1.2 Significant Assumptions

The following assumptions are made by AEI Consultants in this report. AEI Consultants relied on information derived from secondary sources including governmental agencies, the client, designated representatives of the client, property contact, property owner, property owner representatives, computer databases, and personal interviews. Except as set forth in this report, AEI Consultants has made no independent investigation as to the accuracy and completeness of the information derived from secondary sources including government agencies, the client, designated representatives of the client, property contact, property owner, property owner representatives, computer databases, or personal interviews and has assumed that such information is accurate and complete. AEI Consultants assumes information provided by or obtained from governmental agencies including information obtained from government websites is accurate and complete. Groundwater flow and depth to groundwater, unless otherwise specified by on-site well data, or well data from adjacent sites are assumed based on contours depicted on the United States Geological Survey topographic maps. AEI Consultants assumes

the property has been correctly and accurately identified by the client, designated representative of the client, property contact, property owner, and property owner's representatives.

1.3 Limitations

Property conditions, as well as local, state, tribal and federal regulations can change significantly over time. Therefore, the recommendations and conclusions presented as a result of this study apply strictly to the environmental regulations and property conditions existing at the time the study was performed. Available information has been analyzed using currently accepted assessment techniques and it is believed that the inferences made are reasonably representative of the property. AEI Consultants makes no warranty, expressed or implied, except that the services have been performed in accordance with generally accepted environmental property assessment practices applicable at the time and location of the study.

Considerations identified by ASTM as beyond the scope of a Phase I ESA that may affect business environmental risk at a given property include the following: asbestos-containing materials, radon, lead-based paint, lead in drinking water, wetlands, regulatory compliance, cultural and historic resources, industrial hygiene, health and safety, ecological resources, endangered species, indoor air quality, mold, vapor intrusion, and high voltage lines. These environmental issues or conditions may warrant assessment based on the type of the property transaction; however, they are considered non-scope issues under ASTM Standard Practice E1527-05.

If requested by the client, these non-scope issues are discussed in Section 6.2. Otherwise, the purpose of this investigation is solely to satisfy one of the requirements for qualification of the innocent landowner defense, contiguous property owner or bona fide prospective purchaser under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). ASTM Standard Practice E1527-05 and the EPA Standards and Practices for All Appropriate Inquiries (40 CFR Part 312) constitute the "all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice" as defined in:

1) 42 U.S.C § 9601(35)(B), referenced in the ASTM Standard Practice E1527-05.

2) Sections 101(35)(B) (ii) and (iii) of CERCLA and referenced in the EPA Standards and Practices for All Appropriate Inquiries (40 CFR Part 312).

3) 42 U.S.C. 9601(40) and 42 U.S.C. 9607(q).

The Phase I Environmental Site Assessment is not, and should not be construed as, a warranty or guarantee about the presence or absence of environmental contaminants that may affect the property. Neither is the assessment intended to assure clear title to the property in question. The sole purpose of investigation into property title records is to ascertain a historical basis of prior land use. All findings, conclusions, and recommendations stated in this report are based upon facts, circumstances, and industry-accepted procedures for such services as they existed at the time this report was prepared (i.e., federal, state, and local laws, rules, regulations, market

conditions, economic conditions, political climate, and other applicable matters). All findings, conclusions, and recommendations stated in this report are based on the data and information provided, and observations and conditions that existed on the date and time of the property visit. Responses received from local, state, or federal agencies or other secondary sources of information after the issuance of this report may change certain facts, findings, conclusions, or circumstances to the report. A change in any fact, circumstance, or industry-accepted procedure upon which this report was based may adversely affect the findings, conclusions, and recommendations expressed in this report.

1.4 Data Gap and Data Failure

According to ASTM E1527-05, data gaps occur when the Environmental Professional is unable to obtain information required, despite good faith efforts to gather such information.

Data failure is one type of data gap. According to ASTM E1527-05 "data failure occurs when all of the standard historical sources that are reasonably ascertainable and likely to be useful have been reviewed and yet the objectives have not been met". Pursuant to ASTM Standards, historical sources are required to document property use back to the property's first developed use or back to 1940, whichever is earlier.

The following data gaps were identified during the course of this investigation.

- On May 11, 2007, the Santa Clara County Health Department (SCCHD) was contacted to review files on the subject property and nearby sites of concern. Files at the SCCHD may contain information regarding hazardous materials storage, as well as information regarding unauthorized releases of petroleum hydrocarbons or other contaminants that may affect the soil or groundwater in the area. Due to the time constraints associated with this report, AEI was not able to obtain records from the SCCHD. However, based on the detailed information gathered from other historical sources, such as aerial photographs and Water Quality Board records, the absence of this information is not expected to alter the findings of this investigation.

- Interviews with past owners and occupants regarding historical onsite operations were not reasonably ascertainable and therefore, this constitutes a data gap. However, based on information obtained from other sources including, historical aerial photographs and previous environmental investigations, this data gap is not expected to significantly alter the overall findings of this investigation.

Due to time constraints, the client has requested that AEI issue this report despite the above-listed limitations.

1.5 Reliance

This investigation was prepared for the sole use and benefit of DuPont Fabros Development LLC. Neither this report, nor any of the information contained herein shall be used or relied upon for any purpose by any person or entity other than DuPont Fabros Development LLC.

2.0 SITE AND VICINITY DESCRIPTION

2.1 Site Location and Description

The subject property is located on the south side of South Mathew Street in a mixed commercial and industrial area of Santa Clara. The property totals approximately two acres and is improved with a one-story warehouse building totaling approximately 49,000 square feet. The building is occupied by Premier Auto Body Shop, Complete RV Repair Shop, and the California Paper Storage Center. On-site operations consist of auto body work, motor home repair, paper roll storage, and office activities. In addition to the subject property building, the property is improved with asphalt-paved parking areas and associated landscaping.

The subject property was identified in the regulatory database as a small quantity generator of hazardous waste, which is further discussed in Section 5.3

The Assessor's Parcel Number (APN) for the subject property is 230-03-0751. Heating and cooling systems on the subject property are fueled by natural gas and electricity provided by Pacific Gas & Electric. Potable water and sewage disposal are provided by municipal services.

Refer to Figure 1: Site Location Map, Figure 2: Site Map, and Appendix A: Property Photographs for site location.

2.2 Site and Vicinity Characteristics

The subject property is located in a mixed commercial and industrial area of Santa Clara. The immediately surrounding properties consist of Mathew Street followed by the California Paper Processing Facility to the north, AMI Recycling to the east, railroad tracks followed by a vacant industrial/commercial building to the west, and a vacant industrial property to the south.

The south adjacent property was identified as a Spills, Leaks, Investigations and Cleanups (SLIC) sire and a Leaking Underground Storage Tank (LUST) site in the regulatory database. The west adjacent property was identified as a LUST, Voluntary Cleanup Program site, and an ENVIROSTOR site. The north adjacent property was identified as a small quantity generator of hazardous waste and a LUST site. These listings are further discussed in Section 5.3.

2.3 Geology and Hydrogeology

According to information obtained from the US Geological Survey (USGS), the area surrounding the subject property is underlain by sedimentary deposits of the Cenozoic-era. Based on a review of the US Department of Agriculture (USDA) Soil Survey for the area of the subject property, the soils in the vicinity of the subject property are classified as the Botella Series. According to subsurface investigations performed on the south adjacent property, the soils underneath the subject property consist of silty and sandy clays up to a depth of 11 and ½ feet below ground surface (bgs), followed by clayey silt.

Based on a review of the USGS San Jose West, California Quadrangle Topographic Map, the subject property is situated approximately 53 feet above mean sea level, and the local topography is relatively flat with a slight slope to the northeast. The nearest surface water is Coyote Creek, located approximately 3/4-mile to the northeast. Based on groundwater monitoring data obtained from previous subsurface investigations performed at the south adjacent property, the direction of groundwater flow beneath the subject property is inferred to be to the north-northeast and is expected to be encountered at five feet bgs.

3.0 HISTORICAL REVIEW OF SITE AND VICINITY

According to historical sources, portions of the current subject property building were constructed in 1968 by Beaver Lumber Company for use as a warehouse/storage facility. Two additions were made to the building in the 1970s to complete the current configuration. the subject property has been occupied by several commercial/industrial tenants since at least 1970, including Simpson Building Supply and Timber since 1970 until 1986, Northern Hardwood, Inc. since at least 1991 until 2001. Prior to the construction of the building, the property was agricultural land.

The subject property was historically used for agricultural purposes. There is a potential that agricultural chemicals, such as pesticides, herbicides and fertilizers, were used onsite. However, the entire area of the subject property is either paved over or covered by improvements that make direct contact with any potential remaining concentrations in the soil unlikely. Furthermore, the subject property is developed and used for commercial/light industrial purposes and thus no further action related to the former agricultural use of the subject property is warranted at this time. If redevelopment of the subject property is planned for residential use, the owner/user of the report should contact the local planning department to determine whether sampling relating to the former agricultural use of the subject property is required.

3.1 Aerial Photograph Review

On May 11, 2007, AEI Consultants reviewed aerial photographs of the subject property and surrounding area. Aerial photographs were reviewed for the following years:

Date: 1939	Date: 1982
Scale: 1" = xxx' OR 1:xxxx	Scale: 1" = xxx' OR 1:xxxx
Date: 1956	Date: 1993
Scale: 1" = xxx' OR 1:xxxx	Scale: 1" = xxx' OR 1:xxxx
Date: 1965	Date: 1999
Scale: 1" = xxx' OR 1:xxxx	Scale: 1" = xxx' OR 1:xxxx
Date: 1974	Date: 2005
Scale: 1" = xxx' OR 1:xxxx	Scale: Unknown

In the 1939 aerial photograph, the subject property and all of the adjacent properties appear to be agricultural land. Railroad tracks appear to be developed along the western boundary of the subject property as they are today.

In the 1956 aerial photograph, the north adjacent property appears to be developed with several factory buildings much like it is today. The west adjacent property appears under development. Mathew Street appears developed along the northern boundary of the subject property. No other significant changes were noted.

In the 1965 aerial photograph, the west adjacent property appears to be developed with several medium-sized commercial/industrial structures. Not other significant changes were noted.

In the 1974 aerial photograph, the subject property appears to be developed with the current building. The east adjacent property appears to be developed with a portion of the building currently occupied by AMI Recycling. The south adjacent property appears to be developed with the two current warehouse/storage structures. The west adjacent property appears to be developed with one (1) large industrial structure and one medium-sized commercial/industrial structure. No other significant changes were noted.

In the 1982 aerial photograph, the west adjacent property appears to be developed with one commercial/industrial structure. The east adjacent property appears to be developed with the complete building currently occupied by AMI Recycling. No other significant changes were noted.

No significant changes were noted in the 1993, 1999, and 2005 aerial photographs.

If available, high-quality copies of reviewed aerial photographs are included as Figure 3.

3.2 Regulatory Agencies

Local and state agencies, such as environmental health departments, fire prevention bureaus, and building and planning departments are contacted to identify any current or previous reports of hazardous materials use, storage, and/or unauthorized releases that may have impacted the subject property. In addition, information pertaining to Activity and Use Limitations (AULs), defined as legal or physical restrictions, or limitations on the use of, or access to, a site or facility, is requested. Specifically AULs are comprised of engineering controls (EC) and institutional controls (IC).

Engineering Controls are defined as physical modifications to a site or facility to reduce or eliminate the potential for exposure to hazardous substances or petroleum products in the soil or ground water on the property. *Institutional Controls* are defined as a legal or administrative restriction on the use of, or access to, a site or facility to 1) reduce or eliminate the potential for exposure to hazardous substances or petroleum products in the soil or ground water on the property, or 2) to prevent activities that could interfere with the effectiveness of a response action, in order to ensure maintenance of a condition of no significant risk to public health or the environment.

3.2.1 Health Department

On May 11, 2007, the Santa Clara County Health Department (SCCHD) was contacted to review files on the subject property and nearby sites of concern. Files at the SCCHD may contain information regarding hazardous materials storage, as well as information regarding unauthorized releases of petroleum hydrocarbons or other contaminants that may affect the soil or groundwater in the area.

Due to the time constraints associated with this report, AEI was not able to obtain records from the SCCHD. However, based on the detailed information gathered from other historical sources, such as aerial photographs and Water Quality Board records, the absence of this information is not expected to alter the findings of this investigation.

3.2.2 Fire Department

On May 18, 2007, the Santa Clara Fire Department (SCFD) was visited for information on the subject property to identify any evidence of previous or current hazardous material usage.

AEI was provided with the following documentation:

Underground Storage Tank Removal Permit, SCFD (November 4, 1986)

The document indicated that a permit was issued for the removal of one (1) 10,000-gallon diesel fuel Underground Storage Tank (UST). The owner is listed as Beaver Lumber, who reportedly utilized the UST to refuel their trucks. Confirmation samples were taken from the tank excavation walls and floor, which were analyzed for Total Volatile Hydrocarbons (TVH). Concentrations of TVH were not detected, and it was determined by the SCFD that a release did not occur.

Based on the result of the confirmation sampling, the historical presence of the UST is not expected to represent a significant environmental concern.

3.2.3 Building Department

On May 18, 2007, the Santa Clara Building Department (SCBD) was visited for information on the subject property in order to identify historical tenants and property use. Please refer to the following table for a listing of permits reviewed:

Building Permits Reviewed

Year(s)	Owner/Applicant	Description of Permit / Building Use
1968	Beaver Lumber Company	Construction Permit (500)
1971	Beaver Lumber Company	Addition Permit (500)
1976	Not Listed	Addition Permit (500)
1988	Not Listed	Tenant Buildout Permit (520)
1995	Not Listed	Tenant Buildout Permit (510)

Beaver Lumber Company occupied the subject property from approximately 1968 until at least 1986. A UST was removed from the site in 1986 in association with this tenant, which is further discussed in Section 3.2.2. Beaver Lumber Company also owned the south adjacent property, which has had two LUST incidents and one spills incident, all of which are closed. However, according to historical Sanborn Maps and information obtained from local agencies, it does not appear that major operations took place at the subject property and the former tenant is not

expected to represent a significant environmental concern. Refer to Section 5.3 for more information concerning the incidents that have occurred at the south adjacent property.

3.2.4 Planning Department

On May 18, 2007, the Santa Clara County Planning Department (SCCPD) was contacted for information on the subject property in order to identify AULs associated with the subject property.

No information indicating the existence of AULs was on file for the subject property with the SCCPD.

3.2.5 Department of Toxic Substances Control

On May 11, 2007, the Department of Toxic Substances Control (DTSC) was contacted was contacted for information on the subject property to identify any evidence of previous or current hazardous material usage.

No information indicating current or prior use or storage of hazardous materials, or the existence of AULs was on file for the subject property with the DTSC.

3.2.6 Regional Water Quality Control Board

On May 11, 2007, the San Francisco Regional Water Quality Control Board (SFRWQCB) was contacted was contacted for information on the subject property to identify any evidence of previous or current hazardous material usage.

No information indicating current or prior use or storage of hazardous materials, or the existence of AULs was on file for the subject property with the SFRWQCB.

3.3 Sanborn Fire Insurance Maps

Sanborn Fire Insurance maps were developed in the late 1800s and early 1900s for use as an assessment tool for fire insurance rates in urbanized areas. A search was made of Environmental Data Resource's collection of Sanborn Fire Insurance maps on May 11, 2007.

In the 1961 map, the subject property is vacant. The south adjacent is occupied by the Pacific Redwood Casket Company, which occupies the southern portion of the site. Six structures are developed, including a casket manufacturing building, a lumber shed, a lumber storage building, a steam dry kiln building, a sawdust bin, and an unnamed warehouse structure. The west adjacent property is vacant beyond railroad tracks. The east adjacent property is also vacant. The north adjacent property is occupied by a large Paper Production facility as it is today.

In the 1966 map, the south adjacent property is additionally developed with another lumber storage building and two storage sheds. No other significant changes were noted.

3.4 City Directories

A search of historic city directories was conducted for the subject property through Environmental Data Resources and the Santa Clara Public Library on May 18, 2007. Directories were available and reviewed for the years 1922, 1925, 1926, 1930, 1931, 1935, 1936, 1940, 1942, 1946, 1950, 1955, 1957, 1960, 1962, 1963, 1966, 1968, 1970, 1974, 1975, 1978, 1980, 1982, 1985, 1986, 1991, 1996, 2000, 2001 and 2006. The following table summarizes the results of the city directory search.

City Directory Search Results

Year(s)	Occupant Listed
1922-1968	Addresses Not Listed in Research Source
1970	Simpson Building Supply (500), Remaining Addresses not Listed in Research Source
1974-1986	Simpson Building Supply (500), Simpson Timber (520), Remaining Addresses not Listed in Research Source
1991	Premier Body Shop (500), Northern Hardwood, Inc. (520), Remaining Addresses not Listed in Research Source
1996-2001	Premier Body Shop (500), American Camper (504), Northern Hardwood, Inc. (520), Remaining Addresses not Listed in Research Source
2006	Premier Body Shop (500), Complete RV Repair (504), California Paperboard (520), Remaining Addresses not Listed in Research Source

Based on the above information, the subject property has been occupied by several commercial/industrial tenants since at least 1970, including Simpson Building Supply and Timber since 1970 until 1986, Northern Hardwood, Inc. since at least 1991 until 2001. Based on the period of time that Premier Body Shop has occupied the site and the current operations observed (further discussed in Section 6.1), this tenant is not expected to represent a significant environmental concern. California Paperboard utilizes the subject property solely for the storage of paper reams and is not expected to represent a significant environmental concern. According to a previous environmental investigation performed at the subject property, Simpson Building Supply and Timber and Northern Hardwoods, Inc. utilized the subject property solely as a storage facility and are not expected to represent a significant environmental concern.

4.0 INTERVIEWS AND USER PROVIDED INFORMATION

4.1 Interviews

Pursuant to ASTM E1527-05, the following interviews were performed during this investigation in order to obtain information indicating RECs in connection with the subject property.

4.1.1 Interview with Owner

The subject property owner, Mr. Alan Ream, was not aware of any pending, threatened, or past litigation relevant to hazardous substances or petroleum products in, on, or from the subject property; any pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on, or from the subject property; or any notices from a governmental entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products.

4.1.2 Interview with Report User

The report user, DuPont Fabros Development, LLC, was not aware of any pending, threatened, or past litigation relevant to hazardous substances or petroleum products in, on, or from the subject property; any pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on, or from the subject property; or any notices from a governmental entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products.

4.1.3 Interview with Key Site Manager

The key site manager, Mr. Ream, was not aware of any pending, threatened, or past litigation relevant to hazardous substances or petroleum products in, on, or from the subject property; any pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on, or from the subject property; or any notices from a governmental entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products.

4.1.4 Past Owners, Operators and Occupants

Interviews with past owners and occupants regarding historical onsite operations were not reasonably ascertainable and therefore, this constitutes a data gap. However, based on information obtained from other sources including, historical aerial photographs and previous environmental investigations, this data gap is not expected to significantly alter the overall findings of this investigation.

4.1.5 Interview with Others

Information obtained during interviews with local government officials is incorporated into the appropriate segments of this section.

4.2 User Provided Information

User provided information is intended to help identify the possibility of RECs in connection with the subject property. In addition, pursuant to ASTM E1527-05, the User completed the *ASTM User Questionnaire*. Please refer to Appendix C: References for a copy of the questionnaire.

4.2.1 Title Records/Environmental Liens/AULs

The User did not provide any title records, AULs or documentation indicating environmental liens encumbering the subject property or any information regarding previous uses or ownership of the subject property that indicated recognized environmental conditions.

4.2.2 Specialized Knowledge

AEI was not informed by the User of any specialized knowledge or experience related to the subject property or nearby properties.

4.2.3 Valuation Reduction for Environmental Issues

The User did not indicate to AEI any information to suggest that the valuation of the subject property is significantly less than the valuation for comparable properties due to environmental factors.

4.2.4 Commonly Known or Reasonably Ascertainable Information

The User did not inform AEI of any commonly known or reasonably ascertainable information about that the subject property which aided AEI in identifying conditions indicative of a release or threatened release.

4.2.5 Previous Reports and Other Provided Documentation

Documentation was provided to AEI by the Client during this investigation. A summary of this information follows:

Phase I Environmental Site Assessment, E2C, Inc. (September 18, 2000)

The report was performed for the subject property as well as the south adjacent property. The report confirmed that the subject property was formerly developed agriculturally since at least 1939 until the late 1960s, when it was developed with a portion of the current building. Two

additions were made throughout the 1970s. The report confirmed that the subject property was occupied by Simpson Building Supply from 1970 until at least 1986, Premier Body Shop since at least 1990, and American Camper and Northern Hardwoods in the 1990s. Beaver Lumber Company reportedly utilized a portion of the subject property during the 1970s and 1980s as a storage and shipping and receiving facility, in which one UST (discussed in Section 3.2.2) was utilized to refuel onsite trucks. According to the report, Simpson Building Supply and Timber and Northern Hardwoods, Inc. utilized the subject property solely as a storage facility and are not expected to represent a significant environmental concern.

The report noted that six USTs were known to have existed on the south adjacent property. Two LUST incidents were reported for the USTs. Several monitoring wells were installed at the site between 1985 and 2002 to delineate the contamination. Total petroleum hydrocarbons (TPH) as gasoline and diesel, and Benzene, Toluene, Ethylbenzene, and Xylene (BTEX) concentrations were detected in samples in the immediate vicinity of the UST areas. A Pentachlorophenol (PCP) aboveground tank was noted to have existed on the south adjacent property as well, and was addressed as an environmental concern.

Several 55-gallon drums were observed on the subject property at the time of the report, and it was recommended that all empty drums be properly disposed of. No other environmental concerns were identified for the subject property.

Documentation Report for Destruction of 10 A-Zone Monitoring Wells, Stellar Environmental Solutions, Inc. (Stellar) (March 23, 2006)

This report concerned the PCP contamination that was located on the south adjacent property. According to the report, the site has undergone remedial activities for the release of PCP from an AST since 1985. The SFRWQCB granted closure to the site on March 9, 2006, and requested that eleven (11) installed monitoring wells be properly decommissioned. Two of those monitoring wells were located on the subject property. Stellar reported that it could not access one of the monitoring wells at the south adjacent property, MW-16S, due to a large pile of construction debris being located on top of the well. However, Stellar properly decommissioned ten (10) remaining wells, including the two wells on the subject property, and included regulatory documentation in the appendices of their report.

Based on the proper decommissioning of the onsite wells, the former monitoring wells are not expected to represent a significant environmental concern.

5.0 REVIEW OF REGULATORY AGENCY RECORDS

The following information was obtained through a search of electronically compiled federal, state, county, and city databases provided by Environmental Data Resources, Inc. (EDR). The database search includes regulatory agency lists of known or potential hazardous waste sites, landfills, hazardous waste generators, and disposal facilities in addition to sites under investigation. The information provided in this report was obtained from publicly available sources. The locations of the sites listed in this report are plotted with a geographic information system utilizing geocoding of site addresses. The accuracy of these locations is generally +/- 300 feet. AEI's field representative has attempted to confirm the locations of listings on or adjacent to the subject property. Refer to the radius map (Appendix B: Regulatory Database Review Report) for the locations of the sites in relation to the subject property.

5.1 Records Summary

DATABASE REVIEWED	SUBJECT PROPERTY	ADJACENT PROPERTY
Identification as National Priorities List (NPL) "Superfund" site	No	No
Identification as a Federal Delisted NPL site	No	No
Identification as CERCLIS and/or CERCLIS/NFRAP site	No	No
Identification as hazardous waste handler and/or generator (RCRA-TSD, LG-GEN and/or SM-GEN)	**Yes**	**Yes**
Identification as RCRA CORRACTS site	No	No
Identification in Federal Institutional Control/Engineering Control Registries	No	N/A
Identification as an Emergency Response Notification Systems (ERNS) site	No	N/A
Identification as Historical State (Historical CalSites SPL/SCL) site	No	No
Identification as an ENVIROSTOR site	No	No
Identification as SLIC Site	No	**Yes**
Identification as solid waste landfill (SWLF)	No	No
Identification as HAZNET site	No	No
Identification as registered underground/aboveground storage tanks (UST/AST)	No	No
Identification as leaking underground storage tanks (LUST) site	No	**Yes**

Identification as a State DEED Restriction site	No	N/A
Identification as a State Voluntary Cleanup Program (VCP) site	No	No
Identification as Federal Land Use/Indian Lands of the U.S. sites	No	No
Identification as State/Tribal Brownfields site	No	No

The subject property was identified as a small quantity generator of hazardous waste. The west adjacent property was identified as a LUST, VCP, and ENVIROSTAR site. The south adjacent property was identified as a SLIC and LUST site. The north adjacent property was identified as a small quantity generator of hazardous waste and a LUST site. These listings are further discussed in Section 5.3.

5.2 Contaminant Migration

Migration of petroleum hydrocarbon or volatile organic compound (VOC) contamination is generally via groundwater. Therefore, only those contaminant release sites located hydrologically upgradient relative to the subject property are expected to represent a potential environmental concern to the subject property. Contaminated sites located hydrologically downgradient of the subject property are not expected to represent a potential threat to the groundwater quality beneath the subject property. Sites that are situated hydrologically cross-gradient relative to the subject property are not expected to represent a concern unless close proximity allows for the potential of lateral migration. As discussed in Section 2.3, groundwater in the vicinity of the subject property is assumed to flow to the north-northeast. Migration of VOC contaminants in the vapor phase have also been documented which have the potential to impact the subject property; however, evaluation of vapor phase migration and intrusion is beyond the scope of this assessment.

5.3 Record Details

National Priorities List (NPL) is EPA's national listing of contaminated sites targeted for cleanup because they pose a threat to human health and the environment. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) authorizes and requires the EPA to investigate, categorize, and enforce the cleanup of hazardous waste sites on the NPL. An NPL site on or near a particular property may threaten the environmental integrity of the property or affect its marketability.

No sites within a 1-mile radius of the subject property were identified during the NPL database search.

Federal Delisted NPL List consists of sites that no longer require further response actions as determined by the EPA.

No sites within a ½-mile radius of the subject property were identified during the Delisted NPL database search.

CERCLIS and CERCLIS/NFRAP List consists of sites that the EPA has investigated or is presently investigating for release or threatened release of hazardous substances, which may be subject to review in accordance with the terms and conditions of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, also known as Superfund). Sites listed on the "No Further Remedial Action Planned" (NFRAP) database are sites where, following an initial investigation, no contamination was found, contamination was removed quickly, or the contamination was not serious enough to require federal Superfund or NPL consideration.

Nine sites within a ½-mile radius of the subject property were identified during the CERCLIS/NFRAP database search. Eight of these sites are identified on the NFRAP database, indicating that no further remedial action is necessary at these sites. The remaining site is plotted as being located a distance in excess of 1/4-mile from the subject property in a cross-gradient position. Based on regulatory status, relative distance, and the presumed direction of groundwater flow, these sites are not considered to be an environmental concern.

Resource Conservation and Recovery Act (RCRA) Program identifies and tracks hazardous waste from the point of generation to the point of disposal. Information from the RCRA database is divided into three categories: TSD, LG GEN and SM GEN. The TSD category is searched to a 1-mile radius and tracks facilities which treat, store and/or dispose of hazardous waste. LG GEN, or large generators, are facilities that generate more than 1000 kg of hazardous waste per month. SM GEN, or small generators, are facilities that generate between 100 and 1000 kg of hazardous waste per month. The LG-GEN and SM-GEN databases are searched up to a $^1/_8$-mile radius from the subject property.

One site within a 1-mile radius of the subject property was identified during the RCRA-TSD database search.

- The All Metals DBA ECS Refinery site, located at 705 Reed Street, is located approximately 346 feet to the west-southwest (hydrologically cross-gradient) of the subject property. The site is listed as a TSD site with several violations on file that are limited to paperwork issues. Based on the lack of a documented release, this site is not expected to represent a significant environmental concern.

Forty-two sites within a $^1/_8$-mile radius of the subject property were identified during the RCRA (LG-and SM-GEN) database search.

- The subject property, identified as the American Camper site located at 504 and 512 Mathew Street, was identified as a SM-GEN site with no violations on file. Based on the lack of a documented release and observations detailed in Section 6.1, this listing is not expected to represent a significant environmental concern.

- The California Paperboard site, located at 525 Mathew Street, is located on the north adjacent property. The site is located hydrologically downgradient from the subject property. The site is listed as a SM-GEN site with no violations on file. Based on the presumed direction of groundwater flow and factors discussed in the LUST segment of Section 5.3, this site is not expected to represent a significant environmental concern.

The storage, treatment, disposal and/or generation of hazardous materials at the remaining sites is not a significant environmental concern based on the lack of a documented release or factors discussed in prior segments of Section 5.3.

CORRACTS is an EPA-maintained database of Resource Conservation and Recovery Act (RCRA) facilities undergoing "corrective action". A "corrective action order" is issued when there has been a release of hazardous waste or constituents into the environment from a RCRA facility. Corrective actions may be required beyond the facility's boundary and can be required regardless of when the release occurred, even if it predates RCRA.

Two sites within a 1-mile radius of the subject property were identified during the CORRACTS database search.

- The All Metals DBA ECS Refinery site, located at 705 Reed Street, is located approximately 346 feet to the west-southwest (hydrologically cross-gradient) of the subject property. The site is listed as a Materials Recovery Facility and has been assigned a low corrective action priority. Based on the presumed direction of groundwater flow and the regulatory status, this site is not expected to represent a significant environmental concern.

The remaining site is located in excess of ½-mile from the subject property in a cross-gradient position. Based on the distance from the subject property and the presumed direction of groundwater flow, this site is not expected to represent a significant environmental concern.

Federal Institutional Control (IC)/Engineering Control (EC) Registries consist of sites with institutional controls (administrative measures such as land use restrictions, deed restrictions and post remediation requirements intended to prevent exposure to contaminants remaining on site), and engineering controls (physical methods to create pathway elimination for regulated substances to enter environmental media or effect human health).

The subject property was not identified in the Federal IC/EC database search.

Emergency Response Notification Systems (ERNS) List is EPA's database of emergency response actions.

The subject property was not identified during the ERNS database search.

Historical California Sites (CalSites) are provided by the California Environmental Protection Agency (EPA), Department of Toxic Substances Control (DTSC) and include state equivalent NPL (SPL) and CERCLIS (SCL) sites. The CalSites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the CalSites database. The database is no longer updated by the state agency and has been replaced by EnviroStor.

One site within a 1-mile radius of the subject property were identified during the Historical CalSites database search.

This site is located in excess of ½-mile from the subject property in a downgradient position. Based on the distance from the subject property and the presumed direction of groundwater flow, this site is not expected to represent a significant environmental concern.

ENVIROSTOR is a database maintained by the DTSC Site Mitigation and Brownfields Reuse Program, which identifies sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (NPL); States Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Fifteen sites within a 1-mile radius of the subject property were identified during the Envirostor database search.

- The Lombardo Diamond Core Drilling site, located at 585 Roberts Avenue, is located approximately 130 feet to the north (hydrologically down-gradient) of the subject property. Metal coating and galvanizing has historically occurred onsite. The SFRWQCB is currently performing remedial activities at the property. Based on the presumed direction of groundwater flow, this site is not expected to represent a significant environmental concern.

- The 600 Mathew Street site is located on the northernmost west adjacent property. The site is located hydrologically cross-gradient from the subject property. The site is currently enrolled in the Voluntary Cleanup Program, and is listed as a No Further Action site. Based on the presumed direction of groundwater flow and the regulatory status, this site is not expected to represent a significant environmental concern. Refer to the VCP segment of this Section for more information concerning this site.

The remaining sites are located in excess of ¼-mile from the subject property in either cross- or downgradient positions. Based on the distance and presumed direction of groundwater flow, these sites are not expected to represent a significant environmental concern.

SLIC sites are provided by the Regional Water Quality Control Board (RWQCB). This list includes sites that have recorded spills, leaks, investigations, and cleanups.

Eleven sites, within a $^{1}/_{8}$-mile radius of the subject property were identified during the SLIC database search.

- The south adjacent property, identified as Beaver Lumber Company at 535 Reed Street, was identified in the Spills, Leaks, Investigations, and Cleanups database. The site is located hydrologically upgradient from the subject property. The site was monitored by the San Francisco Regional Water Quality Control Board (SFRWQCB) and is listed as closed. This listing is in relation to onsite pentachlorophenol (PCP) contamination from a PCP aboveground storage tank located at the site. Beaver Lumber Company reportedly utilized a portion of the subject property during the 1970s and 1980s as a storage facility and shipping receiving area, in which a UST was utilized for refueling trucks (discussed above). The plume of PCP contamination appears to have reached the subject property. According to the SFRWQCB Geotracker website, two monitoring wells were installed on the subject property in order to determine if contamination was present. The most recent groundwater monitoring event prior to closure took place on July 28, 2005. During that event, MW-5, located on the southern boundary of the subject property, yielded non-detectable concentrations of PCP. MW-20S, also located along the southern boundary, yielded 11 milligrams per liter (mg/L) of PCP. The SFRWQCB determined that PCP levels had significantly attenuated and would continue to do so in the future, and the south adjacent property reached closure on March 9, 2006. Both of the wells located on the subject property were decommissioned in 2006. Based on this information and the nature of former subject property use, no further action or investigation appears to be warranted at this time. However, any proposed disturbance of the subsurface for construction or other purposes would require the implementation of engineering controls to protect the health and safety of workers involved with subsurface activities.

- The Lombardo Diamond Core Drilling site, located at 585 Roberts Avenue, is located approximately 130 feet to the north (hydrologically down-gradient) of the subject property. Metal coating and galvanizing has historically occurred onsite. The SFRWQCB is currently performing remedial activities at the property. Based on the presumed direction of groundwater flow, this site is not expected to represent a significant environmental concern.

The remaining sites are located in excess of ¼-mile from the subject property in either cross- or downgradient positions. Based on the distance and the presumed direction of groundwater flow, the remaining sites are not expected to represent a significant environmental concern.

Solid Waste Landfills (SWLF) is a database generated by the State of California Solid Waste Information System (SWIS), which includes active and inactive landfills and transfer stations within the state maintained by the California Integrated Waste Management Board.

One site within a ½-mile radius of the subject property was identified during the SWLF database search. This site is located in excess of ¼-mile from the subject property in a cross-gradient position. Based on the distance and the presumed direction of groundwater flow, this site is not expected to represent a significant environmental concern.

HAZNET Sites database consists of data that is extracted from the copies of hazardous waste manifests received each year by the DTSC.

The subject property was not identified in the HAZNET database.

Underground/Aboveground Storage Tanks (UST/AST) List is a comprehensive listing of registered underground and aboveground storage tanks located within the State of California.

Four sites within a ¼-mile radius of the subject property were identified during the UST/AST database search. None of these sites are located adjacent to the subject property. Due to the lack of a documented release or factors discussed in the LUST segment of Section 5.3, the storage of hazardous materials within registered tanks is not a significant environmental concern.

Leaking Underground Storage Tanks (LUST) List is a list produced by the Regional Water Quality Control Board (RWQCB) of known sites with current or former leaking underground storage tanks on the premises.

One-hundred and twenty-eight sites within a ½-mile radius of the subject property were identified during the LUST database search.

- The south adjacent property, identified as Beaver Lumber Company at 535 Reed Street, was identified twice in the LUST database. The site is located hydrologically up-gradient from the subject property. The site received closure for both incidents on February 7, 2002, one of which took place in May 29, 1985. According to the SFRWQCB Geotracker website, the nearest monitoring well in relation to the onsite LUST incidents was MW-3, which is located approximately 300 feet to the south of the subject property. The most recent groundwater monitoring event before the site reached closure on February 28, 2002 yielded no concentrations of Total Petroleum Hydrocarbons for gas or diesel, Benzene, Toluene, Ethylbenzene, and Xylene (BTEX), Methyl tert-Butyl Ether (MTBE), and Total Oil and Gas. Based on these facts and the regulatory status, this site is not expected to represent a significant environmental concern.

- The California Paperboard site, located at 525 Mathew Street, is located on the north adjacent property. The site is listed twice. On January 8, 1991, a release of an unknown quantity of gasoline was reported. No information concerning the second listing was

listed. The site is currently undergoing pollution characterization for both incidents. Based on the presumed direction of groundwater flow, this site is not expected to represent a significant environmental concern.

- The Nelson Brothers Trucking site, located at 600 Mathew Street, is located on the west adjacent property. The site is located hydrologically cross-gradient from the subject property. The site is listed three times. On January 29, 1992, a release of an unknown quantity of gasoline was reported. This incident received case closure on December 22, 2000. No information concerning the second and third listings was listed, excluding a Case Closed status that was granted on December 22, 2000. Based on the regulatory status and the presumed direction of groundwater flow, this site is not expected to represent a significant environmental concern.

- The Intex Auto Parts site, located at 2290 De La Cruz Boulevard, is located approximately 274 feet to the east (hydrologically cross-gradient) of the subject property. On January 1, 1992, a release of an unknown quantity of gasoline was reported. Pollution characterization activities are currently ongoing. Based on the presumed direction of groundwater flow, this site is not expected to represent a significant environmental concern.

- The Jenic site, located at 448 Robert Avenue, is located approximately 44 feet to the north (hydrologically downgradient) of the subject property. The site is listed twice for the same release. On January 7, 1991, a release of an unknown quantity of gasoline was reported. Pollution Characterization is currently ongoing at the site. Based on the presumed direction of groundwater flow, this site is not expected to represent a significant environmental concern.

The remaining sites are located in excess of 1/8-mile from the subject property, have received Case Closed status, and/or are located in cross- or downgradient positions. Based on the regulatory status, the distance, and/or the presumed direction of the groundwater flow, these sites are not expected to represent a significant environmental concern.

State Deed Restriction (DEED) List is maintained by the DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) and Hazardous Waste Management Program (HWMP). The SMBRP list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. The HWMP has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

The subject property was not identified during the DEED database search.

State Voluntary Cleanup Program (VCP) Sites are incorporated in the DTSC SMBRPD database which identifies sites that have known contamination, or those properties undergoing voluntary investigation and/or cleanup and which are listed in the VCP program.

One site within a ½-mile radius of the subject property was identified during the State VCP database search.

- The 600 Mathew Street site is located on the west adjacent property. The site is located hydrologically cross-gradient from the subject property. The site reached closure on March 21, 2001. Based on the presumed direction of groundwater flow and the regulatory status, this site is not expected to represent a significant environmental concern.

Federal Land Use/Indian Lands of the U.S. is a database of areas administered by the Bureau of Indian Affairs which include areas of 640 acres or more. Included in the database are Federally-administered lands within a reservation which may or may not be considered part of the reservation. Hazardous materials use/storage permits, LUSTs and USTs on Indian Lands may also be incorporated in the State database listings.

No sites within a ½-mile radius of the subject property were identified during the Federal Land Use/Indian Lands Use database search.

State/Tribal Brownfields is a database of abandoned or underused industrial and/or commercial properties that are contaminated (or thought to be contaminated) and have an active potential for redevelopment. Various states do not have specific Brownfields programs, and thus the information may also be incorporated in the State database listings.

No sites within a ½-mile radius of the subject property were identified during the Brownfields database search.

6.0 SITE INSPECTION AND RECONNAISSANCE

On May 18, 2007, a site reconnaissance of the subject property and adjacent properties was conducted by Neil Yodnane of AEI in order to obtain information indicating the likelihood of recognized environmental conditions at the subject property and adjacent properties as specified in ASTM Standard Practice E1527-05 §8.4.2, 8.4.3 and 8.4.4.

6.1 On-Site Observations

Identified Yes	Identified No	Observation
☒	☐	Hazardous Substances and/or Petroleum Products in Connection with Property Use
☐	☒	Aboveground & Underground Hazardous Substance or Petroleum Product Storage Tanks (ASTs / USTs)
☐	☒	Hazardous Substance and Petroleum Product Containers and Unidentified Containers not in Connection with Property Use
☐	☒	Unidentified Substance Containers
☒	☐	Electrical or Mechanical Equipment Likely to Contain Fluids
☐	☒	Interior Stains or Corrosion
☐	☒	Strong, Pungent or Noxious Odors
☐	☒	Pools of Liquid
☒	☐	Drains, Sumps and Clarifiers
☐	☒	Pits, Ponds and Lagoons
☐	☒	Stained Soil or Pavement
☐	☒	Stressed Vegetation
☐	☒	Solid Waste Disposal or Evidence of Fill Materials
☐	☒	Waste Water Discharges
☐	☒	Wells
☐	☒	Septic Systems
☐	☒	Other

The subject property is occupied by Premier Auto Body Shop, Complete RV Repair Shop, and the California Paper Storage Center. On-site operations consist of auto body work, motor home repair, paper roll storage, and office activities.

Hazardous Substances and/or Petroleum Products in Connection with Property Use

Although hazardous substances and petroleum products are associated with the current auto repair operations conducted on the subject property, no evidence of improper storage or handling of these materials was observed during the site reconnaissance. Additionally, no staining or evidence of a release was observed during the site reconnaissance, and the subject property is not listed for any spills or releases in connection with the use or handling of these materials. Based on this information and the observations made during the site reconnaissance the use of these materials on the subject property is not expected to represent a significant environmental concern.

The Premier Body Shop is equipped with a paint booth. The paint booth is used for painting vehicles onsite. Premier Body Shop utilizes small quantities of solvent-based paints onsite. No floor drains or conduits to the subsurface were observed in the vicinity of the paint booth and paint storage area. Due to the on-site observations, the current presence of the paint booth and paints on the subject property is not expected to represent a significant environmental concern.

AEI observed two (2) 55-gallon drums of used motor oil and two (2) 55-gallon drums of antifreeze onsite. The drums were provided with secondary containment. No stains or leaks were observed at the base of the drums. Based on these facts, the drums are not expected to represent a significant environmental concern.

Electrical or Mechanical Equipment Likely to Contain Fluids

Toxic polychlorinated biphenyls (PCBs) were commonly used historically in electrical equipment such as transformers, fluorescent lamp ballasts, and capacitors. According to United States EPA regulation 40 CFR, Part 761, there are three categories for classifying such equipment: <50 ppm of PCBs is considered "Non-PCB"; between 50 and 500 ppm is considered "PCB-Contaminated"; and >500 ppm is considered "PCB-Containing". Pursuant to 15 U.S.C. 2605(e)(2)(A), the manufacture, process, or distribution in commerce or use of any polychlorinated biphenyl in any manner other than in a totally enclosed manner was prohibited after January 1, 1977.

Transformers

The management of potential PCB-containing transformers is the responsibility of the local utility or the transformer owner. Actual material samples need to be collected to determine if transformers are PCB-containing.

Three pad-mounted transformers were observed on the subject property during the site inspection. The transformers are owned and operated by Pacific Gas & Electric, and based on the presumed date of installation, are PCB containing. No spills, staining or leaks were observed on or around the transformers. Based on the good condition of the equipment, the transformers are not expected to represent a significant environmental concern.

Premier Body Shop is equipped with two aboveground lifts. Each of the lifts is equipped with a container of hydraulic fluid totaling approximately ten gallons situated approximately four feet above the ground surface. No evidence of stains or leakage from the units was observed, and the lifts are therefore not expected to represent a significant environmental concern.

Drains, Sumps and Clarifiers

Two storm drains were observed in the parking area of the subject property. No hazardous substances or petroleum products were noted in the vicinity of the drains. Based on the use of the drains solely for storm water runoff, the presence of the drains is not expected to represent a significant environmental concern.

6.2 Non-ASTM Services

Building Components

In general, building components that are in good condition are not expected to represent a health and safety concern to the occupants of a property. Please refer to the table below for a general description of the building components observed during AEI's site inspection.

Observed Building Components

Material	Location	Condition
Drywall Systems	Throughout Office Areas	Good
Acoustical Ceiling Tiles	Throughout Office Areas	Good
Roofing Systems	Roof	Not Inspected

Building components were observed to be in good condition during AEI's site inspection.

Asbestos-Containing Building Materials

For buildings constructed prior to 1980, the Code of Federal Regulations (29 CFR 1926.1101) states that all thermal system insulation (boiler insulation, pipe lagging, and related materials) and surface materials must be designated as "presumed asbestos-containing material" (PACM) unless proven otherwise through sampling in accordance with the standards of the Asbestos Hazard Emergency Response Act.

Regardless of building construction date, the EPA's National Emission Standards for Hazardous Air Pollutants (NESHAP) requires that an asbestos survey adhering to AHERA sampling protocol be performed prior to demolition or renovation activities that may disturb ACMs. This requirement is typically enforced by the local air pollution control or air quality management district, and specifies that all suspect asbestos-containing materials (ACMs) be sampled to determine the presence or absence of asbestos prior to any renovation or demolition activities to prevent potential exposure to workers and/or building occupants.

In general, the following commonly-encountered building components are considered to be friable materials: acoustical plaster, fireproofing, drywall systems, ceiling tiles, wall and ceiling texturing, thermal systems insulation (TSI), various mastics, and roofing products. The following commonly-encountered building materials are considered to be non-friable: vinyl floor tile, sheet vinyl flooring, and asbestos-cement products.

Lead-Based Paint

Lead-based paint is defined as any paint, varnish, stain, or other applied coating that has 1 mg/cm^2 (or 5,000 ug/g by dry weight) or more of lead. Section 1017 of the Housing and Urban Development Guidelines, Residential Lead-Based Paint Hazard Reduction Act of 1992, otherwise known as "Title X", defines a lead-based paint hazard is "any condition that causes exposure to lead that would result in adverse human health effects" resulting from lead-contaminated dust, bare, lead-contaminated soil, and/or lead-contaminated paint that is

deteriorated or present on accessible, friction, or impact surfaces. Therefore, under Title X, intact lead-based paint on most walls and ceilings would not be considered a "hazard", although the paint should be maintained and its condition monitored to ensure that it does not deteriorate and become a hazard. Additionally, Section 1018 of this law directed HUD and EPA to require the disclosure of known information on lead-based paint and lead-based paint hazards before the sale or lease of most housing built before 1978. Most private housing, public housing, Federally owned housing, and housing receiving Federal assistance are affected by this rule.

In buildings constructed after 1978, it is very unlikely that lead-based paint is present. Due to the age of the subject property building, there is a potential that lead-based paint is present. Both interior and exterior painted surfaces were observed to be in good condition and are not expected to pose a health and safety concern to the occupants of the subject property at this time.

Local regulations may apply to lead-based paint in association with building renovation/demolition and worker/occupant protection. Actual material samples would need to be collected in order to determine if lead-based paint is present.

Radon

Radon is a naturally-occurring, odorless, invisible gas. Natural radon levels vary and are closely related to geologic formations. Radon may enter buildings through basement sumps or other openings.

The US EPA has prepared a map to assist National, State, and local organizations to target their resources and to implement radon-resistant building codes. The map divides the country into three Radon Zones, Zone 1 being those areas with the average predicted indoor radon concentration in residential dwellings exceeding the EPA Action limit of 4.0 picoCuries per Liter (pCi/L). It is important to note that the EPA has found homes with elevated levels of radon in all three zones, and the EPA recommends site specific testing in order to determine radon levels at a specific location. However, the map does give a valuable indication of the propensity of radon gas accumulation in structures.

Radon sampling was not requested as part of this investigation. According to the US EPA, the radon zone level for the area is Zone 2, which has a predicted average indoor screening level between 2 pCi/L and 4 pCi/L, below the action level of 4.0 pCi/L set forth by the EPA.

Drinking Water Sources and Lead in Drinking Water

Santa Clara County supplies potable water to the subject property. The most recent water quality report states that lead levels in the areas water supply were not detected and therefore are well within standards established by the EPA.

Mold/Indoor Air Quality Issues

Molds are simple, microscopic organisms, which can often be seen in the form of discoloration, frequently green, gray, white, brown or black. When excessive moisture or water accumulates

indoors, mold growth will often occur, particularly if the moisture problem remains undiscovered or is not addressed. As such, interior areas of buildings characterized by poor ventilation and high humidity are the most common locations of mold growth. Building materials including drywall, wallpaper, baseboards, wood framing, insulation, and carpeting often play host to such growth. Mold spores primarily cause health problems through the inhalation of mold spores or the toxins they emit when they are present in large numbers. This can occur primarily when there is active mold growth within places where people live or work.

Mold, if present, may or may not visually manifest itself. Neither the individual completing this inspection, nor AEI has any liability for the identification of mold-related concerns except as defined in applicable industry standards. In short, this Phase I ESA should not be construed as a mold survey or inspection.

AEI Consultants observed interior areas of the subject building in order to identify the significant presence of mold. AEI did not note obvious visual or olfactory indications of the presence of mold, nor did AEI observe obvious indications of significant water damage. As such, no bulk sampling of suspect surfaces was conducted as part of this assessment and no additional action with respect to mold appears to be warranted at this time.

This activity was not designed to discover all areas which may be affected by mold growth on the Property. Rather, it is intended to give the client an indication if significant (based on observed areas) mold growth is present at the Property. Additional areas of mold not observed as part of this limited assessment, possibly in pipe chases, HVAC systems and behind enclosed walls and ceilings, may be present on the Property.

6.3 Adjacent Property Reconnaissance Findings

Identified Yes	Identified No	Observation
☐	☒	Hazardous Substances and/or Petroleum Products in Connection with Property Use
☐	☒	Aboveground & Underground Hazardous Substance or Petroleum Product Storage Tanks (ASTs / USTs)
☐	☒	Hazardous Substance and Petroleum Product Containers and Unidentified Containers not in Connection with Property Use
☐	☒	Unidentified Substance Containers
☒	☐	Electrical or Mechanical Equipment Likely to Contain Fluids
☐	☒	Interior Stains or Corrosion
☐	☒	Strong, Pungent or Noxious Odors
☐	☒	Pool of Liquid
☒	☐	Drains and Sumps
☐	☒	Pits, Ponds and Lagoons
☐	☒	Stained Soil or Pavement
☐	☒	Stressed Vegetation
☐	☒	Solid Waste Disposal or Evidence of Fill Materials
☐	☒	Waste Water Discharges
☐	☒	Wells
☐	☒	Septic Systems
☐	☒	Other

Electrical or Mechanical Equipment Likely to Contain Fluids

Several pole-mounted and pad-mounted transformers were observed on the adjacent sites during the site inspection. No spills, staining or leaks were observed on or around the transformers. Based on the good condition of the equipment, the transformers are not expected to represent a significant environmental concern.

Railroad tracks are located adjacent to the west of the subject property. Railroad spurs represent environmental concerns due to the historical application of oils containing polychlorinated biphenyls (PCBs), herbicides, and arsenic for pest and weed control, as well as the potential presence of creosote on the rail ties, and the historical common practice of using coal cinders for track fill material. However, the railroad tracks located adjacent to the west of the subject property are surrounded by gravel. Based on the presence of gravel, the use of oils, arsenic, and herbicides associated with weed or pest control is expected to be minimal, and therefore does not represent a significant environmental concern.

Drains and Sumps

Several storm drains were observed in the parking areas of the adjacent properties. No hazardous substances or petroleum products were noted in the vicinity of the drains. Based on the use of the drains solely for storm water runoff, the presence of the drains is not expected to represent a significant environmental concern.

Wells

According to an *A-Zone Well Closure* report performed for the south adjacent property by Stellar Environmental Solutions, Inc. on March 24, 2006, one inactive monitoring well is located on the south adjacent property. AEI did not observe the monitoring well during the site visit. Monitoring wells have the potential to be a conduit to the subsurface. However, the monitoring well is located approximately 200 feet to the south of the subject property. Based on these facts, the adjacent monitoring well is not expected to represent a significant environmental concern.

7.0 FINDINGS AND CONCLUSIONS

Findings

Recognized environmental conditions (RECs) are defined by the ASTM Standard Practice E1527-05 as the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. AEI's investigation has revealed the following recognized environmental conditions associated with the subject property or nearby properties:

- No on-site recognized environmental conditions were identified during the course of this investigation.

Historical recognized environmental conditions (HRECs) are defined by the ASTM Standard Practice E1527-05 as an environmental condition which in the past would have been considered a recognized environmental condition, but which may or may not be considered a recognized environmental condition currently. AEI's investigation has revealed the following historical recognized environmental conditions associated with the subject property or nearby properties:

- According to an *Underground Storage Tank Removal Permit* issued by the Santa Clara Fire Department (SCFD), one (1) 10,000-gallon diesel fuel underground storage tank (UST) was removed from the subject property on November 4, 1986. The owner is listed as Beaver Lumber. Confirmation samples were taken from the tank excavation walls and floor, which were analyzed for Total Volatile Hydrocarbons (TVH). Concentrations of TVH were not detected, and it was determined by the SCFD that a release did not occur. Based on the result of the confirmation sampling, the historical presence of the UST is not expected to represent a significant environmental concern.

- The south adjacent property, identified as Beaver Lumber Company at 535 Reed Street, was identified in the Spills, Leaks, Investigations, and Cleanups database. The site is located hydrologically upgradient from the subject property. The site was monitored by the San Francisco Regional Water Quality Control Board (SFRWQCB) and is listed as closed. This listing is in relation to onsite pentachlorophenol (PCP) contamination from a PCP aboveground storage tank located at the site. Beaver Lumber Company reportedly utilized a portion of the subject property during the 1970s and 1980s as a storage facility and shipping receiving area, in which a UST was utilized for refueling trucks (discussed above). The plume of PCP contamination appears to have reached the subject property. According to the SFRWQCB Geotracker website, two monitoring wells were installed on the subject property in order to determine if contamination was present. The most recent groundwater monitoring event prior to closure took place on July 28, 2005. During that event, MW-5, located on the southern boundary of the subject property, yielded non-detectable concentrations of PCP. MW-20S, also located along the southern boundary, yielded 11 milligrams per liter (mg/L) of PCP. The SFRWQCB determined that PCP levels had significantly attenuated and would

continue to do so in the future, and the south adjacent property reached closure on March 9, 2006. Both of the wells located on the subject property were decommissioned in 2006. Based on this information and the nature of former subject property use, no further action or investigation appears to be warranted at this time. However, any proposed disturbance of the subsurface for construction or other purposes would require the implementation of engineering controls to protect the health and safety of workers involved with subsurface activities.

Environmental issues include environmental concerns identified by AEI that warrant discussion but do not qualify as recognized environmental conditions, as defined by the ASTM Standard Practice E1527-05. AEI's investigation has revealed the following environmental issues associated with the subject property or nearby properties:

- The subject property was historically used for agricultural purposes. There is a potential that agricultural chemicals, such as pesticides, herbicides and fertilizers, were used onsite. However, the entire area of the subject property is either paved over or covered by improvements that make direct contact with any potential remaining concentrations in the soil unlikely. Furthermore, the subject property is developed and used for commercial/light industrial purposes and thus no further action related to the former agricultural use of the subject property is warranted at this time. If redevelopment of the subject property is planned for residential use, the owner/user of the report should contact the local planning department to determine whether sampling relating to the former agricultural use of the subject property is required.

Conclusions, Opinions, and Recommendations

We have performed a Phase I Environmental Site Assessment for the property located at 500-520 Mathew Street in the City of Santa Clara, Santa Clara County, California, in conformance with the scope and limitations of ASTM Standard Practice E1527-05 and the Environmental Protection Agency Standards and Practices for All Appropriate Inquiries (40 CFR Part 312). Any exceptions to, or deletions from, this practice are described in Section 1.2 of this report. This assessment has revealed no evidence of recognized environmental conditions in connection with the property. AEI recommends no further investigations for the subject property at this time.

8.0 SIGNATURE OF ENVIRONMENTAL PROFESSIONALS

By signing this report, the senior author declares that, to the best of his or her professional knowledge and belief, he or she meets the definition of *Environmental Professional* as defined in §312.10 of 40 CFR Part 312.

The senior author has the specific qualifications based on education, training, and experience to assess a property of the nature, history and setting of the subject property. The senior author has developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40CFR Part 312.

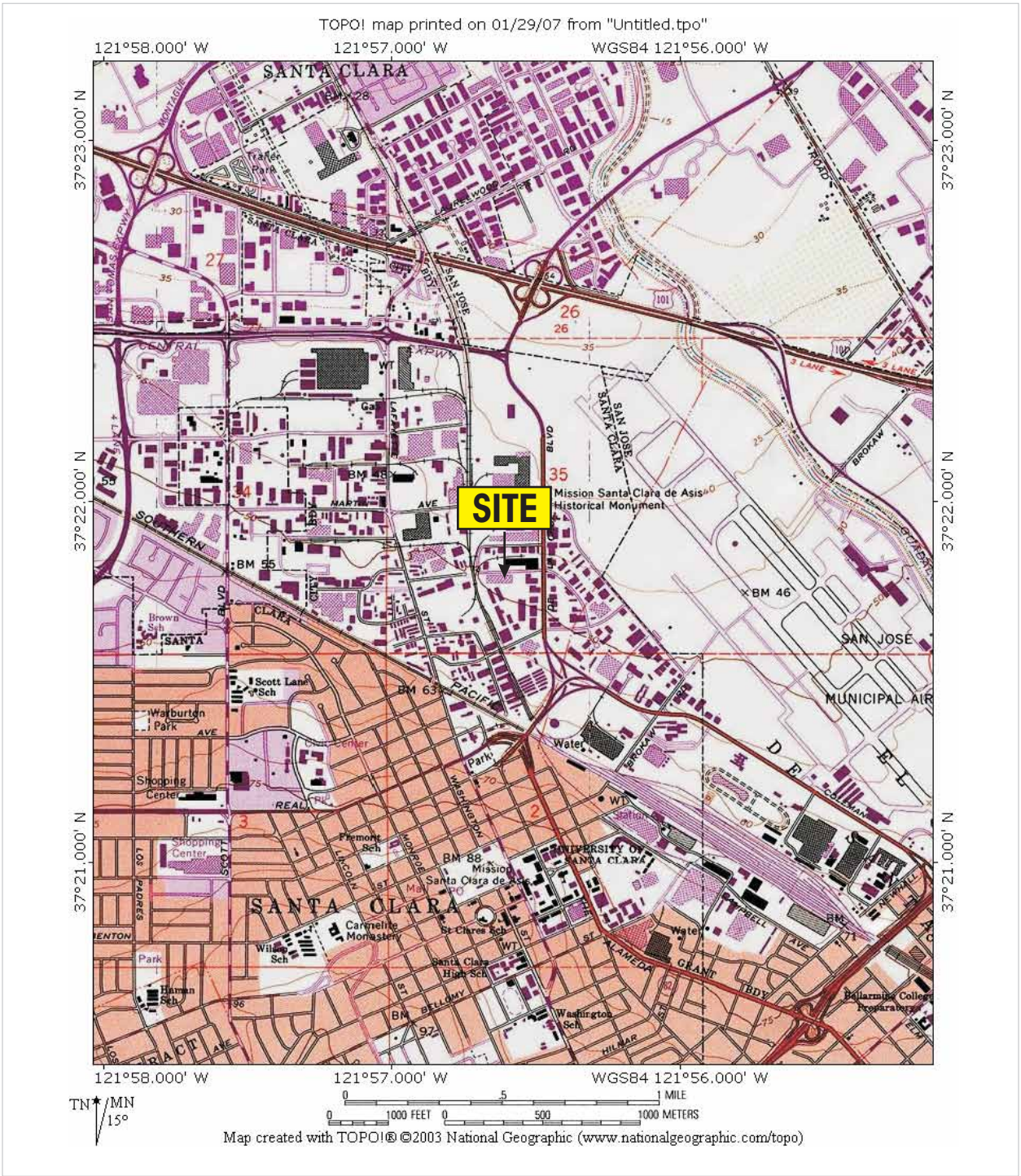
Prepared By:

Neil Yodnane
Senior Project Manager

Reviewed By:

Lynn Smith
Senior Author, REA

FIGURES



N

USGS TOPOGRAPHIC MAP
SAN JOSE WEST, CALIFORNIA
QUADRANGLE
Created 1992

SITE LOCATION MAP

500-520 Mathew Street
Santa Clara, California 95050

FIGURE 1
Job No: 272330

AEI

LEGEND

N

Subject Property Line

Aboveground Hydraulic Lift

55-Gallon Drums

SITE MAP

500-520 Mathew Street
Santa Clara, California 95050

FIGURE 2
Job No: 272330

AEI

N

SOURCE: EDR
YEAR: 1939

AERIAL PHOTOGRAPH

500-520 Mathew Street
Santa Clara, California 95050

FIGURE 3
Job No: 272330

AEI

N

SOURCE: EDR
YEAR: 1956

AERIAL PHOTOGRAPH

500-520 Mathew Street
Santa Clara, California 95050

FIGURE 3
Job No: 272330

AEI

N

SOURCE: EDR
YEAR: 1965

AERIAL PHOTOGRAPH

500-520 Mathew Street
Santa Clara, California 95050

FIGURE 3
Job No: 272330

AEI

N

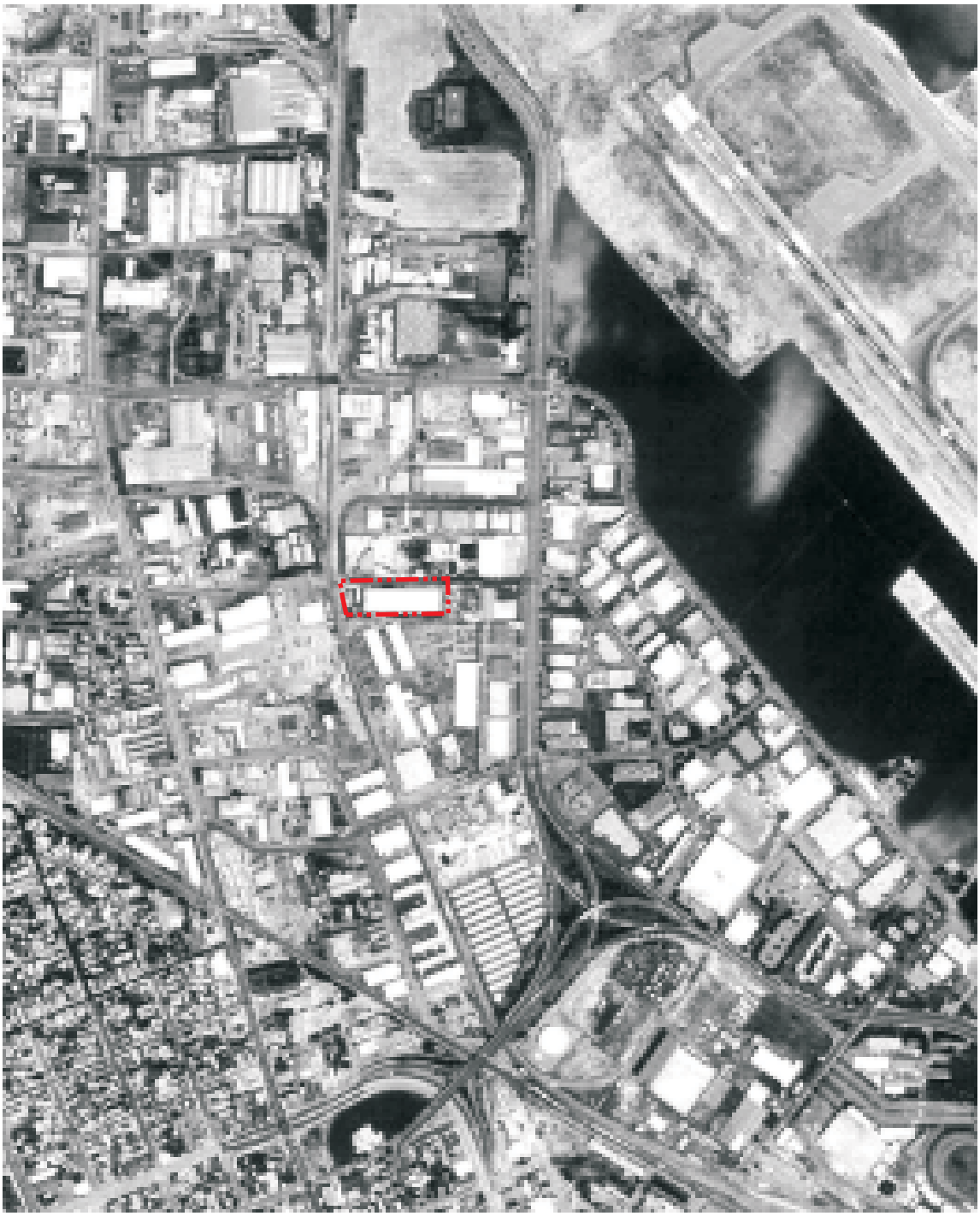
SOURCE: EDR
YEAR: 1974

AERIAL PHOTOGRAPH

500-520 Mathew Street
Santa Clara, California 95050

FIGURE 3
Job No: 272330

AEI



N

SOURCE: EDR
YEAR: 1982

AERIAL PHOTOGRAPH

500-520 Mathew Street
Santa Clara, California 95050

FIGURE 3
Job No: 272330

AEI

N

SOURCE: EDR
YEAR: 1993

AERIAL PHOTOGRAPH

500-520 Mathew Street
Santa Clara, California 95050

FIGURE 3
Job No: 272330

AEI

N

SOURCE: Google Earth
YEAR: 2005

AERIAL PHOTOGRAPH

500-520 Mathew Street
Santa Clara, California 95050

FIGURE 3
Job No: 272330

AEI

Appendix C

Phase I Environmental Site Assesssments
535 - 555 Reed Street and
500 - 520 Mathew Street
(with all appendices)

Appendix B

City of Santa Clara Notice of MND
(Feb. 6, 2008)

NOTICE

MITIGATED NEGATIVE DECLARATION

February 6, 2008

As authorized by the City Council of the City of Santa Clara as a Lead Agency, the City hereby provides a 20-day public review period and proposes to adopt a MITIGATED NEGATIVE DECLARATION of environmental impact pursuant to the California Environmental Quality Act (CEQA).

File(s):	**PLN2007-06643 (Santa Clara SC-1 Data Center)**
Project Location:	555 Reed Street, two parcels totaling 16.09 acres, fronting Reed and Mathew Streets approximately 250 feet west of de la Cruz Boulevard (APNs 230-03-075 & 080). Property is Zoned MH (Heavy Industrial).
Applicant:	CAS Architects
Owner:	Xeres Ventures, LLC
Project Description:	**Mitigated Negative Declaration**; and **Architectural Review** for a new Data Center and a customer-owned substation.

INITIAL STUDY DETERMINATION

An Initial Study was conducted by the Project Clearance Committee on November 13, 2007 and a Mitigated Negative Declaration was prepared and is available for review in the project file in the Planning Division office in the City Hall. Based upon the Initial Study, insofar as the project represents the development of a site in an urbanized area and insofar as all necessary public services are available the proposed project **WILL NOT HAVE** a significant effect on the environment **because mitigation measures can be incorporated into/added to the project by conditions of approval.**

The California Environmental Quality Act (CEQA) requires this notice to disclose whether any listed toxic sites are present. The San Francisco Regional Water Quality Control Board (RWQCB Case #43S0958) oversaw characterization and remediation measures for pentachlorophenol contamination of soil and groundwater between October 2000 and March 2006. In 2005, reported groundwater concentrations were considered stable and constrained to the site and regulatory closures was issued by the RWQCB in March 2006.

COMMENTS

The comment period for this document begins on Tuesday, February 5, 2008 and closes on Tuesday, February 26, 2008. Persons having comments concerning this project, including objections to the basis of determination set forth in the Initial Study and Mitigated Negative Declaration, are invited to furnish their comments summarizing the specific and factual basis for their comments, in writing to the City of Santa Clara Planning Department. Comments may be filed with the City in response to the preparation of this Mitigated Negative Declaration, pursuant to Section 15073 of the CEQA Guidelines. Responses received in writing on or before the date of review or verbally at the time of the review of this project will be considered along with the proposed
Mitigated Negative Declaration. This item has tentatively been set for review by the Architectural Review Committee on March 5, 2008.

The draft Mitigated Negative Declaration, Initial Study and reference documents are available for review from 8:00 a.m. to 5:00 p.m. Monday through Friday at the City of Santa Clara, Planning Division Office, 1500 Warburton Avenue, Santa Clara, CA 95050. Further details may be obtained from the Planning Department at 408/615-2450.

Lead Agency:	City of Santa Clara Planning Division
Contact:	Judith Silva, Associate Planner 1500 Warburton Avenue Santa Clara CA 95050
Phone:	408-615-2450 FAX:408-247-9857

I:\PLANNING\2008\Project Files Active\PLN2007-06643 555 Reed Street\mitiNegDecNotice 535-5555reedst.doc MAILED

Posted 2/7/08 2.7.08

County of Santa Clara
Office of the County Clerk-Recorder
Business Division

County Government Center
70 West Hedding Street, E. Wing, 1st Floor
San Jose, California 95110 (408) 299-5665

FILE PLN 2007-00643

ENVIRONMENTAL DECLARATION

For CLERK-RECORDER'S USE ONLY
POSTED ON FEB 6 2008 THROUGH FEB 26 2008
IN THE OFFICE OF THE COUNTY CLERK-RECORDER
REGINA ALCOMENDRAS, COUNTY CLERK
BY _____ DEPUTY LAURA B. AGUILAR

FOR CLERK-RECORDER FILE STAMP

ENDORSED

FEB 6 2008

REGINA ALCOMENDRAS, County Clerk-Recorder
Santa Clara County
By _____ Deputy

CLERK-RECORDER FILE NO.

CA Dept. of Fish and Game Receipt #

NAME OF LEAD AGENCY: CITY OF SANTA CLARA

NAME OF APPLICANT: CAS ARCHITECTS / XERES VENTURES

CLASSIFICATION OF ENVIRONMENTAL DOCUMENT: 535-555 REED ST

1. ( ) **NOTICE OF PREPARATION**

2. ( ) **NOTICE OF EXEMPTION**
$50.00 COUNTY CLERK FEE REQUIRED

3. **NOTICE OF DETERMINATION:**

NEGATIVE DECLARATION PURSUANT TO PUBLIC RESOURCES CODE § 21080(C)

( ) **$1926.75 REQUIRED ($1876.75 STATE FILING FEE AND $50.00 COUNTY CLERK FEE)**

( ) A COMPLETED "CEQA FILING FEE NO EFFECT DETERMINATION FORM" FROM THE DEPARTMENT OF FISH & GAME, DOCUMENTING THE DFG'S DETERMINATION THAT THE PROJECT WILL HAVE NO EFFECT ON FISH, WILDLIFE AND HABITAT, **OR** AN OFFICIAL, DATED RECEIPT / PROOF OF PAYMENT SHOWING PREVIOUS PAYMENT OF THE DFG FILING FEE FOR THE *SAME* PROJECT **IS ATTACHED:**
$50.00 COUNTY CLERK FEE REQUIRED

ENVIRONMENTAL IMPACT REPORT PURSUANT TO PUBLIC RESOURCES CODE § 21152

( ) **$2656.75 REQUIRED ($2606.75 STATE FILING FEE AND $50.00 COUNTY CLERK FEE)**

( ) A COMPLETED "CEQA FILING FEE NO EFFECT DETERMINATION FORM" FROM THE DEPARTMENT OF FISH & GAME, DOCUMENTING THE DFG'S DETERMINATION THAT THE PROJECT WILL HAVE NO EFFECT ON FISH, WILDLIFE AND HABITAT, **OR** AN OFFICIAL, DATED RECEIPT / PROOF OF PAYMENT SHOWING PREVIOUS PAYMENT OF THE DFG FILING FEE FOR THE *SAME* PROJECT **IS ATTACHED:**
$50.00 COUNTY CLERK FEE REQUIRED

NOTE: "*SAME PROJECT*" MEANS NO CHANGES. IF THE DOCUMENT SUBMITTED IS NOT THE SAME (OTHER THAN DATES), A "NO EFFECT DETERMINATION" LETTER FROM THE FISH AND GAME FOR THE **SUBSEQUENT** FILING OR THE APPROPRIATE FEES ARE REQUIRED.

(4.) Other: Notice of Availability

". . . NO PROJECT SHALL BE OPERATIVE, VESTED, OR FINAL, NOR SHALL LOCAL GOVERNMENT PERMITS FOR THE PROJECT BE VALID, UNTIL THE FILING FEES REQUIRED PURSUANT TO THIS SECTION ARE PAID."
FISH & GAME CODE SECTION 711.4(C)(3)

NOTICE TO BE POSTED FOR 20 **DAYS.**

THIS FORM MUST BE COMPLETED AND ATTACHED TO THE FRONT OF ALL ENVIRONMENTAL DOCUMENTS LISTED ABOVE (*INCLUDING COPIES*) SUBMITTED FOR FILING.
CHECKS SHOULD BE MADE PAYABLE TO : SANTA CLARA COUNTY CLERK-RECORDER.

Board of Supervisors: Donald F. Gage, Blanca Alvarado, Pete McHugh, Ken Yeager, Liz Kniss
County Executive: Peter Kutras, Jr.
01-01-2008

Appendix C

City of Santa Clara Adoption of MND and MMRP
(Mar. 5, 2008)

FILE COPY

development, and will not be materially detrimental to the public welfare or injurious to property or improvements in said neighborhood.

(5) That the proposed development, as set forth in the plans and drawings, are consistent with the set of more detailed policies and criteria for architectural review as approved and updated from time to time by the City Council, which set shall be maintained in the Planning Division office. The policies and criteria so approved shall be fully effective and operative to the same extent as if written into and made a part of this ordinance.

The Architectural Committee may require the applicant or owner of any such proposed development, as a condition to the approval of any such proposal, to modify buildings, parking areas, landscaping, signs, and other facilities and improvements as the Architectural Committee deems necessary to secure the purposes of this ordinance and General Plan of the City, and may require guarantees and evidence that such conditions will be complied with by the applicant. If the Architectural Committee is unable to make the findings and determinations prerequisite to the granting of architectural approval pursuant to the standards described above, the application shall be denied.

NEW/ CONTINUED ITEMS

1. File: **PLN2007-06643**
   Location: 535-555 Reed Street, two parcels totaling 16.09 acres, fronting Reed and Mathew Streets, approximately 250 feet west of de la Cruz Boulevard (APN 230-03-075 & 080). Properties are Zoned MH (Heavy Industrial).
   Applicant: CAS Architects
   Owner: Xeres Ventures, LLC
   Request: **Adoption of Mitigated Negative Declaration**; and **Architectural Review** for a new Data Center and a customer-owned substation

Judith Silva, Project Manager, addressed those present. She noted this item had been before the Architectural Committee on November 7, 2007 and reviewed directions of the Committee. She noted the Committee was being requested to adopt the Mitigated Negative Declaration, Mitigation Monitoring and Reporting Program and perform Architectural Review on the project. She noted no significant impacts had been identified and that there are no Planning Commission items, i.e. rezoning, use permit or variances required for the project.

Ron Ronconi, AIA then reviewed the request, noting the entire project will be designed with intent to achieve LEED Silver rating upon completion of construction. Mr. Ronconi stated that since the preliminary review in November there had been minor changes and reviewed architectural details and screening of the mechanical equipment. Hasmekh Patel of DVA Architects presented photographs and plans of the three other data centers constructed in various regions of the country. Commissioner Marine stated he had reviewed all documents and was comfortable with the proposal.

It was moved by Commissioner Marine, seconded by Commissioner Stattenfield and carried to **Adopt the Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program** for the proposed data center at 535-555 Reed Street. It was further moved by Commissioner Marine and seconded by Commissioner Stattenfield to **approve the architecture review of the project**.

Mr. Chen stated that staff will work on detailed landscaping items with the applicants.

2. File: **PLN2004-04467**
   Location: 45 Cabot Avenue, a 0.65-acre lot on the east side of Cabot Avenue approximately 130 feet north of Stevens Creek Boulevard (APN: 296-17-002). Property is Zoned PD (Planned Development).
   Applicant: RPS Properties
   Owner: RPS Properties
   Request: Alterations to floor plan and exterior elevations of previously approved PD

Appendix D

BAAQMD Authority to Construct for Permit Application No. 17020, Plant No. 18801 (July 15, 2010)

BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT
SINCE 1955

July 15, 2010

Xeres Ventures LLC
1212 New York Ave, Suite 900
Washington, DC 20005

Attention: Hossein Fateh

Authority to Construct for Permit Application No. 17020, Plant No. 18801

Required Action

Your Authority to Construct is enclosed. This Authority to Construct is not a Permit to Operate. **To receive your Permit to Operate you must:**

1. Complete the Start-up Notification portion of the Authority to Construct.
2. Send the Start-up Notification to the assigned Permit Engineer via e-mail, fax or mail **at least seven days** prior to operating your equipment.

Note: Operation of equipment without sending the Start-up Notification to the District may result in enforcement action.

Authorization of Limited Use

The Authority to Construct authorizes operation during the start-up period from the date of initial operation indicated in your Start-up Notification until the Permit to Operate is issued, up to a maximum of 90 days. All conditions (specific or implied) included in this Authority to Construct will be in effect during the start-up period.

Contact Information

If you have any questions, please contact your assigned Permit Engineer:

Tamiko D Endow, Air Quality Engineer II

Tel: (415) 749-4939 **Fax:** (415) 749-4949 **Email:** tendow@baaqmd.gov

---

Xeres Ventures LLC, P#18801
Permit Application #17020
Permit Conditions for Sources
S-1 through S-32, Emergency Diesel-fired Internal Combustion Engine Generators, Model Year 2010 Detroit Diesel MTU 16V4000G83, 3353 bhp, each;
Each abated by a Selective Catalytic Reduction System (A-1 through A-32)

1. The owner/operator shall operate each engine only for the following purposes:
   a. To mitigate emergency conditions,
   b. For emission testing to demonstrate compliance with a District, State or Federal emission limit,
   c. For initial startup testing/commissioning, or
   d. For reliability-related activities (maintenance and other testing, but excluding initial startup testing/commissioning and emission testing).

   Operating while mitigating emergency conditions or while emission testing to show compliance with District, State or Federal emission limits is not limited.

[Basis: Stationary Diesel Engine ATCM 17 Cal. Code of Regs. ("CCR") Section 93115.6(a)(3)(A)(1)(c) (2010)]

2. The owner/operator shall ensure that each engine is operated for no more than 50 hours for reliability-related activities in any consecutive 12-month period.

[Basis: District Regulation 9, Rule 8, Section 330; Stationary Diesel Engine ATCM 17 CCR Section 93115.6(a)(3)(A)(1)(c)]

3. The owner/operator shall further limit the hours of reliability-related operation of each engine so that the combined reliability-related operation for all 32 engines does not exceed 700 hours in any consecutive 12-month period and that the combined operating hours are limited to the following times:
   a. From 12am up to 8am: 300 hours
   b. From 8am to up to 4pm: 200 hours
   c. From 4pm to up to 12am: 200 hours

[Basis: Cumulative Increase; District Regulation 2, Rule 5]

4. The owner/operator shall ensure that no more than 16 engines are operated at one time for initial startup testing/commissioning purposes. The owner/operator shall also ensure that combined operation for initial startup testing/commissioning does not exceed 800 hours for each set of 16 engines (S-1 through S-16 and S-17 through S-32), unless a different limit is approved by the APCO.

[Basis: Stationary Diesel Engine ATCM 17 CCR Section 93115.6(a)(3)(C)(3)]

5. The owner/operator shall ensure that only one engine is operated at a time for emission testing and for reliability-related activities and shall ensure that the Load Bank is used for start-ups of these activities if they will last longer than 30 minutes and require a load of 50% or more.
[Basis: State AAQS 17 CCR Section 70200]

6. The owner/operator shall operate each engine only when a non-resettable totalizing meter (with a minimum display capability of 9,999 hours) that measures and records the hours of operation for the engine is installed, operated and properly maintained.
[Basis: District Regulation 2, Rule 5; District Regulation 9, Rule 8, Section 530; Stationary Diesel Engine ATCM 17 CCR Section 93115.10(e)(1); 40 Code of Fed. Regs. ("CFR") Section 60.4209 (2010)]

7. The owner/operator shall ensure that the emissions of nitrogen oxides (NOx) from each engine is abated through a properly operated and properly maintained Selective Catalytic Reduction (SCR) System whenever fuel is combusted at each source and the SCR catalyst bed has reached minimum operating temperature.
[Basis: Cumulative Increase; District Regulation 2, Rule 1, Section 403; State AAQS 17 CCR Section 70200]

8. When abatement of an engine by the SCR System is required by Part 7 above, the owner/operator shall ensure that the SCR System reduces NOx emissions (calculated as NO2) from the engine to no more than 46 ppmv, on a dry basis, corrected to 15% oxygen, as determined through Source Test Method ST-13 or alternate source test method approved by the District's Source Test Section.
[Basis: Cumulative Increase; District Regulation 2, Rule 1, Section 403; State AAQS 17 CCR Section 70200]

9. The owner/operator shall ensure that only CARB diesel fuel with a sulfur content not exceeding 0.0015% by weight (15 ppmw) and aromatic hydrocarbon content not exceeding 10% by volume is used at S-1 through S-32
[Basis: Stationary Diesel Engine ATCM 17 CCR Section 93115.5(b)(1)]

10. The owner/operator shall operate and maintain the engine-generators, S-1 through S-32, and associated SCR systems in accordance with the manufacturers' written instructions.
[Basis: 40 CFR Section 60.4211]

11. Notwithstanding Part 1, for the purpose of limiting the potential to emit of this facility, the owner/operator shall ensure that the emissions from emergency and all other use of the engines does not result in NOx emissions exceeding 93.5 tons per year. Compliance with this limit shall be tracked by ensuring that total combined operation of all engines at this facility does not exceed 8,000 hours in any consecutive 12-month period, including operation under emergency conditions and all other conditions. If the total operating hours for all of the engines at this site exceeds 8,000 hours in any consecutive 12-month period, the owner/operator must either submit a demonstration that the facility has not exceeded the major source thresholds or submit an application for a Major Facility Review Permit, in accordance with Regulation 2, Rule 6 and comply with the application requirements of 40 CFR Part 52.

[Basis: Regulation 2, Rule 6; 40 CFR Part 52]

12. Records: The owner/operator shall maintain the following records in a District-approved log:
    a. For operation of the engines: The date, source number, operation start and end times, whether the load bank was used, the load or load range, a description of the operation as listed in (i) through (v) below, and the name of the operator entering the log entry:
        i. emergency operation - and the nature of each emergency condition;
        ii. required emission testing - and citation of the applicable District, State or Federal regulation;
        iii. initial start-up/commissioning;
        iv. reliability-related activities; or
        v. other operation - and a description of why operation was necessary.
    b. Fuel usage for each engine and fuel purchase records, showing sulfur content.
    c. Maintenance records for the engines and SCR systems, including records of catalyst changes.
    d. At the end of the month, the hours operation in a(i) through a(v) above shall be totaled for each engine and summed with the previous 11 months of data to calculate the most recent 12-month sum.
    e. At the end of the month, the hours of operation for reliability-related activities (a(iv) above) for all engines at the facility shall be totaled for each of the time periods described in Part 3 and summed with the previous 11 months of data to calculate the most recent 12-month sums.
    f. The hours of operation for initial start-up/commissioning (a(iii) above) shall be totaled for

S-1 through S-16 and S-17 through S-32.

g. The total hours of operation for emergency (a(i) above) and all other purposes shall be totaled for all engines at the end of the month and summed with the previous 11 months of data to calculate the most recent 12-month sum.

h. The fuel usage in b above shall be totaled at the end of each month for the previous 12-month period.

Log entries shall be retained on-site, either at a central location or at the engine location, for at least 60 months from the date of entry and be made immediately available to the District staff upon request.

[Basis: Cumulative Increase; District Regulation 2, Rule 5; District Regulation 2, Rule 6; District Regulation 9, Rule 8; Stationary Diesel Engine ATCM 17 CCR Section 93115.10(g); 40 CFR Part 52; 40 CFR Section 60.4209]

13. A Permit to Operate shall not be issued for, and the owner/operator shall not operate, Source S-17 through S-32 for any reason whatsoever until the California Energy Commission (CEC) has granted a small power plant exemption relating to the DuPont Fabros Data Center per Section 25541 of the California Public Resources Code, approved an application for certification relating to the DuPont Fabros Data Center per Chapter 6 of Division 15 of the California Public Resources Code, or it has otherwise been determined that Sources S-1 through S-32 are not subject to the provisions of Chapter 6 of Division 15 of the California Public Resources Code.

[Basis: District Regulation 2, Rule 1, Section 403]

14. The owner/operator shall conduct a District-approved start-up source test on each engine to demonstrate compliance with the NOx limit in Part 8 of this condition, no later than 120 days from initial start-up. The owner/operator shall conduct additional District-approved source tests to demonstrate compliance with the NOx limit in Part 8 of this condition no later than 60 days after each catalyst change. The owner/operator shall submit the source test results to the District's Source Test staff no later than 30 days after the source test has been performed.

[Basis: Cumulative Increase; District Regulation 2, Rule 1, Section 403; State AAQS 17 CCR Section 70200]

15. For the source test performed on the first engine, the owner/operator shall determine the time at which the SCR System becomes operational for an engine operated at 50% load, without use of the Load Bank to preheat the SCR System catalyst, and shall measure the abated NOx emissions at 50% load. The owner/operator shall submit the test results to the District's Source Test and

Engineering staff no later than 30 days after the source test has been performed. If operation of the engine at 50% load, without the Load Bank to preheat the SCR System catalyst, requires longer than 1 hour to reach the minimum exhaust temperature necessary for operation of the SCR System, the owner/operator shall submit revised NO2 modeling to demonstrate that the actual time necessary to reach the minimum catalyst temperature will not change the project's compliance with the state 1-hour NO2 standard.

[Basis: District Regulation 2, Rule 1, Section 403; State AAQS 17 CCR Section 70200]

16. The owner/operator shall obtain approval of all source test procedures from the District's Source Test Section prior to conducting any tests. The owner/operator shall comply with all applicable testing requirements as specified in Volume V of the District's Manual of Procedures. The owner/operator shall notify the District's Source Test Section, in writing, of the source test protocols at least 14 days prior to testing and of the projected test dates at least 7 days prior to testing.

[Basis: District Regulation 2, Rule 1, Section 403]

End of Conditions

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-1 Diesel-Fired Emergency Engine Generator 1A

Emergency IC Engine, Model Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-1 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-1
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-2 Diesel-Fired Emergency Engine Generator 1B

Emergency IC Engine, Model Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-2 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-2
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-3 Diesel-Fired Emergency Generator 2A

Emergency IC Engine, Model Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-3 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-3
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-4 Diesel-Fired Emergency Engine Generator 2B

Emergency IC Engine, Model Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-4 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-4
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-5 Diesel-Fired Emergency Engine Generator 3A

Emergency IC Engine, Model Year 2010; Detroit Diesel MTU 16V4000G83, 3353 bhp

abated by

A-5 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-5
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-6 Diesel-Fired Emergency Engine Generator 3B

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-6 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-6
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-7 Diesel-Fired Emergency Engine Generator 4A

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-7 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-7
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-8 Diesel-Fired Emergency Engine Generator 4B

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-8 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-8
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-9 Diesel-Fired Emergency Generator 5A

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-9 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-9
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-10 Diesed-Fired Emergency Engine Generator 5B

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-10 Selective Catalytic Reduction, Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-10
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-11 Diesel-Fired Emergency Engine Generator 6A

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-11 Selective Catalytic Reduction, (SCR) Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-11
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-12 Diesel-Fired Emergency Engine Generator 6B

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-12 Selective Catalytic Reduction (SCR), Steuler SCR Ssytem

Equipment above is subject to attached condition no. 24670.

Approved by

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-12
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-13 Diesel-Fired Emergency Engine Generator 7A

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-13 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Issue date: July 14, 2010
Expiration date: July 13, 2012

Approved by
for
JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-13
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-14 Diesel-Fired Emergency Engine Generator 7B

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-14 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-14
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-15 Diesel-Fired Emergency EngineGenerator 8A

Emergency IC Engine, Make Year; 2010 Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-15 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Issue date: July 14, 2010
Expiration date: July 13, 2012

Approved by Scott Lutz
for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-15
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-16 Diesel-Fired Emergency Engine Generator 8B

Emergency IC Engine, Make Year; 2010 Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-16 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-16
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-17 Diesel-Fired Emergency Engine Generator 9A

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-17 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Issue date: July 14, 2010
Expiration date: July 13, 2012

Approved by
for

JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-17
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-18 Diesel-Fired Emergency Engine Generator 9B

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-18 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-18
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-19 Diesel-Fired Emergency Engine Generator 10A

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-19 Selective Catalytic Reduction (SCR), Steuler SCR Sysem

Equipment above is subject to attached condition no. 24670.

Approved by

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-19
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-20 Diesel-Fired Emergency Engine Generator 10B

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-20 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-20
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050

is hereby granted an *Authority to Construct* for the following equipment:

S-21 Diesel-Fired Emergency Engine Generator 11A

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-21 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Issue date: July 14, 2010
Expiration date: July 13, 2012

Approved by
for

JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-21
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-22 Diesel-Fired Emergency Engine Generator 11B

Emergency IC Engine, Make Year 2010; Detroit Diesel, MTU16V4000G83, 3353 bhp

abated by

A-22 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-22
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-23 Diesel-Fired Emergency Engine Generator 12A

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-23 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Issue date: July 14, 2010
Expiration date: July 13, 2012

Approved by *for*

JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-23
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050

is hereby granted an *Authority to Construct* for the following equipment:

S-24 Diesel-Fired Emergency Engine Generator 12B

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-24 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Issue date: July 14, 2010
Expiration date: July 13, 2012

Approved by
for

JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-24
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050

is hereby granted an *Authority to Construct* for the following equipment:

S-25 Diesel-Fired Emergency Engine Generator 13A

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-25 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Issue date: July 14, 2010
Expiration date: July 13, 2012

Approved by

for

JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-25
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-26 Diesel-Fired Emergency Engine Generator 13B

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-26 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-26
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-27 Diesel-Fired Emergency Engine Generator 14A

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-27 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-27
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-28 Diesel-Fired Emergency Engine Generator 14B

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-28 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-28
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-29 Diesel-Fired Emergency Engine Generator 15A

Emergency IC Engine, Model Year 2010; Detroit Diesel MTU164V000G83, 3353 bhp

abated by

A-29 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-29
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-30 Diesel-Fired Emergency Engine Generator 15B

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-30 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Seth Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-30
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-31 Diesel-Fired Emergency Engine Generator 16A

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU16V4000G83, 3353 bhp

abated by

A-31 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-31
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 18801
Application No. 17020

Xeres Ventures LLC

535 Reed Street, Santa Clara, CA 95050
is hereby granted an *Authority to Construct* for the following equipment:

S-32 Diesel-Fired Emergency Engine Generator 16B

Emergency IC Engine, Make Year 2010; Detroit Diesel MTU164V000G83, 3353 bhp

abated by

A-32 Selective Catalytic Reduction (SCR), Steuler SCR System

Equipment above is subject to attached condition no. 24670.

Approved by Scott Lutz

for JACK P. BROADBENT
EXECUTIVE OFFICER / APCO

Issue date: July 14, 2010
Expiration date: July 13, 2012

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Tamiko D Endow, Air Quality Engineer II
Tel: (415) 749-4939 **Fax:** (415) 749-4949
Email: tendow@baaqmd.gov

Plant No. 18801
Source No. S-32
Application No. 17020

The initial operation of this equipment is scheduled for _____ (month/day/year)

Print your first and last name _____

Telephone No. _____

Appendix E

BAAQMD Authority Addendum to MND
(June 15, 2010)

ADDENDUM TO MITIGATED NEGATIVE DECLARATION
Santa Clara SC-1 Data Center Project (Xeres Ventures, LLC)
June 15, 2010

Xeres Ventures, LLC ("Applicant") has proposed constructing a new data center at 535-555 Reed Street, Santa Clara, California ("project"). The City of Santa Clara ("City") is the Lead Agency for this project for purposes of the California Environmental Quality Act ("CEQA"). On March 5, 2008, the City's Architectural Committee adopted a Mitigated Negative Declaration for the project.
This Addendum identifies minor changes to the project that were made by the Applicant after the adoption of the Mitigated Negative Declaration.

Background: In preparing its Initial Study and Mitigated Negative Declaration the City evaluated the impacts of constructing a data center which would include the following stationary sources: 32 low usage diesel-fired internal combustion engines ("engine-generators"), 3,848 bhp each, with projected non-emergency use of 100 hours per year per engine-generator; 4 natural gas-fired boilers, 1.44 MMBtu/hr each; 2 cooling towers; and 4 underground diesel fuel storage tanks, 50,000 gallons each.

The Bay Area Air Quality Management District ("District") is the agency primarily responsible for assuring that federal and state ambient air quality standards are attained and maintained in the San Francisco Bay Area. The District has discretionary permitting authority over the stationary sources identified above and therefore is a Responsible Agency for the project under CEQA.

In evaluating the project, District Staff determined that the project as originally proposed would not meet all District rules and regulations. Accordingly, the Applicant has agreed to modify the project in the ways listed below (see "Project Modifications").

The District finds that the project, as modified, complies with all District, state and federal air quality rules and regulations. The District also finds that the modifications would not result in significant environmental effects or otherwise require the preparation of a subsequent EIR or negative declaration under Section 15162 of the CEQA guidelines (14 Cal. Code Regs. ("CCR") §§ 15000-15387 (2010)). Because minor changes must be made to the Mitigated Negative Declaration, however, to reflect the Applicant's modification of the project after the Initial Study and Mitigated Negative Declaration were prepared, the District has prepared this Addendum to the Mitigated Negative Declaration pursuant to Section 15164 of the CEQA guidelines.

Project Modifications: The changes to the original project, which were not analyzed in the Mitigated Negative Declaration adopted by the City on March 5, 2008, are as follows:

1. The 32 engine-generators are 3,353 bhp each rather than 3,848 bhp each;
2. Additional limitations shall be imposed on the 32 engine-generators:
   a. Their projected hours of non-emergency operation have been reduced from 100 hours per year per engine-generator to 50 hours per year per engine-generator;
   b. Their combined hours of operation for reliability-related operations shall not exceed the following limits per year:
      i. From 12am up to 8am: 300 hours;
      ii. From 8am to up to 4pm: 200 hours;
      iii. From 4pm to up to 12am: 200 hours; and
   c. Their projected hours for initial startup testing/commissioning have been limited to 50 hours per engine, unless a different limit is approved by the Air Pollution Control Officer (APCO); and
3. The 4 natural gas-fired boilers are 1.75MMBtu/hr each, rather than 1.44 MMBtu/hr each.

Discussion: District Regulation 2, Rule 1, Section 310 specifies that all proposed new and modified sources subject to District permit requirements must be reviewed in accordance with CEQA requirements, except in limited cases that are not applicable here (ministerial projects or projects exempt from CEQA under Section 2-1-312). As mentioned above, as the Lead Agency for this project under CEQA, the City prepared the Initial Study and Mitigated Negative Declaration for this project.

In adopting the Initial Study and Negative Declaration, the City found that the project, including proposed operation of the 32 engine-generators, would not result in any significant air quality impacts and that the engine-generators would be operated in compliance with all District requirements. One of these requirements is the District's "project risk" limit in District Regulation 2-5-302.1, which provides that no new or modified source of toxic air contaminants ("TACs") shall be issued a District Authority to Construct or Permit to Operate if the project risk, as estimated upon completion of a health risk screening analysis, is more than 10 in one million (10^{-5}). The engine-generators are sources of TACs in the form of diesel particulate emissions. The City based its evaluation on the Applicant's original project proposal, which included 100 hours per year of non-emergency operation of each engine-generator and no abatement of the engine-generators' diesel particulate emissions.

However, the City did not include a health risk screening analysis or any other technical analysis to support its finding that the original project proposal would comply with the District's project risk limit. The District's analysis, supported by health risk screening analyses, demonstrates that the original project proposal would result in a project cancer risk greater than 10 in one million, and therefore, could not be approved under District Regulation 2-5-302.1.

As a result, the Applicant has modified the project by: (1) reducing the proposed non-emergency use of the 32 engine-generators from 100 hours per year per engine-generator to 50 hours per year per engine-generator; (2) limiting the combined total of proposed hours of reliability-related operations for the 32 engine-generators that will be performed in any year during the 8-hour periods 12am to 8am, 8am to 4pm, or 4pm to 12am; and (3) limiting the proposed hours for initial startup testing/commissioning to 50 hours per engine, unless a different limit is approved by the APCO.

Further health risk screening analysis by the District demonstrates that the project, so modified, will not result in an estimated health risk that exceeds the District's project risk limit.

In addition, the Applicant has modified the project to include 4 natural gas-fired boilers that are 1.75 MMBtu/hr each, rather than 1.44 MMBtu/hr each. Also, the 32 engine-generators are 3,353 bhp each, rather than 3,848 bhp each.
The District has included these modifications in its evaluation and finds that the air quality impacts associated with this project will not be significant.

Additional Discussion Regarding NO_2: Under CEQA, the lead agency shall prepare an environmental impact report ("EIR") where substantial evidence supports a fair argument that emissions from a project may have a significant environmental impact. Cal. Pub. Res. Code §§21100, 21151, 21080, 21082.2(d); 14 CCR 15002(f)(1) & (2), 15063; *Laurel Heights Improvement Ass'n v. Regents of the Univ. of Calif.*, 6 Cal. 4th 1112, 1123 (1993). The word "may" connotes a "reasonable possibility" of a significant impact. *No Oil, Inc. v. Los Angeles*, 13 Cal. 3d 68, 83 n. 16 (1974).

Under the state CEQA Guidelines, Appendix G, a lead agency's inquiry into whether a project's air quality impacts may be significant should include an inquiry into whether the project would "violate any air quality standard[.]" With respect to nitrogen dioxide (NO_2), federal 1-hour and annual and state 1-hour ambient air quality standards apply.

In adopting the Initial Study and Negative Declaration, the City found that the projected NO_2 emissions from the project as originally proposed, including proposed operation of the 32 engine-generators, would not result in significant long-term air quality impacts because emissions would not exceed the District significance threshold for NO_2 of 15 tons per year. An attached modeling report compared projected worst-case annual average NO_2 emissions (2.5 $\mu g/m^3$) with the annual national ambient air quality standard ("NAAQS") for NO_2 (100 $\mu g/m^3$) and found that the annual federal standard (NAAQS) would not be exceeded.

The Initial Study, however, did not analyze whether projected emissions would exceed the state 1-hour NO_2 ambient air quality standard ("AAQS"). The Initial Study also did not discuss potential violations of the federal 1-hour NAAQS, which did not become effective until April 12, 2010, after the City had adopted the Initial Study and Negative Declaration.

Under the state CEQA Guidelines, California Code of Regulations, title 14, section 15052(a)(3), the District, as a responsible agency, shall assume the role of the Lead Agency when "[t]he Lead Agency prepared inadequate environmental documents without consulting with the Responsible Agency as required by Sections 15072 or 15082 [of the state CEQA Guidelines], and the statute of limitations has expired for a challenge to the action of the appropriate Lead Agency." Here, the District was not alerted to the City's Initial Study and was not consulted by the City prior to the City's adoption of the Mitigated Negative Declaration, and the 30-day statute of limitations for challenging the City's 2008 Mitigated Negative Declaration has long since expired. To determine whether the Mitigated Negative Declaration was "inadequate" and whether the District should assume the role of Lead Agency to issue an EIR to address potentially significant NO2 impacts, the District requested the Applicant to conduct further modeling of NO2 emissions against the state 1-hour NO2 AAQS and new federal 1-hour NAAQS.

The results from the further modeling demonstrate that the project is extremely unlikely to result in a violation of the state 1-hour AAQS for NO_2 (338 $\mu g/m^3$). The modeling shows at most a 25 in a million (0.0025%) chance of an exceedance, and further, that if such an exceedance were to occur, it would result in at most a 30% exceedance over the numerical standard for a period less than 1 hour in total duration. The modeling also shows that the project will not result in a violation of the new federal 1-hour NO_2 NAAQS (188 $\mu g/m^3$, based on the 3-year average of the 98th percentile or 8th highest 1-hour NO2 concentrations in any year).

These results do not establish a "reasonable possibility" of a significant environmental impact from NO2 emissions. *See No Oil, Inc.*, 13 Cal. 3d at 83 n. 16. The District has concluded, therefore, that no EIR is necessary to further examine NO2 emissions under 14 CCR section 15052(a)(3).

Appendix F

Letter from Arlene L. Ichien & Melissa Jones to Mr. W. Tate Cantrell, Jr. (Apr. 21, 2008)

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512
www.energy.ca.gov

April 21, 2008

Mr. W. Tate Cantrell, Jr.
Vice President, Data Center Technologies
DuPont Fabros Technology, Inc.
1212 New York Avenue, NW
Suite 900
Washington, DC 20005

RE: Diesel Backup Generators (Xeres Permit S-1 through S-32)

Dear Mr. Cantrell:

The California Energy Commission has received information regarding 32 low-use diesel backup generators that we understand Xeres Ventures, LLC, plans to install to support a data center at 535 Reed Street in Santa Clara, California. We also understand each backup generator has a rated capacity of 2.87 megawatts, which would make the total generating capacity at the site be 91.8 megawatts. We also understand Xeres is seeking a permit from the Bay Area Air Quality Management District, as well as a use permit from the City of Santa Clara.

The purpose of this letter is to inform you that the Energy Commission has permitting jurisdiction over the 32 diesel generators. As a general matter, the Energy Commission has jurisdiction over any site for a thermal power plant with a generating capacity of 50 megawatts or more. (Pub. Resources Code §§ 25110, 25120, 25500.) Here, the 32 generators, each to use diesel as a source of thermal energy to generate electricity, constitute a thermal power plant with more than 50 megawatts in generating capacity.

The aggregation of all 32 generators is based on their common location for a computer server campus and their common purpose to provide power conditioning and backup power to the data center that is also planned for the site. The issue of whether to aggregate the backup generators and view them as a thermal power plant under the Energy Commission's jurisdiction is one we have dealt with on more than one occasion. In all these cases, including a few in which the power plants were to be located a mile or more apart and two others which also involved diesel backup generators for a data center, the Energy Commission's Chief Counsel concluded the Commission has jurisdiction based on aggregating the proposed power plants, including backup diesel generators.

The factors supporting aggregation include such matters as the separate generating units: (a) being served by common structures, for example, a common control room or a common gas line, (b) if lacking a common control room, nevertheless being triggered to operate by the same event , for example, grid failure, (c) being under common ownership or subject to a common permit to operate, (d) being proposed as part of a foreseeable plan of development and, thus, constituting a "project" under the California Environmental Quality Act for purposes of environmental review by the permitting agency, and (e) being installed to serve a common industrial or commercial host.

Here, the generators will be located on one site proposed for the development of a data center. The generators are considered by the Air District to be components of a single project. The generators have the common purpose of serving as power conditioning and backup generators for a computer server campus being developed by a single project proponent. Their operation is likely to be triggered by the same event, for example, lightning storms or grid failure. Moreover, the potential for the generators to operate simultaneously should be analyzed in a comprehensive environmental document in accordance with the California Environmental Quality Act. Such analysis would identify the project's emissions, assess their impacts, identify feasible mitigation, and assess the potential health risks from this concentration of diesel engines.

For all these reasons, we believe the Energy Commission has permitting authority over the 32 generators, regardless of whether the power will be sold to the grid or used exclusively on-site. Thus, to receive a valid permit for the 32 diesel generators, Xeres must file with the Energy Commission either an application for a small power plant exemption (for a thermal power plant of 50 to 100 megawatts) or an application for certification. We believe an application for certification would be most appropriate, given the potential for adverse impacts from the use of diesel fuel in as many as 32 generators operating at one time.

In either case, the Energy Commission, as a matter of statute, serves as lead agency under the California Environmental Quality Act. As lead agency, it is responsible for preparing the appropriate environmental document for public review and consideration in deciding whether to approve the application. In the case of a small power plant exemption, the project is exempted from the Commission's jurisdiction and permitted at the local level. In the case of an application for certification, the project is permitted by the Energy Commission. During the certification process, the Commission and its staff work with the Air District, which is required under the Commission's regulations to issue a determination of compliance with the District's rules. The conditions of the District's determination, provided within the timeline of the Commission's proceeding, are incorporated into and become enforceable through the Commission's final decision.

If Xeres wishes to claim otherwise about the Commission's jurisdiction, or seek a formal opinion from the Energy Commission, you may file a request for a jurisdictional determination under the Commission's regulations, specifically, section 1230 et seq. in Title 20 of the California Code of Regulations.

In any event, the staff of the Energy Commission is interested in working with you, DuPont Fabros Technology, Inc., and Xeres in a productive manner. Please do not hesitate to contact Arlene Ichien at (916) 654-3959 or by e-mail at aichien@energy.state.ca.us if you have any questions whatsoever.

Sincerely,

ARLENE L. ICHIEN
Assistant Chief Counsel

MELISSA JONES
Executive Director

cc: Michael J Tollstrup, Air Resources Board
Tamiko Endow, Bay Area Air Quality Management District
Gerardo Rios, US Environmental Protection Agency
Terrance O'Brien, California Energy Commission

Appendix G

EPA Memorandum re: Guidance Concerning the Implementation of the I-hour N02 NAAQS (June 29, 2010)

Further clarification of this guidance and application of Appendix W for the 1-hour NO2 standard was published March 1, 2011 and is available in the Region 7 NSR Policy & Guidance database.

http://www.epa.gov/region07/air/nsr/nsrmemos/appwno2_2.pdf

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

JUN 29 2010

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

MEMORANDUM

SUBJECT: Guidance Concerning the Implementation of the 1-hour NO_2 NAAQS for the Prevention of Significant Deterioration Program

FROM: Stephen D. Page, Director
Office of Air Quality Planning and Standards

TO: Regional Air Division Directors

On January 22, 2010, the Environmental Protection Agency (EPA) announced a new 1-hour nitrogen dioxide (NO_2) National Ambient Air Quality Standard (hereinafter, either the 1-hour NO_2 NAAQS or 1-hour NO_2 standard) of 100 parts per billion (ppb), which is attained when the 3-year average of the 98th-percentile of the annual distribution of daily maximum 1-hour concentrations does not exceed 100 ppb at each monitor within an area. EPA revised the primary NO_2 NAAQS to provide the requisite protection of public health. The final rule for the new 1-hour NO_2 NAAQS was published in the Federal Register on February 9, 2010 (75 FR 6474), and the standard became effective on April 12, 2010. EPA policy provides that any federal Prevention of Significant Deterioration (PSD) permit issued under 40 CFR 52.21 on or after that effective date must contain a demonstration of source compliance with the new 1-hour NO_2 standard.

EPA is aware of reports from stakeholders indicating that some sources—both existing and proposed—are modeling potential violations of the 1-hour NO_2 standard. In many cases, the affected units are emergency electric generators and pump stations, where short stacks and limited property rights exist. However, larger sources, including coal-fired and natural gas-fired power plants, refineries, and paper mills, could also model potential violations of the new NO_2 NAAQS.

To respond to these reports and facilitate the PSD permitting of new and modified major stationary sources, we are issuing the attached guidance, in the form of two memoranda, for implementing the new 1-hour NO_2 NAAQS under the PSD permit program. The guidance contained in the attached memoranda addresses two areas. The first memorandum, titled, "General Guidance for Implementing the 1-hour NO_2 National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour NO_2 Significant Impact Level," includes guidance for the preparation and review of PSD permits with respect to the new 1-hour NO_2 standard. This guidance memorandum sets forth a recommended interim 1-hour NO_2 significant impact level (SIL) that states may consider when carrying out the required

PSD air quality analysis for NO_2, until EPA promulgates a 1-hour NO_2 SIL via rulemaking. The second memorandum, titled "Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard," includes specific modeling guidance for estimating ambient NO_2 concentrations and determining compliance with the new 1-hour NO_2 standard.

This guidance does not bind state and local governments and the public as a matter of law. Nevertheless, we believe that state and local air agencies and industry will find this guidance useful when carrying out the PSD permit process. We believe it will provide a consistent approach for estimating NO_2 air quality impacts from proposed construction or modification of NOx emissions sources. For the most part, the attached guidance reiterates existing policy and guidance, but focuses on how this information is relevant to implementation of the new 1-hour NO_2 NAAQS.

Please review the guidance included in the two attached memoranda. If you have questions regarding the general implementation guidance contained in the first memorandum, please contact Raj Rao (rao.raj@epa.gov). If you have questions regarding the modeling guidance in the second memorandum, please contact Tyler Fox (fox.tyler@epa.gov). We are continuing our efforts to address permitting issues related to NO_2 and other NAAQS including the recently-signed 1-hour sulfur dioxide NAAQS. We plan to issue additional guidance to address these new 1-hour standards in the near future.

Attachments:

1. Memorandum from Anna Marie Wood, Air Quality Policy Division, to EPA Regional Air Division Directors, "General Guidance for Implementing the 1-hour NO_2 National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour NO_2 Significant Impact Level" (June 28, 2010).
2. Memorandum from Tyler Fox, Air Quality Modeling Group, to EPA Regional Air Division Directors, "Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard" (June 28, 2010).

cc: Anna Marie Wood
Richard Wayland
Raj Rao
Tyler Fox
Dan deRoeck
Roger Brode
Rich Ossias
Elliott Zenick
Brian Doster

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

June 28, 2010

MEMORANDUM

SUBJECT: General Guidance for Implementing the 1-hour NO_2 National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour NO_2 Significant Impact Level

FROM: Anna Marie Wood, Acting Director /s/
Air Quality Policy Division

TO: Regional Air Division Directors

INTRODUCTION

We are issuing the following guidance to explain and clarify the procedures that may be followed by applicants for Prevention of Significant Deterioration (PSD) permits and permitting authorities reviewing such applications to properly demonstrate that proposed construction will not cause or contribute to a violation of the new 1-hour nitrogen dioxide (NO_2) National Ambient Air Quality Standard (hereinafter, either the 1-hour NO_2 NAAQS or 1-hour NO_2 standard) that became effective on April 12, 2010. EPA revised the primary NO_2 NAAQS by promulgating a 1-hour NO_2 NAAQS to provide the requisite protection of public health. Under section 165(a)(3) of the Clean Air Act (the Act) and sections 52.21(k) and 51.166(k) of EPA's PSD regulations, to obtain a permit, a source must demonstrate that its proposed emissions increase will not cause or contribute to a violation of any NAAQS.

This guidance is intended to: (1) explain the recommended procedures for stakeholders to follow to properly address concerns over high preliminary modeled estimates of ambient NO_2 concentrations that suggest potential violations of the new 1-hour NO_2 standard under some modeling and permitting scenarios; (2) help reduce the burden of modeling for the hourly NO_2 standard where it can be properly demonstrated that a source will not have a significant impact on ambient 1-hour NO_2 concentrations; and (3) identify approaches that allow sources and permitting authorities to mitigate, in a manner consistent with existing regulatory requirements, potential modeled violations of the 1-hour NO_2 NAAQS, where appropriate. Accordingly, the techniques described in this memorandum may be used by permit applicants and permitting authorities to configure projects and permit conditions in order to reasonably conclude that a proposed source's emissions do not cause or contribute to modeled 1-hour NO_2 NAAQS violations so that permits can be issued in accordance with the applicable PSD program requirements.

This guidance discusses existing provisions in EPA regulations and previous guidance for applying those provisions but focuses on the relevancy of this information for implementing the

new NAAQS for NO_2. Importantly, however, this guidance also sets forth a recommended interim 1-hour NO_2 significant impact level (SIL) that EPA will use for implementing the federal PSD program, and that states may choose to rely upon to implement their PSD programs for NOx if they agree that these values represent *de minimis* impact levels and incorporate into each permit record a rationale supporting this conclusion. This interim SIL is a useful screening tool that can be used to determine whether or not the emissions from a proposed source will significantly impact hourly NO_2 concentrations, and, if significant impacts are predicted to occur, whether the source's emissions "cause or contribute to" any modeled violations of the new 1-hour NO_2 NAAQS.

BACKGROUND

On April 12, 2010, the new 1-hour NO_2 NAAQS became effective. EPA interprets its regulations at 40 CFR 52.21 (the federal PSD program) to require permit applicants to demonstrate compliance with "any" NAAQS that is in effect on the date a PSD permit is issued. (See, e.g., EPA memo dated April 1, 2010, titled "Applicability of the Federal Prevention of Significant Deterioration Permit Requirements to New and Revised National Ambient Air Quality Standards.") Due to the introduction of a short-term averaging period for the 1-hour NO_2 NAAQS, we anticipate that some stationary sources with relatively short stacks may experience increased difficulty demonstrating that emissions from new construction or modifications will not cause or contribute to a violation of the 1-hour NO_2 NAAQS.

We are responding to reports from stakeholders which indicate that some sources, existing and proposed, are modeling high hourly NO_2 concentrations showing violations of the 1-hour NO_2 NAAQS—based only on the source's projected emissions of NOx under some modeling and permitting scenarios. We find that, in many cases, the modeled violations are resulting from emissions at emergency electric generators and pump stations, where short stacks and limited property rights exist. In other cases, the problem may occur during periods of unit startup, particularly where controls may initially not be in operation. Finally, certain larger sources, including coal-fired and natural gas-fired power plants, refineries, and paper mills could also experience problems in meeting the new 1-hour NO_2 NAAQS using particular modeling assumptions and permit conditions.

We believe that, in some instances, the projected violations result from the use of maximum modeled concentrations that do not adequately take into account the form of the 1-hour standard, and are based on the conservative assumption of 100% NOx-to-NO_2 conversion in the ambient air. To the extent that this is the case, it may be possible to provide more accurate projections of ambient NO_2 concentrations by applying current procedures which account for the statistical form of the 1-hour NO_2 standard, as well as more realistic estimates of the rate of conversion of NOx emissions to ambient NO_2 concentrations. See EPA Memorandum from Tyler Fox, Air Quality Modeling Group, to EPA Regional Air Division Directors, "Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard" (June 28, 2010) for specific modeling guidance for estimating ambient NO_2 concentrations consistent with the new 1-hour NO_2 NAAQS. In addition, where short stacks are currently being used, or are under design, it may be possible to lessen the source's air quality impacts without improper dispersion by implementing "good engineering practice" (GEP) stack heights to

increase the height of existing or designed stacks to avoid excessive concentrations due to downwash, as described in the guidance below.

It is EPA's expectation that the guidance in this memorandum and available modeling guidance for NO_2 assist in resolving some of the issues arising from preliminary analyses that are reportedly showing potential exceedances of the new 1-hour NO_2 NAAQS that would not be present under more refined modeling applications. In addition, the techniques described in this memorandum may also help avoid violations of the standard through design of the proposed source or permit conditions, consistent with existing regulatory requirements, which enable the source to demonstrate that its proposed emissions increase will not cause or contribute to a modeled violation of the 1-hour NO_2 standard. Moreover, the interim 1-hour NO_2 SIL that is included in this guidance will provide a reasonable screening tool for efficiently implementing the PSD requirements for an air quality impact analysis.

The following discussion provides guidance concerning demonstrating compliance with the new NAAQS and mitigating modeled violations using air quality-based permit limits more stringent than what the Best Available Control Technology provisions may otherwise require, air quality offsets, the use of GEP stack heights, possible permit conditions for emergency generators, and an interim 1-hour NO_2 SIL.

AIR-QUALITY BASED EMISSIONS LIMITATIONS

Once a level of control required by the Best Available Control Technology provisions is proposed by the PSD applicant, the proposed source's emissions must be modeled at the BACT emissions rate(s) to demonstrate that those emissions will not cause or contribute to a violation of any NAAQS or PSD increment. EPA's 1990 Workshop Manual (page B.54) describes circumstances where a source's emissions based on levels proposed through the top-down process may not be sufficiently controlled to prevent modeled violations of an increment or NAAQS. In such cases, it may be appropriate for PSD applicants to propose a more stringent control option (that is, beyond the level identified via the top-down process) as a result of an adverse impact on the NAAQS or PSD increments.

DEMONSTRATING COMPLIANCE WITH THE NEW NAAQS & MITIGATING MODELED VIOLATIONS WITH AIR QUALITY OFFSETS

A 1988 EPA memorandum provides procedures to follow when a modeled violation is identified during the PSD permitting process. See Memorandum from Gerald A. Emison, EPA OAQPS, to Thomas J. Maslany, EPA Air Management Division, "Air Quality Analysis for Prevention of Significant Deterioration (PSD)." (July 5, 1988). In brief, a reviewing authority may issue a proposed new source or modification a PSD permit only if it can be shown that the proposed project's emissions will not "cause or contribute to" any modeled violations.

To clarify the above statement, in cases where modeled violations of the 1-hour NO_2 NAAQS are predicted, but the permit applicant can show that the NOx emissions increase from the proposed source will not have a significant impact *at the point and time of any modeled violation*, the permitting authority has discretion to conclude that the source's emissions will not

contribute to the modeled violation. As provided in the July 5, 1988, guidance memo, in such instances, because of the proposed source's *de minimis* contribution to any modeled violation, the source's impact will not be considered to cause or contribute to such modeled violations, and the permit could be issued. This concept continues to apply, and the significant impact level (described further below) may be used as part of this analysis. A 2006 decision by the EPA Environmental Appeals Board (EAB) provides detailed reasoning that demonstrates the permissibility of finding that a PSD source would not be considered to cause or contribute to a modeled NAAQS violation because its estimated air quality impact was insignificant at the time and place of the modeled violations.[1] See In re *Prairie State Gen. Co.*, 13 E.A.D. ___, ___, PSD Appeal No. 05-05, Slip. Op. at 137-144 (EAB 2006)

However, where it is determined that a source's impact does cause or contribute to a modeled violation, a permit cannot be issued without some action taken to mitigate the source's impact. In accordance with 40 CFR 51.165(b)[2], a major stationary source or major modification (as defined at §51.165(a)(1)(iv) and (v)) that locates in an NO_2 attainment area, but would cause or contribute to a violation of the 1-hour NO_2 NAAQS anywhere may "reduce the impact of its emissions upon air quality by obtaining sufficient emission reductions to, at a minimum, compensate for its adverse ambient [NO_2] impact where the major source or major modification would otherwise cause or contribute to a violation ...." An applicant can meet this requirement for obtaining additional emissions reductions by either reducing its emissions at the source, e.g., promoting more efficient production methodologies and energy efficiency, or by obtaining air quality offsets (see below). See, e.g., In re *Interpower of New York, Inc.*, 5 E.A.D. 130, 141 (EAB 1994).[3] A State may also provide the necessary emissions reductions by imposing emissions limitations on other sources through an approved State Implementation Plan (SIP) revision. These approaches may also be combined as necessary to demonstrate that a source will not cause or contribute to a violation of the NAAQS.

Unlike emissions offset requirements in nonattainment areas, in addressing the air quality offset concept, it may not be necessary for a permit applicant to fully offset the proposed emissions increase if an emissions reduction of lesser quantity will mitigate the adverse air quality impact on a modeled violation. ("Although full emission offsets are not required, such a source must obtain emission offsets sufficient to compensate for its air quality impact where the violation occurs." 44 FR 3274, January 16, 1979, at 3278.) To clarify this, the 1988 guidance memo referred to above states that:

> offsets sufficient to compensate for the source's significant impact must be obtained pursuant to an approved State offset program consistent with State Implementation Plan (SIP) requirements under 40 CFR 51.165(b). Where the source is contributing to an

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[1] While there is no 1-hour NO_2 significant impact level (SIL) currently defined in the PSD regulations, we believe that states may adopt interim values, with the appropriate justification for such values, to use for permitting purposes. In addition, we are recommending an interim SIL as part of this guidance for implementing the NO_2 requirements in the federal PSD program, and in state programs where states choose to use it.

[2] The same provision is contained in EPA's Interpretative Ruling at 40 CFR part 51 Appendix S, section III.

[3] In contrast to Nonattainment New Source Review permits, offsets are not mandatory requirements in PSD permits if it can otherwise be demonstrated that a source will not cause or contribute to a violation of the NAAQS. See, In re *Knauf Fiber Glass, GMBH*, 8 E.A.D. 121, 168 (EAB 1999).

existing violation, the required offset may not correct the violation. Such existing violations must be addressed [through the SIP].

In addition, in order to determine the appropriate emissions reductions, the applicant and permitting authority should take into account modeling procedures for the form of the 1-hour standard and for the appropriate NOx-NO_2 conversion rate that applies in the area of concern. As part of this process, existing ambient ozone concentrations and other meteorological conditions in the area of concern may need to be considered. Note that additional guidance for this and other aspects of the modeling analysis for the impacts of NOx emissions on ambient concentrations of NO_2 are addressed in EPA modeling guidance, including the June 28, 2010, Memorandum titled, "Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard."

"GOOD ENGINEERING PRACTICE" STACK HEIGHT & DISPERSION TECHNIQUES

If a permit applicant is unable to show that the source's proposed emissions increase will not cause or contribute to a modeled violation of the new 1-hour NO_2 NAAQS, the problem could be the result of plume downwash effects which may cause high ambient concentrations near the source. In such cases, a source may be able to raise the height of its existing stacks (or designed stacks if not yet constructed) to a GEP stack height of at least 65 meters, measured from the ground-level elevation at the base of the stack.

While not necessarily totally eliminating the effects of downwash in all cases, raising stacks to GEP height may provide substantial air quality benefits in a manner consistent with statutory provisions (section 123 of the Act) governing acceptable stack heights to minimize extensive concentrations due to atmospheric downwash, eddies or wakes. Permit applicants should also be aware of the regulatory restrictions on stack heights for the purpose of modeling for compliance with NAAQS and increments. Section 52.21(h) of the PSD regulations currently prohibits the use of dispersion techniques, such as stack heights above GEP, merged gas streams, or intermittent controls for setting NOx emissions limits or to meet the annual and 1-hour NAAQS and annual NO_2 increments. However, stack heights in existence before December 31, 1970, and dispersion techniques implemented before then, are not affected by these limitations. EPA's general stack height regulations are promulgated at 40 CFR 51.100(ff), (gg), (hh), (ii), (jj), (kk) and (nn), and 40 CFR 51.118.

a. *Stack heights*: A source cannot take credit for that portion of a stack height in excess of the GEP height when modeling to develop the NOx emissions limitations or to determine source compliance with the annual and 1-hour NO_2 NAAQS. It should be noted, however, that this limitation <u>does not limit</u> the actual height of any stack constructed by a new source or modification.

The following limitations apply in accordance with §52.21(h):

- For a stack height less than GEP, the actual stack height must be used in the source impact analysis for NOx emissions;

- For a stack height equal to or greater than 65 meters, the impact on NOx emission limits may be modeled using the greater of:
    - A *de minimis* stack height equal to 65 meters, as measured from the ground-level elevation at the base of the stack, without demonstration or calculation (40 CFR 51.100(ii)(1));
    - The refined formula height calculated using the dimensions of nearby structures in accordance with the following equation:

  GEP = H + 1.5L, where H is the height of the nearby structure and L is the lesser dimension of the height or projected width of the nearby structure (40 CFR 51.100(ii)(2)(ii)).[4]

- A GEP stack height exceeding the refined formula height may be approved when it can be demonstrated to be necessary to avoid "excessive concentrations" of NO_2 caused by atmospheric downwash, wakes, or eddy effects by the source, nearby structures, or nearby terrain features. (40 CFR 51.100(ii)(3), (jj), (kk));

- For purposes of PSD (and NOx/NO_2), "excessive concentrations" means a maximum ground-level concentration of NO_2 due to NOx emissions from a stack due in whole or in part to downwash, wakes, and eddy effects produced by nearby structures or nearby terrain features which individually is at least 40 percent in excess of the maximum NO_2 concentration experienced in the absence of such effects and (a) which contributes to a total NO_2 concentration due to emissions from all sources that is greater than the annual or 1-hour NO_2 NAAQS or (b) greater than the PSD (annual) increment for NO_2. (40 CFR 51.100(kk)(1)).

Reportedly, for economic and other reasons, many existing source stacks have been constructed at heights less than 65 meters, and source impact analyses may show that the source's emissions will cause or contribute to a modeled violation of the annual or 1-hour NO_2 NAAQS. Where this is the case, sources should be aware that they can increase their stack heights up to 65 meters without a GEP demonstration.

b. *Other dispersion techniques*: The term "dispersion technique" includes any practice carried out to increase final plume rise, subject to certain exceptions (40 CFR 51.100(hh)(1)(iii), (2)(i) – (v)). Beyond the noted exceptions, such techniques are not allowed for getting credit for modeling source compliance with the annual and 1-hour NO_2 NAAQS and annual NO_2 increment.

[4] For stacks in existence on January 12, 1979, the GEP equation is GEP = 2.5 H (provided the owner or operator produces evidence that this equation was actually relied on in establishing an emission limitation for NOx (40 CFR 51.100(ii)(2)(i)

OPERATION OF EMERGENCY EQUIPMENT & GENERAL STARTUP CONDITIONS

In determining an emergency generator's potential to emit, existing guidance (EPA memo titled "Calculating Potential to Emit (PTE) for Emergency Generators," September 6, 1995) allows a default value of 500 hours "for estimating the number of hours that an emergency generator could be expected to operate under worst-case conditions." The guidance also allows for alternative estimates to be made on a case-by-case basis for individual emergency generators. This time period must also consider operating time for both testing/maintenance as well as for emergency utilization. Likewise, existing EPA policy does not allow NOx emissions to be excluded from the source impact analysis (NAAQS and increments) when the emergency equipment is operating during an emergency. EPA provides no exemption from compliance with the NAAQS during periods of emergency operation. Thus, it is not sufficient to consider only emissions generated during periods of testing/maintenance in the source impact analysis.

If during an emergency, emergency equipment is never operated simultaneously with other emissions units at the source that the emergency equipment will back up, a worst-case hourly impact analysis may very well occur during periods of normal source operation when other emissions units at the facility are likely to be operating simultaneously with the scheduled testing of emergency equipment. To avoid such worst-case modeling situations, a permit applicant may commit to scheduling the testing of emergency equipment during times when the source is not otherwise operating, or during known off-peak operating periods. This could provide a basis to justify not modeling the 1-hour impacts of the emergency equipment under conditions that would include simultaneous operation with other onsite emissions units. Accordingly, permits for emergency equipment may include enforceable conditions that specifically limit the testing/maintenance of emergency equipment to certain periods of time (seasons, days of the week, hours of the day, etc.) as long as these limitations do not constitute dispersion techniques under 40 CFR 51.1(hh)(1)(ii).

We also note that similar problems associated with the modeling of high 1-hour NO_2 concentrations have been reported to occur during startup periods for certain kinds of emissions units—often because control equipment cannot function during all or a portion of the startup process. EPA currently has no provisions for exempting emissions occurring during equipment startups from the air quality analysis to demonstrate compliance with the NAAQS. Startup emissions may occur during only a relatively small portion of the unit's total annual operating schedule; however, they must be included in the required PSD air quality analysis for the NAAQS. Sources may be willing to accept enforceable permit conditions limiting equipment startups to certain hours of the day when impacts are expected to be lower than normal. Such permit limitations can be accounted for in the modeling of such emissions. Applicants should direct other questions arising concerning procedures for modeling startup emissions to the applicable permitting authority to determine the most current modeling guidance.

SCREENING VALUES

In the final rule establishing the hourly NO_2 standard, EPA discussed various implementation considerations for the PSD permitting program. 75 FR.6474, 6524 (Feb. 9, 2010). This discussion included the following statements regarding particular screening values that have historically been used on a widespread basis to facilitate implementation of the PSD permitting program:

> We also believe that there may be a need to revise the screening tools currently used under the NSR/PSD program for completing NO_2 analyses. These screening tools include the significant impact levels (SILs), as mentioned by one commenter, but also include the significant emissions rate for emissions of NOx and the significant monitoring concentration (SMC) for NO_2. EPA intends to evaluate the need for possible changes or additions to each of these important screening tools for NOx/NO_2 due to the addition of a 1-hour NO_2 NAAQS. If changes or additions are deemed necessary, EPA will propose any such changes for public notice and comment in a separate action. 75 FR 6525.

EPA intends to conduct an evaluation of these issues and submit our findings in the form of revised significance levels under notice and comment rulemaking if any revisions are deemed appropriate. In the interim, for the reasons provided below, we recommend the continued use of the existing significant emissions rates (SER) for NOx emissions as well as an interim 1-hour NO_2 SIL that we are setting forth today for conducting air quality impact analyses for the 1-hour NO_2 NAAQS. As described in the section titled Introduction, EPA intends to implement the interim 1-hour NO_2 SIL contained herein under the federal PSD program and offers states the opportunity to use it in their PSD programs if they choose to do so. EPA is not addressing the significant monitoring concentrations in this memorandum.

SIGNIFICANT EMISSIONS RATE

Under the terms of existing EPA regulations, the applicable significant emissions rate for nitrogen oxides is 40 tons per year. 40 CFR 52.21(b)(23); 40 CFR 51.166(b)(23). The significant emissions rates defined in those regulations are specific to individual pollutants but are not differentiated by the averaging times of the air quality standards applicable to some of the listed pollutants. Although EPA has not previously promulgated a NO_2 standard using an averaging time of less than one year, the NAAQS for SO_2 have included standards with 3-hour and 24-hour averaging times for many years. EPA has applied the 40 tons per year significant emissions rate for SO_2 across all of these averaging times. Until the evaluation described above and any associated rulemaking is completed, EPA does not believe it has cause to apply the NO_2 significant emissions rate any differently than EPA has historically applied the SO_2 significant emissions rate and others that apply to standards with averaging times less than 1 year.

Under existing regulations, an ambient air quality impact analysis is required for "each pollutant that [a source] would have the potential to emit in significant amounts." 40 CFR 52.21(m)(1)(i)(a); 40 CFR. 51.166(m)(1)(i)(a). For modifications, these regulations require this analysis for "each pollutant for which [the modification] would result in a significant net

emissions increase." 40 CFR.52.21(m)(1)(i)(b); 40 CFR.51.166(m)(1)(i)(b). EPA construes this regulation to mean that an ambient impact analysis is not necessary for pollutants with emissions rates below the significant emissions rates in paragraph (b)(23) of the regulations. No additional action by EPA or permitting authorities is necessary at this time to apply the 40 tpy significant emissions rate in existing regulations to the hourly NO_2 standard.

INTERIM 1-HOUR NO_2 SIGNIFICANT IMPACT LEVEL

A significant impact level (SIL) serves as a useful screening tool for implementing the PSD requirements for an air quality analysis. The primary purpose of the SIL is to serve as a screening tool to identify a level of ambient impact that is sufficiently low relative to the NAAQS or PSD increments such that the impact can be considered trivial or *de minimis*. Hence, the EPA considers a source whose individual impact falls below a SIL to have a *de minimis* impact on air quality concentrations that already exist. Accordingly, a source that demonstrates that the projected ambient impact of its proposed emissions increase does not exceed the SIL for that pollutant at a location where a NAAQS or increment violation occurs is not considered to cause or contribute to that violation. In the same way, a source with a proposed emissions increase of a particular pollutant that will have a significant impact at some locations is not required to model at distances beyond the point where the impact of its proposed emissions is below the SILs for that pollutant. When a proposed source's impact by itself is not considered to be "significant," EPA has long maintained that any further effort on the part of the applicant to complete a cumulative source impact analysis involving other source impacts would only yield information of trivial or no value with respect to the required evaluation of the proposed source or modification. The concept of a SIL is grounded on the *de minimis* principles described by the court in *Alabama Power Co. v. Costle*, 636 F.2d 323, 360 (D.C. Cir. 1980); See also *Sur Contra La Contaminacion v. EPA*, 202 F.3d 443, 448-49 (1st Cir. 2000) (upholding EPA's use of SIL to allow permit applicant to avoid full impact analysis); *In re: Prairie State Gen. Co.*, PSD Appeal No. 05-05, Slip. Op. at 139 (EAB 2006)

EPA has codified several SILs into regulations at 40 CFR 51.165(b). EPA plans to undertake rulemaking to develop a 1-hour NO_2 SIL for the new NAAQS for NO_2. However, EPA has recognized that the absence of an EPA-promulgated SIL does not preclude permitting authorities from developing interim SILs for use in demonstrating that a cumulative air quality analysis would yield trivial gain. Response to Comments, Implementation of New Source Review (NSR) Program for Particulate Matter Less Than 2.5 Micrometers in Diameter ($PM_{2.5}$), pg. 82 (March 2008) [EPA-HQ-OAR-2003-0062-0278].

Until such time as a 1-hour NO_2 SIL is defined in the PSD regulations, we are herein providing a recommended interim SIL that we intend to use as a screening tool for completing the required air quality analyses for the new 1-hour NO_2 under the federal PSD program at 40 CFR 52.21. To support the application of this interim SIL in each instance, a permitting authority that utilizes this SIL as part of an ambient air quality analysis should include in the permit record the analysis reflected in this memorandum and the referenced documents to demonstrate that an air quality impact at or below the SIL is *de minimis* in nature and would not cause a violation of the NAAQS.

Using the interim 1-hour NO_2 SIL, the permit applicant and permitting authority can determine: (1) whether, based on the proposed increase in NOx emissions, a cumulative air quality analysis is required; (2) the area of impact within which a cumulative air quality analysis should focus; and (3) whether, as part of a cumulative air quality analysis, the proposed source's NOx emissions will cause or contribute to a modeled violation of the 1-hour NO_2 NAAQS.

In this guidance, EPA recommends an interim 1-hour NO_2 SIL value of 4 ppb. To determine initially whether a proposed project's emissions increase will have a significant impact (resulting in the need for a cumulative air quality analysis), this interim SIL should be compared to either of the following:

- The highest of the 5-year averages of the maximum modeled 1-hour NO_2 concentrations predicted each year at each receptor, based on 5 years of National Weather Service data; or
- The highest modeled 1-hour NO_2 concentration predicted across all receptors based on 1 year of site-specific meteorological data, or the highest of the multi-year averages of the maximum modeled 1-hour NO_2 concentrations predicted each year at each receptor, based on 2 or more, up to 5 complete years of available site-specific meteorological data.

Additional guidance will be forthcoming for the purpose of comparing a proposed source's modeled impacts to the interim 1-hour NO_2 SIL in order to make a determination about whether that source's contribution is significant when a cumulative air quality analysis identifies violations of the 1-hour NO_2 NAAQS (i.e., "causes or contributes to" a modeled violation).

We derived this interim 1-hour NO_2 SIL by using an impact equal to 4% of the 1-hour NO_2 NAAQS (which is 100 ppb). We have chosen this approach because we believe it is reasonable to base the interim 1-hour NO_2 SIL directly on consideration of impacts relative to the 1-hour NO_2 NAAQS. In 1980, we defined SER for each pollutant subject to PSD. 45 FR 52676, August 7, 1980 at 52705-52710. For PM and SO_2, we defined the SER as the emissions rate that resulted in an ambient impact equal to 4% of the applicable short-term NAAQS. The 1980 analysis focused on levels no higher than 5% of the primary standard because of concerns that higher levels were found to result in unreasonably large amounts of increment being consumed by a single source. Within the range of impacts analyzed, we considered two factors that had an important influence on the choice of *de minimis* emissions levels: (1) cumulative effect on increment consumption of multiple sources in an area, each making the maximum *de minimis* emissions increase; and (2) the projected consequence of a given *de minimis* level on administrative burden. As explained in the preamble to the 1980 rulemaking and the supporting documentation,[5] EPA decided to use 4% of the 24-hour primary NAAQS for PM and SO_2 to define the significant emissions rates (SERs) for those pollutants. It was noted that, at the time, only an annual NO_2 NAAQS existed. Thus, for reasons explained in the 1980 preamble, to define the SER for NOx emissions we used a design value of 2% of the annual NO_2 NAAQS. See 45 FR 52708. Looking now at a short-term NAAQS for NO_2, we believe that it is reasonable as an interim approach to use a SIL value that represents 4% of the 1-hour NO_2

[5] EPA evaluated de minimis levels for pollutants for which NAAQS had been established in a document titled "Impact of Proposed and Alternative De Minimis Levels for Criteria Pollutants"; EPA-450/2-80-072, June 1980.

NAAQS. EPA will consider other possible alternatives for developing a 1-hour NO_2 SIL in a future rulemaking that will provide an opportunity for public participation in the development of a SIL as part of the PSD regulations.

Several state programs have already adopted interim 1-hour NO_2 SILs that differ (both higher and lower) from the interim value being recommended herein. The EPA-recommended interim 1-hour NO_2 SIL is not intended to supersede any interim SIL that is now or may be relied upon to implement a state PSD program that is part of an approved SIP, or to impose the use of the SIL concept on any state that chooses to implement the PSD program—in particular the ambient air quality analysis—without using a SIL as a screening tool. Accordingly, states that implement the PSD program under an EPA-approved SIP may choose to use this interim SIL, another value that may be deemed more appropriate for PSD permitting purposes in the state of concern, or no SIL at all. The application of any SIL that is not reflected in a promulgated regulation should be supported by a record in each instance that shows the value represents a *de minimis* impact on the 1-hour NO_2 standard, as described above.

In the event of questions regarding the general implementation guidance contained in this memorandum, please contact Raj Rao (rao.raj@epa.gov).

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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June 28, 2010

MEMORANDUM

SUBJECT: Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard

FROM: Tyler Fox, Leader
Air Quality Modeling Group, C439-01

TO: Regional Air Division Directors

INTRODUCTION

On January 22, 2010, EPA announced a new 1-hour nitrogen dioxide (NO_2) National Ambient Air Quality Standard (1-hour NO_2 NAAQS or 1-hour NO_2 standard) which is attained when the 3-year average of the 98th-percentile of the annual distribution of daily maximum 1-hour concentrations does not exceed 100 ppb at each monitor within an area. The final rule for the new 1-hour NO_2 NAAQS was published in the Federal Register on February 9, 2010 (75 FR 6474-6537), and the standard became effective on April 12, 2010 (EPA, 2010a). This memorandum clarifies the applicability of current guidance in the *Guideline on Air Quality Models* (40 CFR Part 51, Appendix W) for modeling NO_2 impacts in accordance with the Prevention of Significant Deterioration (PSD) permit requirements to demonstrate compliance with the new 1-hour NO_2 standard.

SUMMARY OF CURRENT GUIDANCE

While the new 1-hour NAAQS is defined relative to ambient concentrations of NO_2, the majority of nitrogen oxides (NOx) emissions for stationary and mobile sources are in the form of nitric oxide (NO) rather than NO_2. Appendix W notes that the impact of an individual source on ambient NO_2 depends, in part, "on the chemical environment into which the source's plume is to be emitted" (see Section 5.1.j). Given the role of NOx chemistry in determining ambient impact levels of NO_2 based on modeled NOx emissions, Section 5.2.4 of Appendix W recommends the following three-tiered screening approach for NO_2 modeling for annual averages:

- Tier 1 - assume full conversion of NO to NO_2 based on application of an appropriate refined modeling technique under Section 4.2.2 of Appendix W to estimate ambient NOx concentrations;
- Tier 2 - multiply Tier 1 result by empirically-derived NO_2/NOx ratio, with 0.75 as the annual national default ratio (Chu and Meyer, 1991); and

- Tier 3 - detailed screening methods may be considered on a case-by-case basis, with the Ozone Limiting Method (OLM) identified as a detailed screening technique for point sources (Cole and Summerhays, 1979).

Tier 2 is often referred to as the Ambient Ratio Method, or ARM. Site-specific ambient NO_2/NOx ratios derived from appropriate ambient monitoring data may also be considered as detailed screening methods on a case-by-case basis, with proper justification. Consistent with Section 4.2.2, AERMOD is the current preferred model for "a wide range of regulatory applications in all types of terrain" for purposes of estimating ambient concentrations of NO_2, based on NOx emissions, under Tiers 1 and 2 above. We discuss the role of AERMOD for Tier 3 applications in more detail below.

APPLICABILITY OF CURRENT GUIDANCE TO 1-HOUR NO_2 NAAQS

In general, the Appendix W recommendations regarding the annual NO_2 standard are also applicable to the new 1-hour NO_2 standard, but additional issues may need to be considered in the context of a 1-hour standard, depending on the characteristics of the emission sources, and depending on which tier is used, as summarized below:

- Tier 1 applies to the 1-hour NO_2 standard without any additional justification;
- Tier 2 may also apply to the 1-hour NO_2 standard in many cases, but some additional consideration will be needed in relation to an appropriate ambient ratio for peak hourly impacts since the current default ambient ratio is considered to be representative of "area wide quasi-equilibrium conditions"; and
- Tier 3 "detailed screening methods" will continue to be considered on a case-by-case basis for the 1-hour NO_2 standard. However, certain input data requirements and assumptions for Tier 3 applications may be of greater importance for the 1-hour standard than for the annual standard given the more localized nature of peak hourly vs. annual impacts. In addition, use of site-specific ambient NO_2/NOx ratios based on ambient monitoring data will generally be more difficult to justify for the 1-hour NO_2 standard than for the annual standard.

While Appendix W specifically mentions OLM as a detailed screening method under Tier 3, we also consider the Plume Volume Molar Ratio Method (PVMRM) (Hanrahan, 1999a) discussed under Section 5.1.j of Appendix W to be in this category at this time. Both of these options account for ambient conversion of NO to NO_2 in the presence of ozone, based on the following basic chemical mechanism, known as titration, although there are important differences between these methods:

$$NO + O_3 \rightarrow NO_2 + O_2 \qquad \text{(Eq. 1)}$$

As noted in Section 5.1.j, EPA is currently testing the PVMRM option to determine its suitability as a refined method. Limited evaluations of PVMRM have been completed, which show encouraging results, but the amount of data currently available is too limited to justify a designation of PVMRM as a refined method for NO_2 (Hanrahan, 1999b; MACTEC, 2005). EPA is currently updating and extending these evaluations to examine model performance for

predicting hourly NO_2 concentrations, including both the OLM and PVMRM options, and results of these additional evaluations will be provided at a later date. A sensitivity analysis of the OLM and PVMRM options in AERMOD has been conducted that compares modeled concentrations based on OLM and PVMRM with Tiers 1 and 2 for a range of source characteristics (MACTEC, 2004). This analysis serves as a useful reference to understand how ambient NO_2 concentrations may be impacted by application of this three-tiered screening approach, and includes comparisons for both annual average and maximum 1-hour NO_2 concentrations.

Key model inputs for both the OLM and PVMRM options are the in-stack ratios of NO_2/NOx emissions and background ozone concentrations. While the representativeness of these key inputs is important in the context of the annual NO_2 standard, they will generally take on even greater importance for the new 1-hour NO_2 standard, as explained in more detail below. Recognizing the potential importance of the in-stack NO_2/NOx ratio for hourly NO_2 compliance demonstrations, we recommend that in-stack ratios used with either the OLM or PVMRM options be justified based on the specific application, i.e., there is no "default" in-stack NO_2/NOx ratio for either OLM or PVMRM.

The OLM and PVMRM methods are both available as non-regulatory-default options within the EPA-preferred AERMOD dispersion model (Cimorelli, *et al.*, 2004; EPA, 2004; EPA, 2009). As a result of their non-regulatory-default status, pursuant to Sections 3.1.2.c, 3.2.2.a, and A.1.a(2) of Appendix W, application of AERMOD with the OLM or PVMRM option is no longer considered a "preferred model" and, therefore, requires justification and approval by the Regional Office on a case-by-case basis. While EPA is continuing to evaluate the PVMRM and OLM options within AERMOD for use in compliance demonstrations for the 1-hour NO_2 standard, as long as they are considered to be non-regulatory-default options, their use as alternative modeling techniques under Appendix W should be justified in accordance with Section 3.2.2, paragraph (e), as follows:

> "e. Finally, for condition (3) in paragraph (b) of this subsection [preferred model is less appropriate for the specific application, or there is no preferred model], an alternative refined model may be used provided that:
>
> i. The model has received a scientific peer review;
> ii. The model can be demonstrated to be applicable to the problem on a theoretical basis;
> iii. The data bases which are necessary to perform the analysis are available and adequate;
> iv. Appropriate performance evaluations of the model have shown that the model is not biased toward underestimates; and
> v. A protocol on methods and procedures to be followed has been established."

Since AERMOD is the preferred model for dispersion for a wide range of application, the focus of the alternative model demonstration for use of the OLM and PVMRM options within AERMOD is on the treatment of NOx chemistry within the model, and does not need to address basic dispersion algorithms within AERMOD. Furthermore, items i and iv of the alternative

model demonstration for these options can be fulfilled in part based on existing documentation (Cole and Summerhays, 1979; Hanrahan, 1999a; Hanrahan, 1999b; MACTEC, 2005), and the remaining items should be routinely addressed as part of the modeling protocol, irrespective of the regulatory status of these options. The issue of applicability to the problem on a theoretical basis (item ii) is a case-by-case determination based on an assessment of the adequacy of the ozone titration mechanism utilized by these options to account for NOx chemistry within the AERMOD model based on "the chemical environment into which the source's plume is to be emitted" (Appendix W, Section 5.1.j). The adequacy of available data bases needed for application of OLM and PVMRM (item iii), including in-stack NO_2/NOx ratios and background ozone concentrations, is a critical aspect of the demonstration which we discuss in more detail below. It should also be noted that application of the OLM or PVMRM methods with other Appendix W models or alternative models, whether as a separate post-processor or integrated within the model, would require additional documentation and demonstration that the methods have been implemented and applied appropriately within that context, including model-specific performance evaluations which satisfy item iv under Section 3.2.2.e.

Given the form of the new 1-hour NO_2 standard, some clarification is needed regarding the appropriate data periods for modeling demonstrations of compliance with the NAAQS vs. demonstrations of attainment of the NAAQS through ambient monitoring. While monitored design values for the 1-hour NO_2 standard are based on a 3-year average (in accordance with Section 1(c)(2) of Appendix S to 40 CFR Part 50), Section 8.3.1.2 of Appendix W addresses the length of the meteorological data record for dispersion modeling, stating that "[T]he use of 5 years of NWS [National Weather Service] meteorological data or at least 1 year of site specific data is required." Section 8.3.1.2.b further states that "one year or more (including partial years), up to five years, of site specific data . . . are preferred for use in air quality analyses." Although the monitored design value for the 1-hour NO_2 standard is defined in terms of the 3-year average, this definition does not preempt or alter the Appendix W requirement for use of 5 years of NWS meteorological data or at least 1 year of site specific data. The 5-year average based on use of NWS data, or an average across one or more years of available site specific data, serves as an unbiased estimate of the 3-year average for purposes of modeling demonstrations of compliance with the NAAQS. Modeling of "rolling 3-year averages," using years 1 through 3, years 2 through 4, and years 3 through 5, is not required. Furthermore, since modeled results for NO_2 are averaged across the number of years modeled for comparison to the new 1-hour NO_2 standard, the meteorological data period should include complete years of data to avoid introducing a seasonal bias to the averaged impacts. In order to comply with Appendix W recommendations in cases where partial years of site specific meteorological data are available, while avoiding any seasonal bias in the averaged impacts, an approach that utilizes the most conservative modeling result based on the first complete-year period of the available data record vs. results based on the last complete-year period of available data may be appropriate, subject to approval by the appropriate reviewing authority. Such an approach would ensure that all available site specific data are accounted for in the modeling analysis without imposing an undue burden on the applicant and avoiding arbitrary choices in the selection of a single complete-year data period.

The form of the new 1-hour NO_2 standard also has implications regarding appropriate methods for combining modeled ambient concentrations with monitored background

concentrations for comparison to the NAAQS in a cumulative modeling analysis. As noted in the March 23, 2010 memorandum regarding "Modeling Procedures for Demonstrating Compliance with $PM_{2.5}$ NAAQS" (EPA, 2010b), combining the 98th percentile monitored value with the 98th percentile modeled concentrations for a cumulative impact assessment could result in a value that is below the 98th percentile of the combined cumulative distribution and would, therefore, not be protective of the NAAQS. However, unlike the recommendations presented for $PM_{2.5}$, the modeled contribution to the cumulative ambient impact assessment for the 1-hour NO_2 standard should follow the form of the standard based on the 98th percentile of the annual distribution of daily maximum 1-hour concentrations averaged across the number of years modeled. A "first tier" assumption that may be applied without further justification is to add the overall highest hourly background NO_2 concentration from a representative monitor to the modeled design value, based on the form of the standard, for comparison to the NAAQS. Additional refinements to this "first tier" approach based on some level of temporal pairing of modeled and monitored values may be considered on a case-by-case basis, with adequate justification and documentation.

DISCUSSION OF TECHNICAL ISSUES

While many of the same technical issues related to application of Appendix W guidance for an annual NO_2 standard would also apply in the context of the new 1-hour NO_2 standard, there are some important differences that may also need to be considered depending on the specific application. This section discusses several aspects of these technical issues related to the new 1-hour NO_2 NAAQS, including a discussion of source emission inventories required for modeling demonstrations of compliance with the NAAQS and other issues specific to each of the three tiers identified in Section 5.2.4 of Appendix W for NO_2 modeling.

Emission Inventories

The source emissions data are a key input for all modeling analyses and one that may require additional considerations under the new 1-hour NO_2 standard is the source emissions data. Section 8.1 of Appendix W provides guidance regarding source emission input data for dispersion modeling and Table 8-2 summarizes the recommendations for emission input data that should be followed for NAAQS compliance demonstrations. Although existing NOx emission inventories used to support modeling for compliance with the annual NO_2 standard should serve as a useful starting point, such inventories may not always be adequate for use in assessing compliance with the new 1-hour NO_2 standard since some aspects of the guidance in Section 8.1 differs for long-term (annual and quarterly) standards vs. short-term ($\leq$ 24 hours) standards. In particular, since maximum ground-level concentrations may be more sensitive to operating levels and startup/shutdown conditions for an hourly standard than for an annual standard, emission rates and stack parameters associated with the maximum ground-level concentrations for the annual standard may underestimate maximum concentrations for the new 1-hour NO_2 standard. Due to the importance of in-stack NO_2/NOx ratios required for application of the OLM and PVMRM options within AERMOD discussed above, consideration should also be given to the potential variability of in-stack NO_2/NOx ratios under different operating conditions when those non-regulatory-default options are applied. We also note that source emission input data recommendations in Table 8-2 of Appendix W for "nearby sources" and "other sources" that

may be needed to conduct a cumulative impact assessment include further differences between emission data for long-term vs. short-term standards which could also affect the adequacy of existing annual NOx emission inventories for the new 1-hour NO_2 standard. The terms "nearby sources" and "other sources" used in this context are defined in Section 8.2.3 of Appendix W. Attachment A provides a more detailed discussion on determining NOx emissions for permit modeling.

While Section 8.2.3 of Appendix W emphasizes the importance of professional judgment by the reviewing authority in the identification of nearby and other sources to be included in the modeled emission inventory, Appendix W establishes "a significant concentration gradient in the vicinity of the source" under consideration as the main criterion for this selection. Appendix W also indicates that "the number of such [nearby] sources is expected to be small except in unusual situations." See Section 8.2.3.b. Since concentration gradients will vary somewhat depending on the averaging period being modeled, especially for an annual vs. 1-hour standard, the criteria for selection of "nearby" and "other" sources for inclusion in the modeled inventory may need to be reassessed for the 1-hour NO_2 standard.

The representativeness of available ambient air quality data also plays an important role in determining which nearby sources should be included in the modeled emission inventory. Key issues to consider in this regard are the extent to which ambient air impacts of emissions from nearby sources are reflected in the available ambient measurements, and the degree to which emissions from those background sources during the monitoring period are representative of allowable emission levels under the existing permits. The professional judgments that are required in developing an appropriate inventory of background sources should strive toward the proper balance between adequately characterizing the potential for cumulative impacts of emission sources within the study area to cause or contribute to violations of the NAAQS, while minimizing the potential to overestimate impacts by double-counting of modeled source impacts that are also reflected in the ambient monitoring data. We would also caution against the literal and uncritical application of very prescriptive procedures for identifying which background sources should be included in the modeled emission inventory for NAAQS compliance demonstrations, such as those described in Chapter C, Section IV.C.1 of the draft *New Source Review Workshop Manual* (EPA, 1990), noting again that Appendix W emphasizes the importance of professional judgment in this process. While the draft workshop manual serves as a useful general reference regarding New Source Review (NSR) and PSD programs, and such procedures may play a useful role in defining the spatial extent of sources whose emissions may need to be considered, it should be recognized that "[i]t is not intended to be an official statement of policy and standards and does not establish binding regulatory requirements." See, Preface.

Given the range of issues involved in the determination of an appropriate inventory of emissions to include in a cumulative impact assessment, the appropriate reviewing authority should be consulted early in the process regarding the selection and proper application of appropriate monitored background concentrations and the selection and appropriate characterization of modeled background source emission inventories for use in demonstrating compliance with the new 1-hour NO_2 standard.

Tier-specific Technical Issues

This section discusses technical issues related to application of each tier in the three-tiered screening approach for NO_2 modeling recommended in Section 5.2.4 Appendix W. A basic understanding of NOx chemistry and "of the chemical environment into which the source's plume is to be emitted" (Appendix W, Section 5.1.j) will be helpful for addressing these issues based on the specific application.

Tier 1:

Since the assumption of full conversion of NO to NO_2 will provide the most conservative treatment of NOx chemistry in assessing ambient impacts, there are no technical issues associated with treatment of NOx chemistry for this tier. However, the general issues related to emission inventories for the 1-hour NO_2 standard discussed above and in Attachment A apply to Tier 1.

Tier 2:

As noted above, the 0.75 national default ratio for ARM is considered to be representative of "area wide quasi-equilibrium conditions" and, therefore, may not be as appropriate for use with the 1-hour NO_2 standard. The appropriateness of this default ambient ratio will depend somewhat on the characteristics of the sources, and as such application of Tier 2 for 1-hour NO_2 compliance demonstrations may need to be considered on a source-by-source basis in some cases. The key technical issue to address in relation to this tier requires an understanding of the meteorological conditions that are likely to be associated with peak hourly impacts from the source(s) being modeled. In general, for low-level releases with limited plume rise, peak hourly NOx impacts are likely to be associated with nighttime stable/light wind conditions. Since ambient ozone concentrations are likely to be relatively low for these conditions, and since low wind speeds and stable atmospheric conditions will further limit the conversion of NO to NO_2 by limiting the rate of entrainment of ozone into the plume, the 0.75 national default ratio will likely be conservative for these cases. A similar rationale may apply for elevated sources where plume impaction on nearby complex terrain under stable atmospheric conditions is expected to determine the peak hourly NOx concentrations. By contrast, for elevated sources in relatively flat terrain, the peak hourly NOx concentrations are likely to occur during daytime convective conditions, when ambient ozone concentrations are likely to be relatively high and entrainment of ozone within the plume is more rapid due to the vigorous vertical mixing during such conditions. For these sources, the 0.75 default ratio may not be conservative, and some caution may be needed in applying Tier 2 for such sources. We also note that the default equilibrium ratio employed within the PVMRM algorithm as an upper bound on an hourly basis is 0.9.

Tier 3:

This tier represents a general category of "detailed screening methods" which may be considered on a case-by-case basis. Section 5.2.4(b) of Appendix W cites two specific examples of Tier 3 methods, namely OLM and the use of site-specific ambient NO_2/NOx ratios supported by ambient measurements. As noted above, we also believe it is appropriate to consider the

PVMRM option as a Tier 3 detailed screening method at this time. The discussion here focuses primarily on the OLM and PVMRM methods, but we also note that the use of site-specific ambient NO_2/NOx ratios will be subject to the same issues discussed above in relation to the Tier 2 default ARM, and as a result it will generally be much more difficult to determine an appropriate ambient NO_2/NOx ratio based on monitoring data for the new 1-hour NO_2 standard than for the annual standard.

While OLM and PVMRM are both based on the same simple chemical mechanism of titration to account for the conversion of NO emissions to NO_2 (see Eq. 1) and therefore entail similar technical issues and considerations, there are some important differences that also need to be considered when assessing the appropriateness of these methods for specific applications. While the titration mechanism may capture the most important aspects of NO-to-NO_2 conversion in many applications, both methods will suffer from the same limitations for applications in which other mechanisms, such as photosynthesis, contribute significantly to the overall process of chemical transformation. Sources located in areas with high levels of VOC emissions may be subject to these limitations of OLM and PVMRM. Titration is generally a much faster mechanism for converting NO to NO_2 than photosynthesis, and as such is likely to be appropriate for characterizing peak 1-hour NO_2 impacts in many cases.

Both OLM and PVMRM rely on the same key inputs of in-stack NO_2/NOx ratios and hourly ambient ozone concentrations. Although both methods can be applied within the AERMOD model using a single "representative" background ozone concentration, it is likely that use of a single value would result in very conservative estimates of peak hourly ambient concentrations since its use for the 1-hour NO_2 standard would be contingent on a demonstration of conservatism for all hours modeled. Furthermore, hourly monitored ozone concentrations used with the OLM and PVMRM options must be concurrent with the meteorological data period used in the modeling analysis, and thus the temporal representativeness of the ozone data for estimating ambient NO_2 concentrations could be a factor in determining the appropriateness of the meteorological data period for a particular application. As noted above, the representativeness of these key inputs takes on somewhat greater importance in the context of a 1-hour NO_2 standard than for an annual standard, for obvious reasons. In the case of hourly background ozone concentrations, methods used to substitute for periods of missing data may play a more significant role in determining the 1-hour NO_2 modeled design value, and should therefore be given greater scrutiny, especially for data periods that are likely to be associated with peak hourly concentrations based on meteorological conditions and source characteristics. In other words, ozone data substitution methods that may have been deemed appropriate in prior applications for the annual standard may not be appropriate to use for the new 1-hour standard.

While these technical issues and considerations generally apply to both OLM and PVMRM, the importance of the in-stack NO_2/NOx ratios may be more important for PVMRM than for OLM in some cases, due to differences between the two methods. The key difference between the two methods is that the amount of ozone available for conversion of NO to NO_2 is based simply on the ambient ozone concentration and is independent of source characteristics for OLM, whereas the amount of ozone available for conversion in PVMRM is based on the amount of ozone within the volume of the plume for an individual source or group of sources. The plume volume used in PVMRM is calculated on an hourly basis for each source/receptor

combination, taking into account the dispersive properties of the atmosphere for that hour. For a low-level release where peak hourly NOx impacts occur close to the source under stable/light wind conditions, the plume volume will be relatively small and the ambient NO_2 impact for such cases will be largely determined by the in-stack NO_2/NOx ratio, especially for sources with relatively close fenceline or ambient air boundaries. This example also highlights the fact that the relative importance of the in-stack NO_2/NOx ratios may be greater for some applications than others, depending on the source characteristics and other factors. Assumptions regarding in-stack NO_2/NOx ratios that may have been deemed appropriate in the context of the annual standard may not be appropriate to use for the new 1-hour standard. In particular, it is worth reiterating that the 0.1 in-stack ratio often cited as the "default" ratio for OLM should not be treated as a default value for hourly NO_2 compliance demonstrations.

Another difference between OLM and PVMRM that is worth noting here is the treatment of the titration mechanism for multiple sources of NOx. There are two possible modes that can be used for applying OLM to multiple source scenarios within AERMOD: (1) apply OLM to each source separately and assume that each source has all of the ambient ozone available for conversion of NO to NO_2; and (2) assume that sources whose plumes overlap compete for the available ozone and apply OLM on a combined plume basis. The latter option can be applied selectively to subsets of sources within the modeled inventory or to all modeled sources using the OLMGROUP keyword within AERMOD, and is likely to result in lower ambient NO_2 concentrations in most cases since the ambient NO_2 levels will be more ozone-limited. One of the potential refinements in application of the titration method incorporated in PVMRM is a technique for dynamically determining which sources should compete for the available ozone based on the relative locations of the plumes from individual sources, both laterally and vertically, on an hourly basis, taking into account wind direction and plume rise. While this approach addresses one of the implementation issues associated with OLM by making the decision of which sources should compete for ozone, there is only very limited field study data available to evaluate the methodology.

Given the importance of the issue of whether to combine plumes for the OLM option, EPA has addressed the issue in the past through the Model Clearinghouse process. The general guidance that has emerged in those cases is that the OLM option should be applied on a source-by-source basis in most cases and that combining plumes for application of OLM would require a clear demonstration that the plumes will overlap to such a degree that they can be considered as "merged" plumes. However, much of that guidance was provided in the context of applying the OLM method outside the dispersion model in a post-processing mode on an annual basis. The past guidance on this issue is still appropriate in that context since there is no realistic method to account for the degree of plume merging on an hourly basis throughout the modeling analysis when applied as a post-processor. However, the implementation of the OLM option within the AERMOD model applies the method on a source-by-source, receptor-by-receptor, and hour-by-hour basis. As a result, the application of the OLMGROUP option within AERMOD is such that the sources only compete for the available ozone to the extent that each source contributes to the cumulative NOx concentration at each receptor for that hour. Sources which contribute significantly to the ambient NOx concentration at the receptor will compete for available ozone in proportion to their contribution, while sources that do not contribute significantly to the ambient NOx concentration will not compete for the ozone. Thus, the OLMGROUP option

implemented in AERMOD will tend to be "self-correcting" with respect to concerns that combining plumes for OLM will overestimate the degree of ozone limiting potential (and therefore underestimate ambient NO_2 concentrations). As a result of these considerations, we recommend that use of the "OLMGROUP ALL" option, which specifies that all sources will potentially compete for the available ozone, be routinely applied and accepted for all approved applications of the OLM option in AERMOD. This recommendation is supported by model-to-monitor comparisons of hourly NO_2 concentrations from the application of AERMOD for the Atlanta NO_2 risk and exposure assessment (EPA, 2008), and recent re-evaluations of hourly NO_2 impacts from the two field studies (New Mexico and Palaau) that were used in the evaluation of PVMRM (MACTEC, 2005). These model-to-monitor comparisons of hourly NO_2 concentrations show reasonably good performance using the "OLMGROUP ALL" option within AERMOD, with no indication of any bias to underestimate hourly NO_2 concentrations with OLMGROUP ALL. Furthermore, model-to-monitor comparisons based on OLM without the OLMGROUP option do exhibit a bias to overestimate hourly NO_2 concentrations. We will provide further details regarding these recent hourly NO_2 model-to-monitor comparisons at a later date.

SUMMARY

To summarize, we emphasize the following points:

1. The 3-tiered screening approach recommended in Section 5.2.4 of Appendix W for annual NO_2 assessments generally applies to the new 1-hour NO_2 standard.
2. While generally applicable, application of the 3-tiered screening approach for assessments of the new 1-hour NO_2 standard may entail additional considerations, such as the importance of key input data, including appropriate emission rates for the 1-hour standard vs. the annual standard for all tiers, and the representativeness of in-stack NO_2/NOx ratios and hourly background ozone concentrations for Tier 3 detailed screening methods.
3. Since the OLM and PVMRM methods in AERMOD are currently considered non-regulatory-default options, application of these options requires justification and approval by the Regional Office on a case-by-case basis as alternative modeling techniques, in accordance with Section 3.2.2, paragraph (e), of Appendix W.
4. Applications of the OLM option in AERMOD, subject to approval under Section 3.2.2.e of Appendix W, should routinely utilize the "OLMGROUP ALL" option for combining plumes.
5. While the 1-hour NAAQS for NO_2 is defined in terms of the 3-year average for monitored design values to determine attainment of the NAAQS, this definition does not preempt or alter the Appendix W requirement for use of 5 years of NWS meteorological data or at least 1 year of site specific data.

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ATTACHMENT A

Background on Hourly NOx Emissions for Permit Modeling for the 1-hour NO_2 NAAQS

Introduction

The purpose of this attachment is to address questions about availability of hourly NOx emissions for permit modeling under the new NO_2 NAAQS. It summarizes existing guidance regarding emission input data requirements for NAAQS compliance modeling, and provides background on the historical approach to development of inventories for NO_2 permit modeling and computation of hourly emissions appropriate for assessing the new 1-hour NO_2 standard. Although the NAAQS is defined in terms of ambient NO_2 concentrations, source emission estimates for modeling are based on NOx.

Under the PSD program, the owner or operator of the source is required to demonstrate that the source does not cause or contribute to a violation of a NAAQS (40 CFR 51.166 (k)(1) and 40 CFR 52.21 (k)(1)) and/or PSD increments (40 CFR 51.166 (k)(2) and 52.21 (k)(2)). However, estimation of the necessary emission input data for NAAQS compliance modeling entails consideration of numerous factors, and the appropriate reviewing authority should be consulted early in the process to determine the appropriate emissions data for use in specific modeling applications (see 40 CFR 51, Appendix W, 8.1.1.b and 8.2.3.b)

Summary of Current Guidance

Section 8.1 of the *Guideline on Air Quality Models*, Appendix W to 40 CFR Part 51, provides recommendations regarding source emission input data needed to support dispersion modeling for NAAQS compliance demonstrations. Table 8-2 of Appendix W provides detailed guidance regarding the specific components of the emission input data, including the appropriate emission limits (pounds/MMBtu), operating level (MMBtu/hr), and operating factor (e.g., hr/yr or hr/day), depending on the averaging time of the standard. Table 8-2 also distinguishes between the emission input data needed for the new or modified sources being assessed, and "nearby" and "other" background sources included in the modeled emission inventory.

Based on Table 8-2, emission input data for new or modified sources for annual and quarterly standards are essentially the same as for short-term standards ($\leq$ 24 hours), based on maximum allowable or federally enforceable emission limits, design capacity or federally enforceable permit conditions, and the assumption of continuous operation. However, there are a few additional considerations cited in Appendix W that could result in different emission input data for the 1-hour vs. annual NO_2 NAAQS. For example, while design capacity is listed as the recommended operating level for the emission calculation, peak hourly ground-level concentrations may be more sensitive than annual average concentrations to changes in stack parameters (effluent exit temperature and exit velocity) under different operating capacities. Table 8-2 specifically recommends modeling other operating levels, such as 50 percent or 75 percent of capacity, for short-term standards (see footnote 3). Another factor that may affect maximum ground-level concentrations differently between the 1-hour vs. annual standard is

restrictions on operating factors based on federally enforceable permit conditions. While federally enforceable operating factors other than continuous operation may be accounted for in the emission input data (e.g., if operation is limited to 8 am to 4 pm each day), Appendix W also states that modeled emissions should not be averaged across non-operating time periods (see footnote 2 of Table 8-2).

While emission input data recommendations for "nearby" and "other" background sources included in the modeled emission inventory are similar to the new or modified source emission inputs in many respects, there is an important difference in the operating factor between annual and short-term standards. Emission input data for nearby and other sources may reflect actual operating factors (averaged over the most recent 2 years) for the annual standard, while continuous operation should be assumed for short-term standards. This could result in important differences in emission input data for modeled background sources for the 1-hour NO_2 NAAQS relative to emissions used for the annual standard.

Model Emission Inventory for NO_2 Modeling

For the existing annual NO_2 NAAQS, the permit modeling inventory has generally been compiled from the annual state emission inventory questionnaire (EIQ) or Title V permit applications on file with the relevant permitting authority (state or local air program). Since a state uses the annual EIQ for Title V fee assessment, the state EIQ typically requires reporting of unit capacity, total fuel combusted, and/or hours of operation to help verify annual emissions calculations for fee accuracy purposes. Likewise, Title V operating permit applications contain all of the same relevant information for calculating emissions. While these emission inventories are important resources for gathering emission input data on background sources for NAAQS compliance modeling, inventories which are based on actual operations may not be sufficient for short-term standards, such as the new 1-hour NO_2 NAAQS. However, appropriate estimates of emissions from background sources for the 1-hour NO_2 standard may be derived in many cases from information in these inventories regarding permitted emission limits and operating capacity.

Historically, it has not been a typical practice for an applicant to use the EPA's national emission inventory (NEI) as the primary source for compiling the permit modeling inventory. Since the emission data submitted to the NEI represents annual emission totals, it may not be suitable for use in NAAQS compliance modeling for short-term standards since modeling should be based on continuous operation, even for modeled background sources. Although the NEI may provide emission data for background sources that are more appropriate for the annual NO_2 standard, the utility of the NEI for purposes of NAAQS compliance modeling is further limited due to the fact that additional information regarding stack parameters and operating rates required for modeling may not be available from the NEI. While records exist in the NEI for reporting stack data necessary for point source modeling (i.e., stack coordinates, stack heights, exit temperatures, exit velocities), some states do not report such information to the NEI, or there are may be errors in the location data submitted to the NEI. Under such conditions, default stack information based upon SIC is substituted and use of such data could invalidate modeling results. Building locations and dimensions, which may be required to account for building downwash influences in the modeling analysis, may also be missing or incomplete in many cases.

A common and relatively straightforward approach for compiling the necessary information to develop an inventory of emissions from background sources for a permit modeling demonstration is as follows, patterned after the draft *New Source Review Workshop Manual* (EPA, 1990). The applicant completes initial modeling of allowable emission increases associated with the proposed project and determines the radii of impact (ROI) for each pollutant and averaging period, based on the maximum distance at which the modeled ambient concentration exceeds the Significant Impact Level (SIL) for each pollutant and averaging period. Typically, the largest ROI is selected and then a list of potential background sources within the ROI plus a screening distance beyond the ROI is compiled by the permitting authority and supplied to the applicant. The applicant typically requests permit applications or EIQ submittals from the records department of the permitting authority to gather stack data and source operating data necessary to compute emissions for the modeled inventory. Once the applicant has gathered the relevant data from the permitting authorities, model emission rates are calculated. While this approach is fairly common, it should be noted that the draft workshop manual "is not intended to be an official statement of policy and standards and does not establish binding regulatory requirements" (see, Preface), and the appropriate reviewing authority should be consulted early in the process regarding the selection of appropriate background source emission inventories for the 1-hour NO_2 standard. We also note that Appendix W establishes "a significant concentration gradient in the vicinity of the source" under consideration as the main criterion for selection of nearby sources for inclusion in the modeled inventory, and further indicates that "the number of such [nearby] sources is expected to be small except in unusual situations." See Section 8.2.3.b.

As mentioned previously, modeled emission rates for short-term NAAQS are computed consistent with the recommendations of Section 8.1 of Appendix W, summarized in Table 8-2. The maximum allowable (SIP-approved process weight rate limits) or federally enforceable permit limit emission rates assuming design capacity or federally enforceable capacity limitation are used to compute hourly emissions for dispersion modeling against short-term NAAQS such as the new 1-hour NO_2 NAAQS. If a source assumes an enforceable limit on the hourly firing capacity of a boiler, this is reflected in the calculations. Otherwise, the design capacity of the source is used to compute the model emission rate. A load analysis is typically necessary to determine the load or operating condition that causes the maximum ground-level concentrations. In addition to 100 percent load, loads such as 50 percent and 75 percent are commonly assessed. As noted above, the load analysis is generally more important for short-term standards than for annual standards. For an hourly standard, other operating scenarios of relatively short duration such as "startup" and "shutdown" should be assessed since these conditions may result in maximum hourly ground-level concentrations, and the control efficiency of emission control devices during these operating conditions may also need to be considered in the emission estimation.

Emission Calculation Example

The hourly emissions are most commonly computed from AP-42 emission factors based on unit design capacity. For a combustion unit, the source typically reports both the unit capacity and the actual total amount of fuel combusted annually (gallons, millions of cubic feet

of gas, etc.) to the permitting authority for the EIQ. Likewise, Title V operating permit applications will contain similar information that can be used to compute hourly emissions.

For example, assume you are modeling an uncontrolled natural gas package boiler with a design firing rate of 30 MMBtu/hr. The AP-42 emission factor for an uncontrolled natural gas external combustion source (AP-42, Section 1.4) for firing rates less than 100 MMBtu/hr is 100 lbs. NOx/10^6 SCF natural gas combusted. The hourly emission rate is derived by converting the emission factor expressed in terms of lbs. NOx/10^6 SCF to lbs. NOx/MMBtu. The conversion is done by dividing the 100 lbs. NOx/10^6 SCF by 1,020 to convert the AP-42 factor to lbs. NOx/MMBtu. The new emission factor is now 0.098 lbs. NOx/MMBtu.

For this example, the source has no limit on the hourly firing rate of the boiler; therefore, the maximum hourly emissions are computed by multiplying the design firing rate of the boiler by the new emission factor.

E_{hourly} = 0.098 lbs/MMBtu x 30MMBtu/hr = 2.94 lbs/hr

Thus 2.94 lbs/hr represents the emission rate that would be input into the dispersion model for modeling against the 1-hour NO_2 NAAQS to comport with emission rate recommendations of Section 8.1 of Appendix W.

It is important to note that data derived for the annual state emission inventory (EI) is based on actual levels of fuel combusted for the year, and is therefore different than how allowable emissions are computed for near-field dispersion modeling. For the annual EI report, a source computes their annual emissions based upon the AP-42 emission factor multiplied by the actual total annual throughput or total fuel combusted.

In the 30 MMBtu/hr boiler example, the annual NOx emissions reported to the NEI is computed by:

E_{annual} = (AP-42 emission factor) x (total annual fuel combusted)

E_{annual} = (100 lbs/10^6 SCF) x (100 10^6 SCF/yr) = 10,000 lbs. NOx/yr or 5 tons NOx/yr

Appendix H

EPA Memorandum re: Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO2 NAAQS (Mar. 1, 2011)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

MAR 0 1 2011

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

MEMORANDUM

SUBJECT: Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard

FROM: Tyler Fox, Leader
Air Quality Modeling Group, C439-01

TO: Regional Air Division Directors

INTRODUCTION

On January 22, 2010, EPA announced a new 1-hour nitrogen dioxide (NO_2) National Ambient Air Quality Standard (1-hour NO_2 NAAQS or 1-hour NO_2 standard) that is attained when the 3-year average of the 98th-percentile of the annual distribution of daily maximum 1-hour concentrations does not exceed 100 ppb at each monitor within an area. The final rule for the new 1-hour NO_2 NAAQS was published in the Federal Register on February 9, 2010 (75 FR 6474-6537), and the standard became effective on April 12, 2010 (EPA, 2010a). A memorandum was issued on June 29, 2010, clarifying the applicability of current guidance in the *Guideline on Air Quality Models* (40 CFR Part 51, Appendix W) for modeling NO_2 impacts in accordance with the Prevention of Significant Deterioration (PSD) permit requirements to demonstrate compliance with the new 1-hour NO_2 standard.

This memorandum supplements the June 29, 2010 guidance memo by providing further clarification and guidance on the application of Appendix W guidance for the 1-hour NO_2 standard. Note that while the discussion of NO_x chemistry options in this memo is exclusive to the 1-hour NO_2 standard, the discussion of other topics in this memo should apply equally to the 1-hour SO_2 standard, accounting for the slight differences in the form of the 1-hour NO_2 and SO_2 standards[1]. In summary, the memo:

1. Clarifies procedures for demonstrating compliance with the 1-hour NO_2 NAAQS based on the form of the standard, including significant contribution analyses using the interim Significant Impact Level (SIL) established in the June 29, 2010 memo,

[1] The 1-hour NO_2 standard is based on the 98th-percentile (8th-highest) of the annual distribution of maximum daily 1-hour values, whereas the 1-hour SO_2 standard is based on the 99th-percentile (4th-highest) of the annual distribution of maximum daily 1-hour values.

and details updates to the AERMOD model with an internal post-processor option that supports such analyses.

2. Provides clarification on the use and acceptance of Tier 2 and Tier 3 options for NO_2, including updated model evaluation results for the OLM and PVMRM options incorporated in the AERMOD model.
3. Recommends that compliance demonstrations for the 1-hour NO_2 NAAQS address emission scenarios that can logically be assumed to be relatively continuous or which occur frequently enough to contribute significantly to the annual distribution of daily maximum 1-hour concentrations based on existing modeling guidelines, which provide sufficient discretion for reviewing authorities to not include intermittent emissions from emergency generators or startup/shutdown operations from compliance demonstrations for the 1-hour NO_2 standard under appropriate circumstances.
4. Provides additional clarification and a more detailed discussion of the factors to consider in determination of background concentrations as part of a cumulative impact assessment including identification of nearby sources to be explicitly modeled.
5. Recommends an appropriate methodology for incorporating background concentrations in the cumulative impact assessment for the 1-hour NO_2 standard and details updates to the AERMOD model with an option to include temporally-varying background concentrations within the modeling analysis.

PROCEDURES FOR DEMONSTRATING COMPLIANCE WITH 1-HOUR NO_2 NAAQS

Compliance with the 1-hour NO_2 NAAQS is based on the multiyear average of the 98th-percentile of the annual distribution of daily maximum 1-hour values not exceeding 100 ppb. The 8th-highest of the daily maximum 1-hour values across a year is an unbiased surrogate for the 98th-percentile[1]. The AERMOD dispersion model, EPA's preferred model for near-field applications under Appendix W, was recently modified (version dated 11059) to fully support the form of the 1-hour NO_2 NAAQS, as well as other analyses that may be needed in order to demonstrate that a source does not cause or contribute to a violation of the NAAQS based on the interim SIL established in the June 29, 2010, memorandum.

Application of Interim SIL to Project Impacts

Using the interim 1-hour NO_2 SIL, a permit applicant can determine: (1) whether, based on the proposed increase in NO_x emissions, a cumulative air quality analysis is required; (2) the area of impact within which a cumulative air quality analysis should focus; and (3) whether the proposed source's NO_x emissions will contribute to any modeled violation of the 1-hour NO_2 NAAQS identified in the cumulative analysis.

To determine initially whether a proposed project's emissions increase will have a significant impact (resulting in the need for a cumulative impact assessment), the June 29, 2010, memorandum recommended that the interim SIL should be compared to either of the following:

- The highest of the 5-year averages of the maximum modeled 1-hour NO_2 concentrations predicted each year at each receptor, based on 5 years of National Weather Service data; or
- The highest modeled 1-hour NO_2 concentration predicted across all receptors based on 1 year of site-specific meteorological data, or the highest of the multi-year averages of the maximum modeled 1-hour NO_2 concentrations predicted each year at each receptor, based on 2 or more years, up to 5 complete years of available site-specific meteorological data.

Since the form of the standard is based on the annual distribution of daily maximum 1-hour values, the maximum contribution that a project could make to the air quality impact at a receptor is the multiyear average of the highest 1-hour values at that receptor. If the multiyear average of the highest 1-hour values is below the SIL at all receptors, then the project could not contribute significantly to any modeled violations of the 1-hour NO_2 NAAQS, thus exempting that project from the cumulative impact assessment.

Application of Interim SIL to Cumulative Impact Assessment

If a project's impacts exceed the SIL at any receptors based on this initial impact analysis, then a cumulative impact assessment should be completed to determine whether the project will cause or contribute to any modeled violations of the NAAQS. While not common practice in the past, given the more complex analysis procedures associated with the form of the 1-hour NO_2 NAAQS, we deem it appropriate and acceptable in most cases to limit the cumulative impact analysis to only those receptors that have been shown to have significant impacts from a proposed new source based on the initial SIL analysis, assuming that the design of the original receptor grid was adequate to determine all areas of ambient air where the source could contribute significantly to modeled violations. This may especially be appropriate for the 1-hour NO_2 standard since the initial modeling of the project emissions without other background emission sources may have a tendency to overestimate ambient NO_2 concentrations, even under Tier 3 applications, by understating the potential ozone limiting influence of the background NO_x emissions. If modeled violations of the NAAQS are found based on the cumulative impact assessment, then the project's contribution to all modeled violations should be compared to the interim SIL to determine whether the project causes or contributes to any of the modeled violations.

In past guidance (EPA, 1988), EPA has indicated that the significant contribution analysis should be based on a source's contribution to the modeled violation paired in time and space. The form of the 1-hour NO_2 NAAQS complicates this analysis since the modeled violation is based on a multiyear average of the annual distribution of daily maximum 1-hour values, i.e., a particular modeled violation at a particular receptor represents an average based on specific hours on specific days from each of the five years of meteorological data (for National Weather Service (NWS) data). It is important to point out here that the significant contribution analysis is not limited to analyzing the source's contribution associated only with the modeled design value based on the 98th-percentile cumulative air quality impact at the receptor, but rather must examine all cases where the cumulative impact exceeds the NAAQS at or below the 98th-

percentile. In some cases a source's contribution to the 98th-percentile of the daily maximum 1-hour values from the cumulative impact (i.e., the cumulative impact value or modeled design value that is compared to the NAAQS) may be below the SIL, while the source's contribution to cumulative impacts below the 98th-percentile but above the NAAQS could exceed the SIL. Therefore, the significant contribution analysis should examine every multiyear average of daily maximum 1-hour values, beginning with the 8th-highest (98th-percentile)[2], continuing down the ranked distribution until the cumulative impact is below the NAAQS. Since the form of the standard is based on the annual distribution of daily maximum 1-hour values, the significant contribution analysis should be limited to the distribution of daily maximum 1-hour values, i.e., the 2nd, 3rd, 4th-highest 1-hour values during the day, and so on, are not considered in this analysis. In addition, for applications with more than one year of meteorological data, the significant contribution analysis should only examine ranks paired across the years, i.e., the multiyear average of the *N*th-highest values across each of the years processed. The recent update to the AERMOD model (dated 11059) includes an option (the MAXDCONT keyword) to automatically perform this contribution analysis (EPA, 2010b), examining the contribution from project emissions to the cumulative impacts at each receptor across a user-specified range of ranked values, paired in time and space, as an internal post-processor within the model. Other options are available in the recent AERMOD update that identify the specific data periods contributing to the cumulative modeled impacts at each receptor.

Applicability of Ambient Monitoring Requirements to Modeling Demonstrations

The June 29, 2010 memo addressed one aspect of the applicability of ambient monitoring requirements, set forth in Appendix S to 40 CFR Part 50 in relation to the 1-hour NO_2 standard[3], to modeling applications to demonstrate compliance with the NAAQS, namely the use of 3 years of ambient monitoring data as the basis for attainment of the NAAQS using monitoring vs. the use of 5 years of meteorological data for modeling demonstrations of compliance with the NAAQS. Specifically, the June 29, 2010 memo indicated that "*Although the monitored design value for the 1-hour NO_2 standard is defined in terms of the 3-year average, this definition does not preempt or alter the Appendix W requirement for use of 5 years of NWS meteorological data or at least 1 year of site specific data. The 5-year average based on use of NWS data, or an average across one or more years of available site specific data, serves as an unbiased estimate of the 3-year average for purposes of modeling demonstrations of compliance with the NAAQS. Modeling of 'rolling 3-year averages,' using years 1 through 3, years 2 through 4, and years 3 through 5, is not required*."

We would also like to emphasize that other aspects of the ambient monitoring requirements for the 1-hour NO_2 standard should not be applied for modeling analyses to demonstrate compliance with the NAAQS. For example, Appendix S addresses the data completeness requirements for monitored NO_2 concentrations, procedures for handling missing data periods, and conventions for rounding of monitored values. Appendix S specifies that a sampling day is complete if at least 75 percent of the hourly values are valid and a quarter is complete if at least 75 percent of the sampling days have complete data, and establishes calculation procedures for identifying the monitored design value that should be compared to the

[2] For the 1-hour SO_2 standard the analysis should begin with the 4th-highest, or 99th-percentile value.
[3] Appendix T to 40 CFR Part 50 addresses ambient monitoring requirements for the 1-hour SO_2 standard.

NAAQS. While the requirements of Appendix S are appropriate in the context of ambient monitoring, application of these requirements and procedures to a dispersion modeling analysis is not appropriate and may conflict with modeling guidance in many cases. Appendix W provides guidance on data completeness for meteorological data which specifically addresses the needs of dispersion modeling, including procedures that are explicitly implemented within the meteorological processor and dispersion model to account for missing data due to calm winds or other factors. Adjustments to the calculation procedures for determining the modeled design value for comparison to the NAAQS based on Appendix S data completeness criteria is not appropriate. The EPA Model Clearinghouse has also issued guidance in the past that modeled concentrations should not be rounded before comparing the modeled design value to the NAAQS. The fundamental point to recognize here is that ambient monitoring requirements/procedures and dispersion modeling guidance/procedures address different issues and needs relative to each aspect of air quality assessment, and are often motivated by different concerns and exigencies.

APPROVAL AND APPLICATION OF TIERING APPROACH FOR NO_2

Given the stringency of the 1-hour NO_2 standard relative to the annual standard, many more permit applicants may find it necessary to use the less conservative Tier 2 or Tier 3 approaches in order to demonstrate compliance with the new NAAQS rather than relying on the Tier 1 assumption of full conversion. The June 29, 2010 memo highlighted some of the potential issues that may need to be addressed in the application of these less conservative assumptions for estimating ambient NO_2 impacts, relative to the Tier 1 option of full conversion, and clarified the status of the Tier 3 PVMRM and OLM approaches available as non-regulatory-default options within the AERMOD model.

In order to ease the burden on permit applicants in addressing the need to demonstrate compliance with the 1-hour NO_2 NAAQS, as well as the burden on the permitting authority in reviewing such applications, we offer additional discussion and recommendations in relation to the use of Tier 2 and Tier 3 options. Specifically, we recommend the following:

- Use of 0.80 as a default ambient ratio for the 1-hour NO_2 standard under Tier 2 without additional justification by applicants; and

- General acceptance of 0.50 as a default in-stack ratio of NO_2/NO_x for input to the PVMRM and OLM options within AERMOD, in the absence of more appropriate source-specific information on in-stack ratios.

The following sections explain these recommendations in more detail and also discuss the relative merits of the PVMRM and OLM options, clarifying that we have not indicated any preference of one option over the other. We also provide updated model evaluation results for the PVMRM and OLM options in AERMOD that lend further credence to the use of these Tier 3 options for 1-hour NO_2 compliance demonstrations. We anticipate that these recommendations and updated model evaluations will simplify and facilitate the process of gaining approval for use of these non-regulatory default options in AERMOD.

Tier 2 Ambient Ratio Method (ARM) for NO-to-NO_2 Conversion

Regarding the Tier 2 option of applying an ambient ratio to the Tier 1 result, the June 29, 2010 memo cautioned against use of the 0.75 national default ratio recommended in Appendix W for the annual standard for estimating hourly NO_2 impacts, without some justification of the appropriateness of that assumption. We still do not consider 0.75 as an appropriate default ambient ratio for the 1-hour standard, but several references cite ambient ratios of about 0.80 for hourly NO_2/NO_x (e.g., Wang, et al., 2011; Janssen, et al., 1991), and we believe it would be appropriate to accept that as a default ambient ratio for the 1-hour NO_2 standard. Consideration was given to adopting the default equilibrium ratio of 0.90 incorporated in the PVMRM option as an hourly ARM, but we do not consider that to be an appropriate choice since it is the maximum ratio applied on a source-by-source and hourly basis, irrespective of the predicted hourly NO_x concentration, whereas the Tier 2 ARM of 0.80 would be applied to the maximum cumulative hourly NO_x concentration.

Tier 3 Options for NO-to-NO_2 Conversion

The June 29, 2010 memo clarified that the OLM and PVMRM options in the AERMOD model should be considered as Tier 3 applications under Section 5.2.4 of Appendix W. Also, since the OLM and PVMRM methods are currently implemented as non-regulatory-default options within the AERMOD dispersion model (Cimorelli, *et al.*, 2004; EPA, 2004; EPA, 2010b), their use requires justification and approval by the Regional Office on a case-by-case basis, pursuant to Sections 3.1.2.c, 3.2.2.a, and A.1.a(2) of Appendix W. The June 29 memo also highlighted the importance of two key model inputs for both the OLM and PVMRM options in the context of the 1-hour NO_2 standard, namely the in-stack ratios of NO_2/NO_x emissions and background ozone concentrations. This section provides additional discussion of these key inputs for OLM and PVMRM and also clarifies the similarities and differences between these methods and discusses their relative merits for purposes of demonstrating compliance with the 1-hour NO_2 standard.

As noted in the June 29, 2010 memo, limited evaluations of PVMRM have been completed which show encouraging results, but the amount of data currently available is too limited to justify a designation of PVMRM as a refined method for NO_2 (Hanrahan, 1999; MACTEC, 2005). Furthermore, the original evaluations focused on model performance for annual averages since the only NO_2 standard in effect at the time was annual. We have recently updated the evaluations to reflect the current AERMOD modeling system components and extended them to examine model performance for hourly NO_2 concentrations. Preliminary results from these recent evaluations are presented in Attachment A.

While the limited scope of the available field study data imposes limits on the ability to generalize conclusions regarding model performance, these preliminary results of hourly NO_2 predictions for Palaau and New Mexico show generally good performance for the PVMRM and OLM/OLMGROUP ALL options in AERMOD. We believe that these additional model evaluation results lend further credence to the use of these Tier 3 options in AERMOD for estimating hourly NO_2 concentrations, and we recommend that their use should be generally

accepted provided some reasonable demonstration can be made of the appropriateness of the key inputs for these options, the in-stack NO_2/NO_x ratio and the background ozone concentrations. Although well-documented data on in-stack NO_2/NO_x ratios is still limited for many source categories, we also feel that it would be appropriate in the absence of such source-specific in-stack data to adopt a default in-stack ratio of 0.5 as being adequately conservative in most cases and a better alternative to use of the Tier 1 full conversion or Tier 2 ambient ratio options. This value appears to represent a reasonable upper bound based on the available in-stack data. We hope that over time the range of source categories for which in-stack ratio information is available increases and the quality of such information will improve.

These preliminary model evaluation results also serve to highlight a point worth emphasizing, which is that the PVMRM option in AERMOD is not inherently superior to the OLM option for purposes of estimating cumulative ambient NO_2 concentrations. The June 29, 2010 memo indicated that both PVMRM and OLM should be considered as Tier 3 options, but did not indicate any preference between these two options. Both PVMRM and OLM simulate the same basic chemical mechanism of ozone titration, the interaction of NO with ambient ozone (O_3) to form NO_2 and O_2. The main distinction between PVMRM and OLM is the approach taken to estimate the ambient concentrations of NO and O_3 for which the ozone titration mechanism should be applied. For isolated elevated point sources, the PVMRM option does represent a more refined treatment of ozone titration since it estimates the NO and O_3 available for conversion based on simulating the actual volume of the instantaneous plume as it is transported downwind. As a result, this method will generally provide a more realistic simulation of the NO-to-NO_2 conversion rate along the path of the plume for a particular source, accounting for the influence of meteorological conditions on the entrainment of O_3 associated with growth of the plume. However, the algorithm incorporated in PVMRM for determining which plumes "compete" for available ozone for multi-source applications has not been thoroughly validated, and as shown in the model evaluation results for New Mexico, PVMRM may not always provide a "better" answer than the OLM option.

The PVMRM algorithm as currently implemented may also have a tendency to overestimate the conversion of NO to NO_2 for low-level plumes by overstating the amount of ozone available for the conversion due to the manner in which the plume volume is calculated. The plume volume calculation in PVMRM does not account for the fact that the vertical extent of the plume based on the vertical dispersion coefficient may extend below ground for low-level plumes. This overestimation of the volume of the plume could contribute to overestimating conversion to NO_2. The PVMRM option has further limitations for area source applications, especially for elongated area sources that may be used to simulate road segments. In these cases, the lateral extent of the plume used in calculating the plume volume depends on the projected width of the area source, even if only a portion of the area source actually impacts a nearby receptor. This again would tend to overestimate the volume of the plume for purposes of determining the amount of ozone available for conversion of NO to NO_2, and would likely overestimate ambient NO_2 concentrations. In light of these issues, a series of volume sources rather than elongated area sources is recommended for simulating NO_2 impacts from roadway emissions with PVMRM, especially for receptors located relatively close to the roadway. Furthermore, the OLM option with OLMGROUP ALL was used to estimate NO_2 concentrations from mobile source emissions modeled as area sources for the Atlanta area as part of the EPA's

Risk and Exposure Assessment (REA) for the most recent NO_2 NAAQS review (EPA, 2008). Results of model-to-monitor comparisons from the REA show generally good performance, suggesting that use of OLM with OLMGROUP ALL is appropriate for modeling such emissions.

TREATMENT OF INTERMITTENT EMISSIONS

Modeling of intermittent emission units, such as emergency generators, and/or intermittent emission scenarios, such as startup/shutdown operations, has proven to be one of the main challenges for permit applicants undertaking a demonstration of compliance with the 1-hour NO_2 NAAQS. Prior to promulgation of the new 1-hour NO_2 standard, the only NAAQS applicable for NO_2 was the annual standard and these intermittent emissions typically did not factor significantly into the modeled design value for the annual standard. Sources often take a 500 hour/year permit limit on operation of emergency generators for purposes of determining the potential to emit (PTE), but may actually operate far fewer hours than the permitted limit in many cases and generally have not been required to assume continuous operation of these intermittent emissions for purposes of demonstrating compliance with the annual NAAQS. Due in part to the relatively low release heights typically associated with emergency generators, an assumption of continuous operation for these intermittent emissions would in many cases result in them becoming the controlling emission scenario for determining compliance with the 1-hour standard.

EPA's guidance in Table 8-2 of Appendix W involves a degree of conservatism in the modeling assumptions for demonstrating compliance with the NAAQS by recommending the use of maximum allowable emissions, which represents emission levels that the facility could, and might reasonably be expected to, achieve if a PSD permit is granted. However, the intermittent nature of the actual emissions associated with emergency generators and startup/shutdown in many cases, when coupled with the probabilistic form of the standard, could result in modeled impacts being significantly higher than actual impacts would realistically be expected to be for these emission scenarios. The potential overestimation in these cases results from the implicit assumption that worst-case emissions will coincide with worst-case meteorological conditions based on the specific hours on specific days of each of the years associated with the modeled design value based on the form of the hourly standard. In fact, the probabilistic form of the standard is explicitly intended to provide a more stable metric for characterizing ambient air quality levels by mitigating the impact that outliers in the distribution might have on the design value. The February 9, 2010, preamble to the rule promulgating the new 1-hour NO_2 standard stated that "it is desirable from a public health perspective to have a form that is reasonably stable and insulated from the impacts of extreme meteorological events." 75 FR 6492. Also, the Clean Air Science Advisory Committee (CASAC) "recommended a 98th-percentile form averaged over 3 years for such a standard, given the potential for instability in the higher percentile concentrations around major roadways." 75 FR 6493.

To illustrate the importance of this point, consider the following example. Under a deterministic 1-hour standard, where the modeled design value would be based on the highest of the second-highest hourly impacts (allowing one exceedance per year), a single emission episode lasting 2 hours for an emergency generator or other intermittent emission scenario could

determine the modeled design value if that episode coincided with worst-case meteorological conditions. While the probability of a particular 2-hour emission episode actually coinciding with the worst-case meteorological conditions is relatively low, there is nonetheless a clear linkage between a specific emission episode and the modeled design value. By contrast, under the form of the 1-hour NO_2 NAAQS only one hour from that emission episode could contribute to the modeled design value, i.e., the daily maximum 1-hour value. However, by assuming continuous operation of intermittent emissions the modeled design value for the 1-hour NO_2 NAAQS effectively assumes that the intermittent emission scenario occurs on the specific hours of the specific days for each of the specific years of meteorological data included in the analysis which factor into the multiyear average of the 98th-percentile of the annual distribution of daily maximum 1-hour values. The probability of the controlling emission episode occurring on this particular temporal schedule to determine the design value under the probabilistic standard is significantly smaller than the probability of occurrence under the deterministic standard; thereby increasing the likelihood that impact estimates based on assuming continuous emissions would significantly overestimate actual impacts for these sources.

Given the implications of the probabilistic form of the 1-hour NO_2 NAAQS discussed above, we are concerned that assuming continuous operations for intermittent emissions would effectively impose an additional level of stringency beyond that intended by the level of the standard itself. As a result, we feel that it would be inappropriate to implement the 1-hour NO_2 standard in such a manner and recommend that compliance demonstrations for the 1-hour NO_2 NAAQS be based on emission scenarios that can logically be assumed to be relatively continuous or which occur frequently enough to contribute significantly to the annual distribution of daily maximum 1-hour concentrations. EPA believes that existing modeling guidelines provide sufficient discretion for reviewing authorities to exclude certain types of intermittent emissions from compliance demonstrations for the 1-hour NO_2 standard under these circumstances.

EPA's *Guideline on Air Quality Models* provides recommendations regarding air quality modeling techniques that should be applied in preparation or review of PSD permit applications and serves as a "common measure of acceptable technical analysis when supported by sound scientific judgment." 40 C.F.R. Part 51, Appendix W, section 1.0.a. While the guidance establishes principles that may be controlling in certain circumstances, the guideline is not "a strict modeling 'cookbook'" so that, as the guideline notes, "case-by-case analysis and judgment are frequently required." Section 1.0.c. In particular, with respect to emissions input data, section 8.0.a. of Appendix W establishes the general principle that "the most appropriate data available should always be selected for use in modeling analyses," and emphasizes the importance of "the exercise of professional judgement by the appropriate reviewing authority" in determining which nearby sources should be included in the model emission inventory. Section 8.2.3.b.

For the reasons discussed above, EPA believes the most appropriate data to use for compliance demonstrations for the 1-hour NO_2 NAAQS are those based on emissions scenarios that are continuous enough or frequent enough to contribute significantly to the annual distribution of daily maximum 1-hour concentrations. Section 8.1.1.b of the guideline also provides that "[t]he appropriate reviewing authority should be consulted to determine appropriate

source definitions and for guidance concerning the determination of emissions from and techniques for modeling various source types." When EPA is the reviewing authority for a permit, for the reasons described above, we will consider it acceptable to limit the emission scenarios included in the modeling compliance demonstration for the 1-hour NO_2 NAAQS to those emissions that are continuous enough or frequent enough to contribute significantly to the annual distribution of daily maximum 1-hour concentrations. Consistent with this rationale, the language in Section 8.2.3.d of Appendix W states that "*[i]t is appropriate to model nearby sources only during those times when they, by their nature, operate at the same time as the primary source(s) being modeled.*" While we recognize that these intermittent emission sources could operate at the same time as the primary source(s), the discussion above highlights the additional level of conservatism in the modeled impacts inherent in an assumption that they do in fact operate simultaneously and continuously with the primary source(s).

The rationale regarding treatment of intermittent emissions applies for both project emissions and any nearby or other background sources included in the modeling analysis. However, this rationale does not apply to the load analysis recommended in Table 8-2 of Appendix W, since various operating loads are not by design intended to be intermittent. Appendix W, Section 8.1.2.a. With respect to the operating level, for the proposed new or modified source, Table 8-2 calls for using "[d]esign capacity or federally enforceable permit condition." With respect to nearby sources, the guidelines call for estimating emissions based on "[a]ctual or design capacity (whichever is greater), or federally enforceable permit condition." Footnote 3 to the table notes that "[o]perating levels such as 50 percent and 75 percent of capacity should also be modeled to determine the load causing the highest concentration." The justification for not including certain intermittent operations described in this memo does not apply to these guidelines that address analyzing the load causing the highest concentration.

We recognize that case-specific issues and factors may arise that affect the application of this guidance, and that not all facilities required to demonstrate compliance with the 1-hour NO_2 NAAQS will fit within the scenario described above with clearly defined continuous/normal operations vs. intermittent/infrequent emissions. Additional discretion may need to be exercised in such cases to ensure that public health is protected. For example, an intermittent source that is permitted to operate up to 500 hours per year, but typically operates much less than 500 hours per year and on a random schedule that cannot be controlled would be appropriate to consider under this guidance. On the other hand, an "intermittent" source that is permitted to operate only 365 hours per year, but is operated as part of a process that typically occurs every day, would be less suitable for application of this guidance since the single hour of emissions from each day could contribute significantly to the modeled design value based on the annual distribution of daily maximum 1-hour concentrations. Similarly, the frequency of startup/shutdown emission scenarios may vary significantly depending on the type of facility. For example, a large base-load power plant may experience startup/shutdown events on a relatively infrequent basis whereas as a peaking unit may go through much more frequent startup/shutdown cycles. It may be appropriate to apply this guidance in the former case, but not the latter.

Another aspect of intermittent emissions worth noting is the distinction between intermittent emissions that can be scheduled with some degree of flexibility vs. intermittent emissions that cannot be scheduled. For example, a portion of emissions from an emergency

generator are likely to be associated with regular testing of the equipment that may be required to ensure its reliable operation, while that portion of emergency generator emissions associated with actual emergency use typically cannot be scheduled. In this case it may be appropriate to include a permit condition that restricts operation of the emergency generator during testing to certain hours of the day, which may mitigate that source's contribution to ambient NO_2 levels based on dispersion conditions. Limiting operation to specific time periods is an appropriate permit condition under Appendix W guidance and would not constitute a "dispersion technique" subject to Section 123 of the CAA. In this case the portion of the emissions associated with scheduled testing can be accounted for more realistically by limiting the hours modeled to account for meteorological conditions that are more representative of actual operations.

Another approach that may be considered in cases where there is more uncertainty regarding the applicability of this guidance would be to model impacts from intermittent emissions based on an average hourly rate, rather than the maximum hourly emission. For example, if a proposed permit includes a limit of 500 hours/year or less for an emergency generator, a modeling analysis could be based on assuming continuous operation at the average hourly rate, i.e., the maximum hourly rate times 500/8760. This approach would account for potential worst-case meteorological conditions associated with emergency generator emissions by assuming continuous operation, while use of the average hourly emission represents a simple approach to account for the probability of the emergency generator actually operating for a given hour. Also note that the contribution of intermittent emissions to annual impacts should continue to be addressed as in the past to demonstrate compliance with the annual NO_2 standard.

A final point of clarification regarding intermittent emissions that deserves some emphasis is that the guidance provided here in relation to determining compliance with the 1-hour NO_2 NAAQS through dispersion modeling has no effect on or relevance to the existing policies and guidance regarding excess emissions that may occur during startup and shutdown, where such excess emissions violate applicable emission limitations[4]. In other words, all emissions from a new or modified source are subject to the applicable permitted emission limits and may be subject to enforcement action regarding such excess emissions, regardless of whether a portion of those emissions are not included in the modeling demonstration based on the guidance provided here.

Given the added complexity of the technical issues that arise in the context of demonstrating compliance with the 1-hour NO_2 NAAQS through dispersion modeling, we strongly encourage adherence to the recommendations in Section 10.2.1. of Appendix W that "*[e]very effort should be made by the Regional Office to meet with all parties involved in either a SIP revision or a PSD permit application prior to the start of any work on such a project. During this meeting, a protocol should be established between the preparing and reviewing parties to define the procedures to be followed, the data to be collected, the model to be used, and the analysis of the source and concentration data.*"

[4] While excess emissions during malfunctions are also addressed in the policy related to excess emissions, Appendix W explicitly excludes emissions due to malfunction from the modeling analysis to demonstrate compliance with the NAAQS, unless the excess emissions are the result of poor maintenance, careless operation, or other preventable conditions. See Section 8.1.2.a, footnote a.

DETERMINING BACKGROUND CONCENTRATIONS

Unless a facility can demonstrate that ambient impacts associated from its emissions will not exceed the appropriate SIL, a cumulative analysis of ambient impacts will be necessary, and the determination of background concentrations to include in that cumulative impact assessment will be a critical component of the analysis. The June 29, 2010 memorandum addressed some aspects of this issue, but given the stringency of the new 1-hour NO_2 standard, the "margin for error" in this aspect of the analysis is much smaller than it has been in the past. As a result, we believe it is necessary to provide additional clarification and a more detailed discussion of the factors associated with this aspect of the permitting process. We hope that this additional discussion will serve to more clearly define some of the key steps and considerations in the process that could form the basis of a generic modeling protocol. We also provide suggestions regarding some of the documentation related to this component of the modeling analysis that may facilitate and expedite the review process.

The goal of the cumulative impact assessment should be to demonstrate with an adequate degree of confidence in the result that the proposed new or modified emissions will not cause or significantly contribute to violations of the NAAQS. In general, the more conservative the assumptions on which the cumulative analysis is based, the more confidence there will be that the goal has been achieved and the less controversial the review process will be from the perspective of the reviewing authority. As less conservative assumptions are implemented in the analysis, the more scrutiny those assumptions may require and the review process may tend to be lengthier and more controversial as a result. We expect that by providing a more detailed discussion of the factors to be considered in the cumulative impact assessment, permit applicants and permitting authorities will be able to find the proper balance of the competing factors that contribute to this analysis.

Identifying Nearby Sources to Include in Modeled Inventory

As noted in the June 29, 2010 memo, Section 8.2.3 of Appendix W emphasizes the importance of professional judgment by the reviewing authority in the identification of nearby and other sources to be included in the modeled emission inventory, and establishes "a significant concentration gradient in the vicinity of the source" under consideration as the main criterion for this selection. Appendix W also suggests that "the number of such [nearby] sources is expected to be small except in unusual situations." See Section 8.2.3.b. In light of this guidance, the June 29, 2010 memo cautioned against the literal and uncritical application of very prescriptive procedures for identifying which background sources should be included in the modeled emission inventory for NAAQS compliance demonstrations, such as those described in Chapter C, Section IV.C.1 of the draft *New Source Review Workshop Manual* (EPA, 1990). This caution should not be taken to imply that the procedures outlined in the NSR Workshop Manual are flawed or inappropriate in themselves. Cumulative impact assessments based on following such procedures will generally be acceptable as the basis for permitting decisions, contingent on an appropriate accounting for the monitored contribution. Our main concern is that following such procedures in a literal and uncritical manner may in many cases result in cumulative impact assessments that are overly conservative and could unnecessarily complicate the permitting

process in some cases. Such procedures might be characterized as being sufficient in most cases, but not always necessary to fulfill the requirements of a cumulative impact assessment.

A fundamental challenge in developing more detailed general guidance on the issue of determining background concentrations as part of a cumulative impact assessment is that the factors that need to be considered are very case-specific in nature. These factors include foremost the nature of the source being permitted, including the source characteristics and local meteorological and topographical factors that determine the spatial and temporal patterns of the source's ambient impacts. The initial significant impact assessment should serve to characterize these factors, and we would suggest the following:

1. As a standard practice contour plots of modeled concentrations should be prepared which clearly depict the impact area of the source, preferably overlaid on a map of the area that identifies key geographical features that may influence the dispersion patterns. The concentration contour plot also serves to visually depict the concentration gradients associated with the source's impact.
2. We also recommend that the controlling meteorological conditions for the project impacts be identified as clearly as possible. The probabilistic form of the 1-hour NO_2 standard complicates this assessment somewhat, but the recent update to the AERMOD model includes new model output options (MAXDAILY and MXDYBYYR keywords) that identify the specific time periods on which the modeled design value is based.
3. As an aid to interpreting this information, we also suggest including the location of the meteorological monitoring station used in the modeling analysis on the plot of source impacts, as well as a wind rose depicting general flow patterns.

If a cumulative impact assessment is required due to the source's impacts exceeding the interim SIL, the applicant will need to identify and acquire data on the two main components of the cumulative impact assessment, namely the location and emissions from nearby background sources that may need to be included in the modeled component of the cumulative ambient impact assessment, and the location and magnitude of air quality data from ambient NO_2 monitors located within the area. Section 8.2.1.b of Appendix W states that "[t]ypically, air quality data should be used to establish background concentrations in the vicinity of the source(s) under consideration." Section 8.2.1.c further states that "[i]f the source is not isolated, it may be necessary to use a multi-source model to establish the impact of nearby sources." While many applications will be required to include both monitored and modeled contributions to adequately account for background concentrations in the cumulative analysis, we believe that these statements imply a preference for use of ambient air quality data to account for background concentrations where possible.

Many of the challenges and more controversial issues related to cumulative impact assessments arise in the context of how best to combine a monitored and modeled contribution to account for background concentrations. Addressing these issues requires an assessment of the spatial and temporal representativeness of the background monitored concentrations for purposes of the cumulative impact assessment and the potential for double counting of impacts from modeled sources that may be contributing to the monitored concentrations. This assessment may

involve significant technical details which could complicate the review process. Therefore, the more thoroughly and clearly these issues are documented the more efficient and effective the review process is likely to be.

A key point to remember when assessing these issues is their interconnectedness – the question of which nearby background sources should be included in the cumulative modeling analysis is inextricably linked with the question of what ambient monitoring data is available and what that data represents in relation to the application. Furthermore, the question of how to appropriately combine monitored and modeled concentrations (temporally and spatially) to determine the cumulative impact depends on a clear understanding of what the ambient monitored data represents in relation to the modeled emission inventory. A more detailed temporal pairing of monitored and modeled concentrations may be acceptable in one case given the extent of the modeled emission inventory, while a more conservative assumption for combining monitored and modeled concentrations using high ranked monitored concentrations may be sufficient to justify a more limited modeling inventory. As noted above, the stringency of the new standard may require a more detailed and refined analysis of these issues in order to demonstrate compliance with the standards than was necessary in the past, and these refinements will generally increase the burden on the applicant to adequately demonstrate that the net result of the analysis is protective of the standard. A detailed analysis and explanation of any potential bias to the net result introduced by proposed refinements will be important to facilitate the review process. The issues associated with determining an appropriate method for combining modeled and monitored contributions to a cumulative impact assessment are discussed in more detail in the next section.

Building on the geographical information recommended above for the initial SIL analysis, we suggest including the following documentation:

1. A geographical depiction of the location and magnitude of nearby emission sources, along with the location and magnitude of any ambient monitored data as part of the documentation submitted with a cumulative impact assessment.
2. Depicting the impact area and pattern of the project impacts on such a figure along with a wind rose should be useful in assessing many of the issues touched on above, such as what nearby sources are likely to cause significant concentration gradients in the vicinity of the project source, or more specifically in the areas of high impacts associated with the project source. This figure should also help to identify what nearby source's impacts are likely to be adequately represented in the available monitored data and the potential for double counting of impacts from modeled background sources if certain ambient background data are used.
3. In addition to a standard wind rose, pollution roses (i.e., a depiction of monitored pollutant concentrations as a function of wind direction and/or other meteorological factors) should also be useful for purposes of assessing the representativeness of the monitoring background concentrations in relation to the cumulative impact assessment.

Finally, we reiterate the importance of close coordination with the appropriate reviewing authority in the determination of nearby or other sources to include in the modeled emission inventory.

Significant Concentration Gradient Criterion

While Appendix W (Section 8.2.3.b) identifies "a significant concentration gradient in the vicinity of the source" as the sole criterion in relation to determining which nearby sources should be explicitly modeled as part of the cumulative impact assessment, little else has been written to explain what "significant" means in this context or even what the relevance of a "significant concentration gradient" is for this purpose. In fact, Appendix W states that no attempt was made to "comprehensively define" the term, "owing to both the uniqueness of each modeling situation and the large number of variables involved in identifying nearby sources." Section 8.2.3.b. Nothing has fundamentally changed to alter this characterization, but given the issues and challenges arising from the implementation of the new 1-hour NO_2 standard, we feel compelled to offer some additional explanation regarding what this guidance means and how it should be applied.

One definition of the term "gradient" that applies in this context is "the rate of change of a physical quantity . . . with distance[5]." In this case the physical quantity is the ground-level concentration of the pollutant being assessed. The first point worth noting is that the gradient of the ground-level concentration has two dimensions, a longitudinal (along-wind) gradient and a lateral (cross-wind) gradient. Appendix W makes no distinction as to which gradient is more important or whether both gradients should be considered. Before offering any suggestions on that question, it might be helpful to offer some thoughts on the question of why a significant concentration gradient is mentioned as the sole criterion. Since an ambient monitor is limited to characterizing air quality at a fixed location, the impact from a nearby source that causes a significant concentration gradient in the vicinity of the project source is not likely to be characterized very well by the monitored concentration in terms of its potential for contributing to the cumulative modeled design value due to the high degree of variability of the source's impact. In this sense both the longitudinal and lateral gradients could be of importance. However, since the location of impacts from a particular source relative to other sources being modeled or relative to the ambient monitor location is strongly influenced by the transport wind direction, relatively minor changes in wind direction can result in significant changes in modeled concentrations at a particular time and point in space, such as the monitor location. The longitudinal gradient will also vary as a result of changes in wind speed and atmospheric stability, but in general the impact of this longitudinal variability on concentrations at a particular time and point in space will be less significant than the variability associated with the lateral gradient. From this perspective it would appear that the lateral gradient may be more important to consider for purposes of assessing which background sources should be explicitly modeled.

Concentration gradients associated with a particular source will generally be largest between the source location and the distance to the maximum ground-level concentrations from the source. Beyond the maximum impact distance, concentration gradients will generally be much smaller and more spatially uniform. A general "rule of thumb" for estimating the distance

[5] Webster's New World College Dictionary, Copyright © 2010 by Wiley Publishing, Inc., Cleveland, Ohio.

to maximum 1-hour impact and the region of significant concentration gradients that may apply in relatively flat terrain is approximately 10 times the source release height. For example, the maximum impact area and region of significant concentration gradients associated with a 100 meter stack in flat terrain would be approximately 1,000 meters downwind of the source, with some variation depending on the source characteristics affecting plume rise. However, the potential influence of terrain on maximum 1-hour pollutant impacts may also significantly affect the location and magnitude of concentration gradients associated with a particular source. Even accounting for some terrain influences on the location and gradients of maximum 1-hour concentrations, these considerations suggest that the emphasis on determining which nearby sources to include in the modeling analysis should focus on the area within about 10 kilometers of the project location in most cases. The routine inclusion of all sources within 50 kilometers of the project location, the nominal distance for which AERMOD is applicable, is likely to produce an overly conservative result in most cases.

The relative importance of the lateral vs. the longitudinal gradient will also depend on terrain effects and other factors, such as the atmospheric stability associated with worst-case impacts. The importance of the lateral gradient relative to the longitudinal gradient will generally increase for sources where maximum hourly impacts occur under stable conditions due to the narrowness of the plume under such conditions. The contour plots of modeled design values suggested above provide a method for examining concentration gradients more explicitly. The AERSCREEN model should also serve as a useful tool for identifying the worst-case meteorological conditions for individual sources, as well as determining locations of maximum impact and areas of significant concentration gradients.

A final point to mention in relation to this topic is that the pattern of concentration gradients can vary significantly based on the averaging period being assessed. In general, concentration gradients will be smaller and more spatially uniform for annual averages than for short-term averages, especially hourly averages. The spatial distribution of annual impacts around a source will typically have a single peak “downwind” of the source based on the prevailing wind direction, except in cases where terrain or other geographical effects are important. By contrast, the spatial distribution of peak hourly impacts will typically show several localized concentration peaks with more significant gradients. The number of peaks and the magnitude of the gradients will be somewhat smaller for modeled design values based on the form of the 1-hour NO_2 standard than for overall peak hourly values, due to the smoothing effect of using a multiyear average of the 98th-percentile from the annual distribution of daily maximum values. One implication of these differences between long-term and short-term concentration patterns is that the factors affecting which sources should be included in the modeled inventory and the method for combining modeled with monitored concentrations are more complex for the 1-hour NO_2 standard than for the annual standard.

While we hope this discussion provides some useful insight into this issue, we also caution against interpreting this guidance too literally or too narrowly, and emphasize that a “large number of variables” (Appendix W, Section 8.2.3.b) are involved in this assessment.

COMBINING MODELED RESULTS AND MONITORED BACKGROUND TO DETERMINE COMPLIANCE

One important aspect of the cumulative impact assessment that also deserves further discussion and entails new challenges with the 1-hour NO_2 NAAQS is the method for combining modeled concentrations with monitored background concentrations to determine the cumulative ambient impact. The June 29, 2010 memo indicated that a "first tier" assumption for a uniform monitored background contribution that may be applied without further justification is to add the overall highest hourly background NO_2 concentration (across the most recent three years) from a representative monitor to the modeled design value[6] for comparison to the NAAQS. Use of a single uniform monitored background contribution is the simplest approach to implement since it can be applied outside of the modeling system. We recognize that use of the overall highest hourly background concentration may be overly conservative in many cases, but that conservatism also provided the basis for indicating that this approach could be used without further justification. As explained above, the more conservative the assumptions on which the cumulative analysis is based, the more confidence there will be that the goal of demonstrating that the source will not cause or contribute to violations of the NAAQS has been achieved and the less controversial the review process will be from the perspective of the reviewing authority. The June 29, 2010 memo also indicated that additional refinements to this "first tier" approach based on some level of temporal pairing of modeled and monitored values may be considered on a case-by-case basis, with adequate justification and documentation. Given the importance of this aspect of the analysis and the challenges that have arisen in application of the guidance to date, we feel compelled to offer additional guidance on this issue.

While the "first tier" assumption from the June 29, 2010 memo of using a uniform monitored background contributions based on the overall highest hourly background NO_2 concentration should be acceptable without further justification in most cases, we recognize that this approach could be overly conservative in many cases and may also be prone to reflecting source-oriented impacts from nearby sources, increasing the potential for double-counting of modeled and monitored contributions. Based on these considerations, we believe that a less conservative "first tier" for a uniform monitored background contribution based on the monitored design value from a representative monitor should be acceptable in most cases. The monitored NO_2 design value, i.e., the 98th-percentile of the annual distribution of daily maximum 1-hour values averaged across the most recent three years of monitored data[7], should be used irrespective of the meteorological data period used in the dispersion modeling. This somewhat less conservative "first tier" for a uniform monitored background contribution retains the advantage of being relatively easy to implement.

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[6] The 1-hour NO_2 "modeled design value" refers to the highest (across all modeled receptors) of the 5-year average of the 98th-percentile (8th-highest) of the annual distribution of daily maximum 1-hour values based on NWS meteorological data, or the multiyear average of the 98th-percentile of the annual distribution of daily maximum 1-hour values based on one or more complete years (up to 5 years) of site-specific meteorological data. The1-hour SO_2 "modeled design value" follows the same form except that the multiyear averages of the 99th-percentile (4th-highest) values are used.

[7] The monitored design value for the 1-hour SO_2 standard is based on the 99th-percentile of the annual distribution of daily maximum 1-hour values averaged across the most recent three years of monitored data.

Depending on the circumstances of a particular application, use of a "first tier" assumption for a uniform monitored background contribution may represent a level of conservatism that would obviate the need to include any background sources in the modeled inventory if, for example, the number of nearby sources which could contribute to the cumulative impact is relatively few and the available ambient monitor would be expected to reflect their cumulative impacts reasonably well or conservatively in relation to the modeled design value based on the project emissions. At the other extreme, if the background source inventory included in the modeling is complete enough and background levels due to mobile sources and/or minor sources that are not explicitly modeled is expected to be small, an analysis based solely on modeled emissions and no monitored background might be considered adequate for purposes of the cumulative impact assessment.

One of the important factors to consider in relation to this issue is that the standard is based on the annual distribution of daily maximum 1-hour values, which implies that diurnal patterns of ambient impacts could play a significant role in determining the most appropriate method for combining modeled and monitored concentrations. For example, if the daily maximum 1-hour impacts associated with the project emissions generally occur under nighttime stable conditions whereas maximum monitored concentrations occur during daytime convective conditions, pairing modeled and monitored concentrations based on hour of day should provide a more appropriate and less conservative estimate of cumulative impacts than a method that ignores this diurnal pattern. This situation could occur for applications dominated by low-level sources and for elevated releases subject to plume impaction on nearby complex terrain. It is also important to consider the role of NO_x chemistry for applications using the Tier 3 options in AERMOD since diurnal patterns of background ozone concentrations may also factor into the diurnal patterns of modeled impacts. Given the potential contribution of background ozone levels to the temporal variability of modeled impacts, the seasonal variability of background monitored values could also be important. Incorporating a seasonal component to the variability of background monitored concentrations will also account for some of the variability in meteorological conditions that may contribute to high hourly impacts.

Another situation where understanding the temporal variability of modeled vs. monitored concentrations could be important in determining the most appropriate method for combining modeled and monitored concentrations is where contributions from mobile source emissions contribute significantly to either the monitored background concentrations and/or the modeled concentrations. In these cases, diurnal variability of emissions associated with morning and afternoon rush hours could contribute to the temporal variability of ambient impacts in addition to meteorological factors associated with the dispersion and conversion of NO_x emissions. Since rush hours tend to be relatively fixed in terms of time of day and also occur near the transitions from nighttime stable to daytime convective conditions, and vice versa, incorporating a seasonal or monthly element to the temporal variability should account for the variable effect that dispersion conditions may have depending on whether rush hour occurs during stable or convective hours.

With these general considerations in mind, we now examine the following guidance in relation to the use of background monitored concentrations in a cumulative impact assessment, from Section 8.2.2 of Appendix W, which applies to applications for isolated sources and for the

contribution of "other sources" consisting of "[t]hat portion of the background attributable to all other sources (e.g., natural sources, minor sources and distant major sources)" in a multi-source area:

> b. Use air quality data collected in the vicinity of the source to determine the background concentration for the averaging times of concern. Determine the mean background concentration at each monitor by excluding values when the source in question is impacting the monitor. The mean annual background is the average of the annual concentrations so determined at each monitor. For shorter averaging periods, the meteorological conditions accompanying the concentrations of concern should be identified. Concentrations for meteorological conditions of concern, at monitors not impacted by the source in question, should be averaged for each separate averaging time to determine the average background value. Monitoring sites inside a 90° sector downwind of the source may be used to determine the area of impact. One hour concentrations may be added and averaged to determine longer averaging periods.
>
> c. If there are no monitors located in the vicinity of the source, a ''regional site'' may be used to determine background. A ''regional site'' is one that is located away from the area of interest but is impacted by similar natural and distant man-made sources.

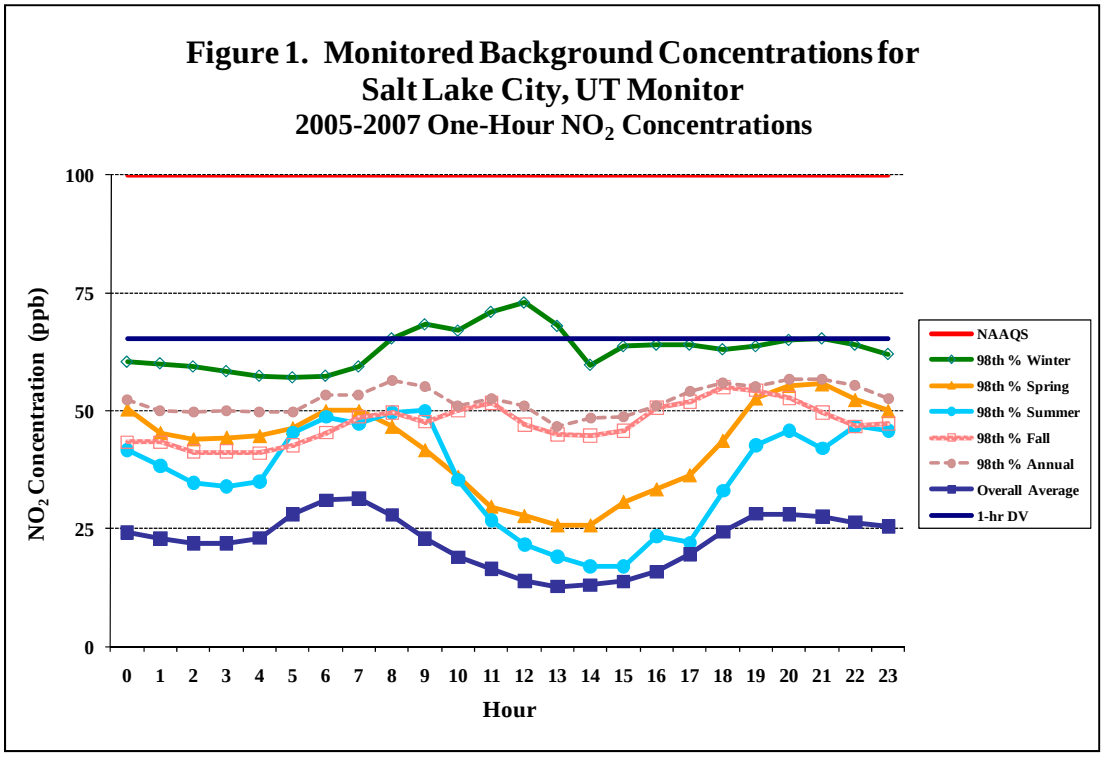
The key principle in this guidance in relation to short-term averaging periods is to determine background concentrations associated with "meteorological conditions accompanying the concentrations of concern." The concentrations thus determined "should be averaged for each separate averaging time to determine the average background value."

Based on this guidance, we believe that an appropriate methodology for incorporating background concentrations in the cumulative impact assessment for the 1-hour NO_2 standard would be to use multiyear averages of the 98th-percentile[8] of the available background concentrations by season and hour-of-day, excluding periods when the source in question is expected to impact the monitored concentration (which is only relevant for modified sources). For situations involving a significant mobile source component to the background monitored concentrations, inclusion of a day-of-week component to the temporal variability may also be appropriate. The rank associated with the 98th-percentile of daily maximum 1-hour values should be generally consistent with the number of "samples" within that distribution for each combination based on the temporal resolution but also account for the number of samples "ignored" in specifying the 98th-percentile based on the annual distribution. For example, Table 1 in Section 5 of Appendix S specifies the rank associated with the 98th-percentile value based on the annual number of days with valid data. Since the number of days per season will range from 90 to 92, Table 1 would indicate that the 2nd-highest value from the seasonal distribution should be used to represent the 98th-percentile. On the other hand use of the 2nd-highest value for each season would effectively "ignore" only 4 values for the year rather than the 7 values "ignored" from the annual distribution. Balancing these considerations we recommend that background values by season and hour-of-day used in this context should be based on the 3rd-highest value for each season and hour-of-day combination, whereas the 8th-highest value should be used if values vary by hour-of-day only. For more detailed temporal pairing, such as season by hour-of-

[8] The 99th-percentile should be used for the 1-hour SO_2 standard.

day and day-of-week or month by hour-of-day, the 1st-highest values from the distribution for each temporal combination should be used.[9]

Figure 1 shows the background monitored concentrations by season and hour-of-day for the Salt Lake City, UT monitor for the period 2005-2007 based on these recommendations. The values labeled "Average Winter", "Average Spring", etc. are the 3-year averages of the 3rd-highest values by hour-of-day for each season; the values labeled "Average 98th %" (the dashed line) are the 3-year average of the 8th-highest values by hour-of-day only; and the values labeled "Overall Average" are the averages across all values by hour-of-day. These results illustrate the significant temporal variability captured by the multiyear averages of the 98th-percentile values by season and hour-of-day. Also note that values for the 98th-percentile by hour-of-day only show little variation by hour-of-day, while values by season and hour-of-day show significant diurnal variability for some seasons.



It should also be noted here that the conventions regarding observation reporting time differ between ambient air quality monitoring, where the observation time is based on the hour-beginning convention (EPA, 2009; see Section 3.20), and meteorological monitoring where the observation is based on the hour-ending convention (EPA, 2000; see Section 7.1). Thus, ambient monitoring data reported for hour 00 should be paired with modeled/meteorological data for hour 01, etc. The recent update to the AERMOD model (dated 11059) provides an option (the BACKGRND keyword on the SO pathway) to include temporally-varying background concentrations within the cumulative impact assessment based on these temporal factors, similar

[9] For 1-hour SO_2 analyses, use the 2nd-highest value for each season and hour-of-day combination, or the 4th-highest value for hour-of-day only. Use the 1st-highest value for more detailed pairing, such as month by hour-of-day or season by hour-of-day and day-of-week.

to the options that have been available in previous versions of the model to vary source emissions using the EMISFACT keyword. We believe that this technique provides a reasonable and efficient method for ensuring that the monitored contribution to the cumulative impact assessment will be representative of the "meteorological conditions accompanying the concentrations of concern" since the monitored values will be temporally paired with modeled concentrations based on temporal factors that are associated with meteorological variability, but will also reflect worst-case meteorological conditions in a manner that is consistent with the probabilistic form of the 1-hour NO_2 standard. The use of multiyear-averaged monitored values for the meteorological conditions of concern is consistent with the language in Appendix W related to this issue, and also consistent with the intent of using monitored background concentrations, which is to reflect the contribution from natural or regional levels of pollution and the net contribution of minor emission sources which are not explicitly accounted for in the modeled inventory.

Since several applications have come to our attention proposing to combine monitored background and modeled concentrations on an hour-by-hour basis, using hourly monitored background data collected concurrently with the meteorological data period being processed by the model, we feel compelled to include a discussion of the potential merits and concerns regarding such an approach. On the surface this approach could be perceived as being a more "refined" method than what is recommended above, and therefore more appropriate. However, the implicit assumption underlying this approach is that the background monitored levels for each hour are spatially uniform and that the monitored values are fully representative of background levels at each receptor for each hour. Such an assumption clearly ignores the many factors that contribute to the temporal and spatial variability of ambient concentrations across a typical modeling domain on an hourly basis. Therefore we do not recommend such an approach except in rare cases of relatively isolated sources where the available monitor can be shown to be representative of the ambient concentration levels in the areas of maximum impact from the proposed new source. Another situation where such an approach may be justified is where the modeled emission inventory clearly represents the majority of emissions that could potentially contribute to the cumulative impact assessment and where inclusion of the monitored background concentration is intended to conservatively represent the potential contribution from minor sources and natural or regional background levels not reflected in the modeled inventory. In this case, the key aspect which may justify the hour-by-hour pairing of modeled and monitored values is a demonstration of the overall conservatism of the cumulative assessment based on the combination of modeled and monitored impacts. Except in rare cases of relatively isolated sources, a single ambient monitor, or even a few monitors, will not be adequately representative of hourly concentrations across the modeled domain to preclude the need to include emissions from nearby background sources in the modeled inventory.

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ATTACHMENT A

Summary of AERMOD Model Performance for 1-hour NO2 Concentrations

As noted in the June 29, 2010 memo, limited evaluations of the Plume Volume Molar Ratio Method (PVMRM) for estimating conversion of NO to NO_2 have been completed which show encouraging results, but the amount of data currently available is too limited to justify a designation of PVMRM as a refined method for NO_2 (Hanrahan, 1999; MACTEC, 2005). The original evaluations of PVMRM also focused on model performance for annual averages since the only NO_2 standard in effect at the time was annual. These evaluations have recently been updated to reflect the current AERMOD modeling system components and extended to examine model performance for hourly NO_2 concentrations and to include the Ozone Limiting Method (OLM). Preliminary results from these recent evaluations are presented below in the form of Q-Q plots of ranked hourly NO_2 concentrations for the two monitors included in the New Mexico Empire Abo field study and for the single monitor included in the Palaau, HI field study. Evaluation results are also summarized in the form of predicted vs. observed 1-hour Robust Highest Concentrations (RHC), a model evaluation metric that represents an exponential tail fit to the top 26 ranked values in the distribution of hourly concentrations. Note that the OLM results presented here incorporate an equilibrium NO_2/NO_x ratio of 0.90, consistent with the PVMRM option.

Figures A-1 and A-2 show results in the form of hourly Q-Q plots for the North monitor and the South monitor, respectively, from the New Mexico field study based on the Tier 1 option of full conversion of NO to NO_2, the OLM option applied on a source-by-source basis, the OLM option applied using OLMGROUP ALL (OLMGRP), as recommended in the June 29, 2010, NO_2 clarification memorandum, and the PVMRM option. The New Mexico results clearly show the conservatism associated with the Tier 1 assumption of full conversion and the OLM option on a source-by-source basis, with both options showing a significant bias to overpredict hourly NO_2 concentrations. The OLMGRP option exhibits the best performance for both New Mexico monitors, with nearly unbiased results for the North monitor and a slight bias to overpredict for the South monitor. The PVMRM option shows significantly better performance than full conversion or source-by-source OLM for both monitors, but not as good performance as the OLMGRP option.

Figure A-3 shows the hourly Q-Q plot for Palaau based on the same range of options shown in Figures A-1 and A-2. Similar to the New Mexico results, the Tier 1 option of full conversion and the OLM option applied on a source-by-source basis show a significant bias to overpredict hourly NO_2 concentrations at Palaau. The PVMRM option shows the best performance for this field study with very good agreement between predicted and observed concentrations. The use of the OLMGRP option clearly improves model performance as compared to application of the OLM option on a source-by-source basis, with the peak predicted concentrations within a factor of 2 higher than observed. These Q-Q plot comparisons are consistent with the comparisons of RHCs summarized in Table A-1, where the average (geometric mean) ratios of Predicted/Observed RHCs for PVMRM and OLMGRP are about 1.5 and 1.2, respectively, and the average RHC ratios for OLMGRP and FULL conversion are much higher at 4.5 and 5.0.

Since these Tier 3 options in AERMOD are intended to estimate the conversion of ambient NO to NO_2, it is also useful to compare the modeled vs. observed NO_2/NO_x ratios since offsetting errors in dispersion vs. conversion could mask poor model performance. Table A-2 summarizes the observed vs. predicted NO_2/NO_x ratios for the three monitors included in these Palaau and New Mexico field studies. These results are generally consistent with the hourly Q-Q plots of NO_2 concentrations, and clearly indicate that the OLM option on a source-by-source basis significantly overestimates the conversion of NO to NO_2. However, results for the New Mexico South monitor are interesting in that the PVMRM option shows much better agreement with observed NO_2/NO_x ratios than the OLMGRP option, whereas the OLMGRP option indicates better performance than PVMRM in terms of hourly NO_2 concentrations.

These preliminary model evaluation results of hourly NO_2 predictions for Palaau and New Mexico show generally good performance for the PVMRM and OLMGROUP ALL options in AERMOD; however, it should be emphasized that these results are very limited in terms of the number of monitors. Although the scope of the field study data is limited, this level of model performance on a paired-in-space basis is impressive, especially for the PVMRM option at Palaau and for the OLMGROUP ALL option for the North monitor at New Mexico. We believe that these additional model evaluation results lend further credence to the use of these Tier 3 options in AERMOD for estimating hourly NO_2 concentrations and to the recommendation to use the OLMGROUP ALL option whenever OLM is applied.

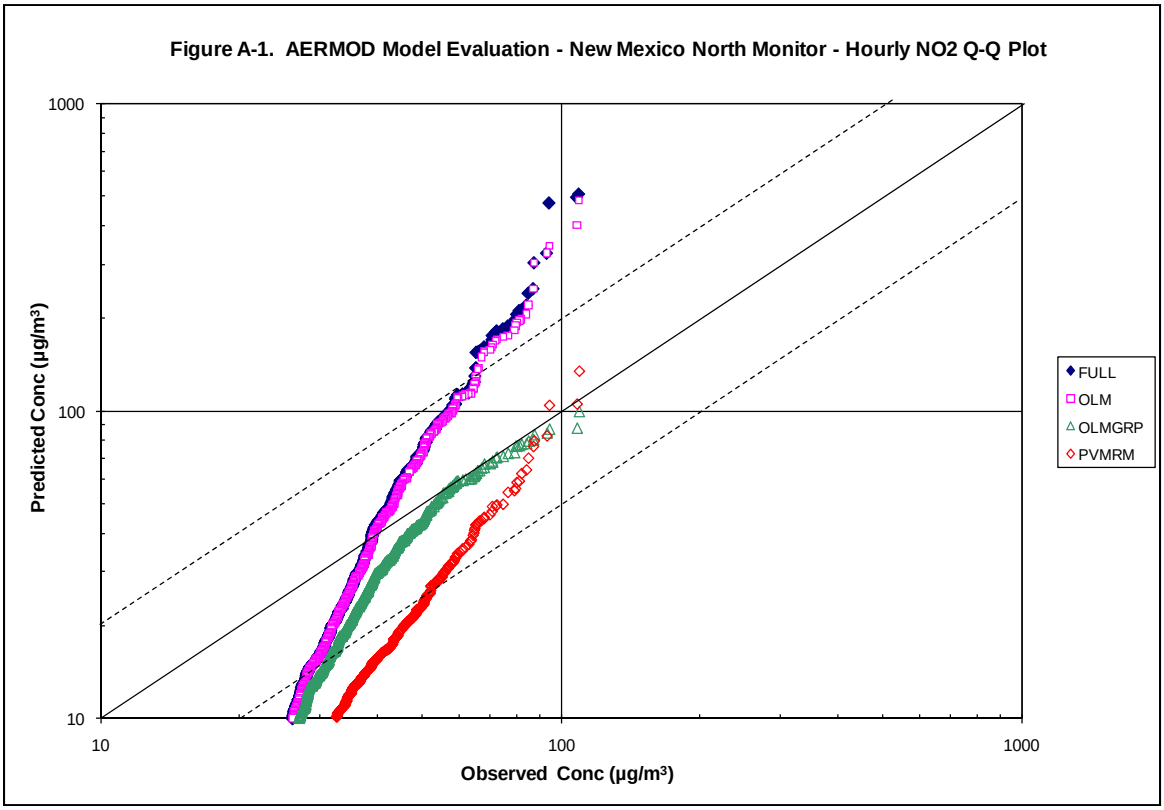
Figure A-1. AERMOD Model Evaluation - New Mexico North Monitor - Hourly NO2 Q-Q Plot
1000
100
10
Predicted Conc (µg/m³)
10
100
1000
Observed Conc (µg/m³)
FULL
OLM
OLMGRP
PVMRM

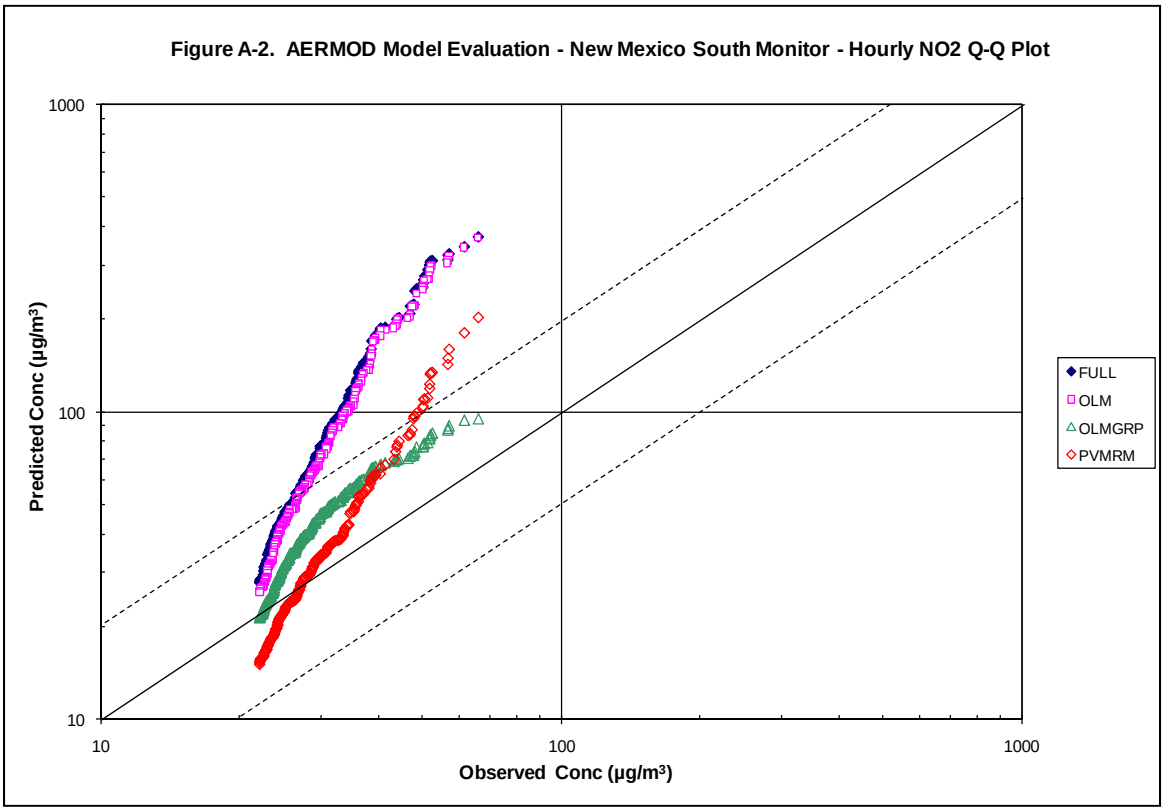
Figure A-2. AERMOD Model Evaluation - New Mexico South Monitor - Hourly NO2 Q-Q Plot
1000
100
10
Predicted Conc (µg/m³)
10
100
1000
Observed Conc (µg/m³)
FULL
OLM
OLMGRP
PVMRM

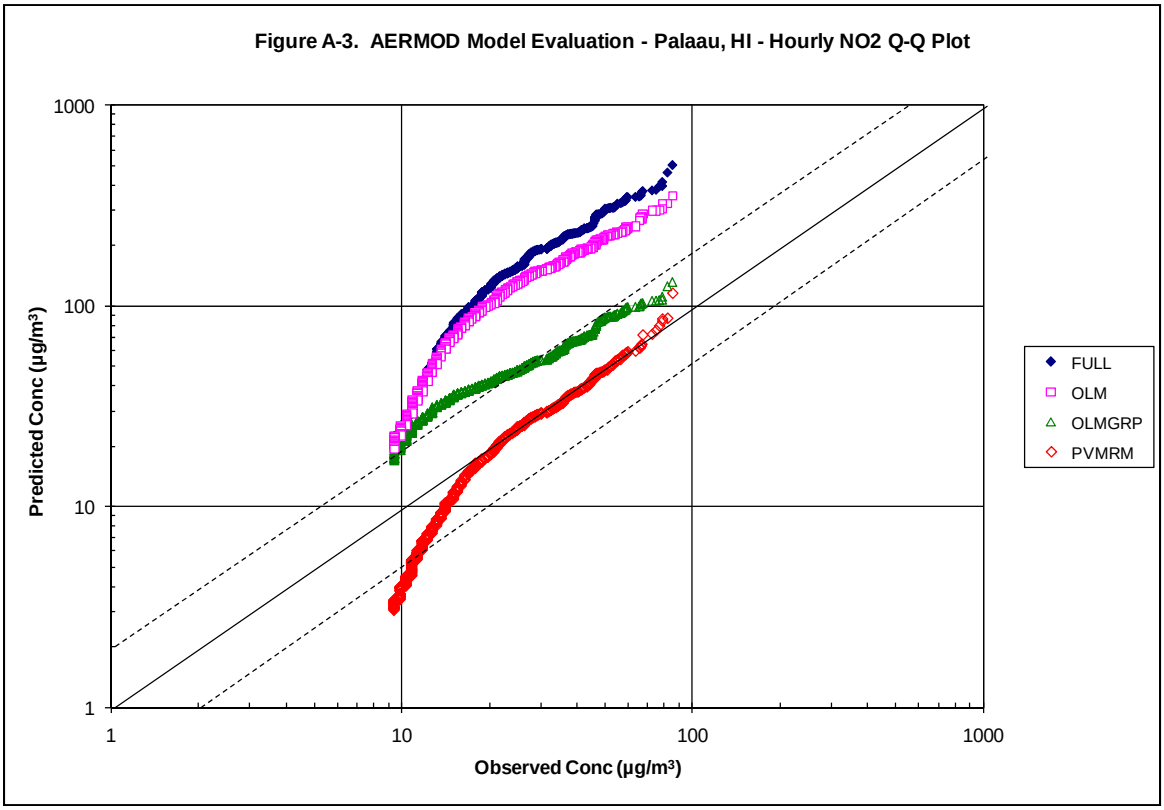

Table A-1. 1-hour NO_2 Robust Highest Concentrations (µg/m^3)

	Observed	PVMRM	OLMGRP	OLM	FULL
New Mexico Abo North Monitor RHC	117.87	116.26	108.38	444.87	449.24
New Mexico Abo South Monitor RHC	70.10	218.98	104.81	440.96	454.68
Hawaii Palaau Monitor RHC	95.42	101.57	113.18	368.57	480.38
Geometric Mean Pred/Obs RHC	---	1.486	1.177	4.510	4.993

Table A-2. Average Unpaired NO_2/NO_x Ratios for Monitored Values of NO_x > 20 ppb

	Monitored NO_2/NO_x	PVMRM NO_2/NO_x	OLMGRP NO_2/NO_x	OLM NO_2/NO_x
New Mexico Abo North Monitor (n=772)	0.455	0.377	0.669	0.976
New Mexico Abo South Monitor (n=262)	0.363	0.437	0.491	0.950
Hawaii Palaau Monitor (n=672)	0.138	0.163	0.376	0.854
Geometric Mean Pred/Obs Ratios	---	1.056	1.756	3.263