APPENDIX A:
Historical Site Assessment

A Cultural Resources Survey for the Quarry Park Master Plan Saratoga, Santa Clara County, California

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July 2, 2013

A Cultural Resources Survey for the Quarry Park Master Plan Saratoga, Santa Clara County, California

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ABSTRACT

Tom Origer & Associates conducted a cultural resources survey for the City of Saratoga's Quarry Park Master Plan in Santa Clara County, California, as requested by The Planning Center | DC&E. The study area is located about two miles southwest of the City of Saratoga's civic center. It includes two parcels (APN 503-48-045 and 517-32-001) comprising 63.35 acres on the south side of Highway 9. This study was conducted in compliance with the California Environmental Quality Act.

The study included archival research at the Northwest Information Center, Sonoma State University (NWIC File No.12-1506), examination of the library and files of Tom Origer & Associates, contact with the Native American Heritage Commission, and field inspection of the project area. Field survey found no prehistoric resources within the study area. The remains of a 20th century quarry and a mid-20th century recreation area were identified and documented during this study. Documentation pertaining to this study is on file at the offices of Tom Origer & Associates (File No. 13-047).

Synopsis

Project:	Quarry Park Master Plan
Location:	Highway 9, Saratoga, Santa Clara County, California
APN:	503-48-045 and 517-32-001
Quadrangle:	Cupertino and Castle Rock Ridge, California 7.5’ series
Study Type:	Mixed-strategy survey
Scope:	63.35 acres
Finds:	Historical quarry remains and mid-20th century recreational area

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INTRODUCTION

This report describes a cultural resources survey of the Quarry Park Master Plan Area in Santa Clara County, California (Figure 1), as requested by The Planning Center | DC&E. The project is located about two miles southwest of the City of Saratoga's civic center, and includes 63.35 acres on the south side of Highway 9. The City of Saratoga acquired the property from the County of Santa Clara for open space and recreational use. The study was designed in compliance with the California Environmental Quality Act. Documentation pertaining to this study is on file at Tom Origer & Associates (File No. 13-044).

REGULATORY CONTEXT

The California Environmental Quality Act (CEQA) requires that cultural resources be considered during the environmental review process. This is accomplished by an inventory of resources within a study area and by assessing the potential that cultural resources could be affected by development.

This cultural resources survey was designed to satisfy environmental issues specified in the CEQA and its guidelines (Title 14 CCR §15064.5) by: (1) identifying all cultural resources within the project area; (2) offering a preliminary significance evaluation of the identified cultural resources; (3) assessing resource vulnerability to effects that could arise from project activities; and (4) offering suggestions designed to protect resource integrity, as warranted.

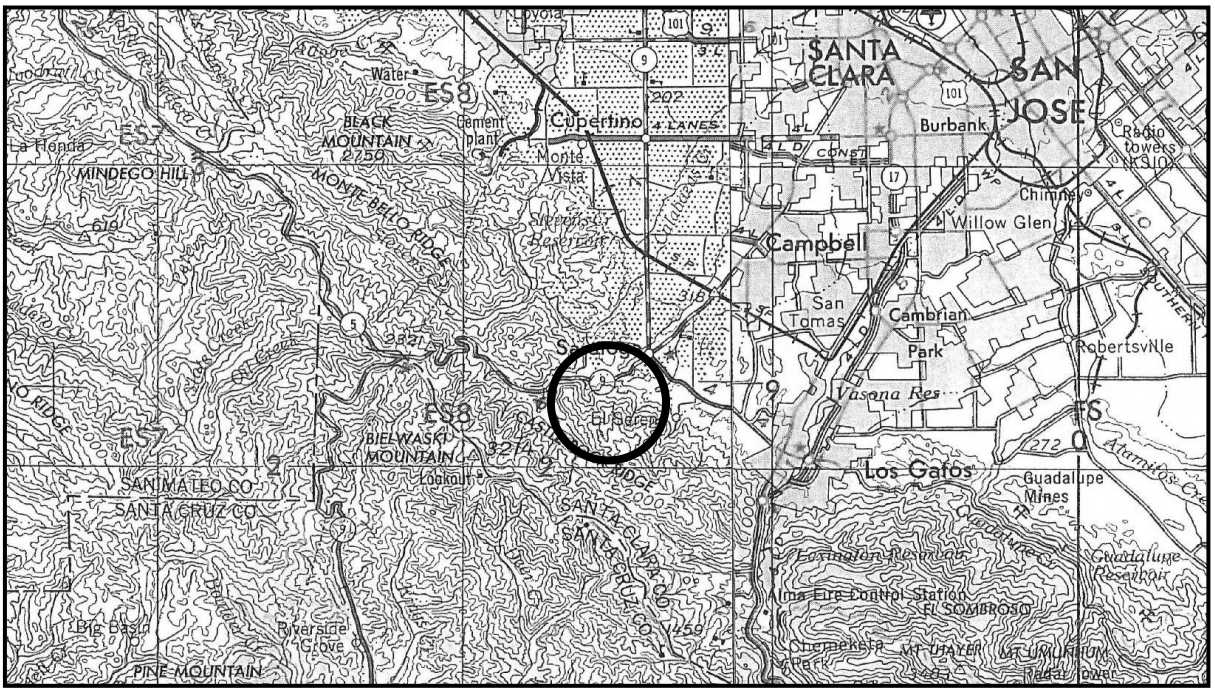

Figure 1. Project vicinity (adapted from the 1960 San Francisco and San Jose 1:250,000-scale USGS maps).

Resource Definitions

Cultural resources are classified by the State Office of Historic Preservation (OHP) as sites, buildings, structures, objects and districts, and each is described by OHP (1995) as follows.

> **Site.** A site is the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archaeological value regardless of the value of any existing structure.
>
> **Building.** A building, such as a house, barn, church, hotel, or similar construction, is created principally to shelter any form of human activity. "Building" may also be used to refer to a historically and functionally related unit, such as a courthouse and jail, or a house and barn.
>
> **Structure.** The term "structure" is used to distinguish from buildings those functional constructions made usually for purposes other than creating human shelter.
>
> **Object.** The term "object" is used to distinguish from buildings and structures those constructions that are primarily artistic in nature or are relatively small in scale and simply constructed. Although it may be, by nature or design, movable, an object is associated with a specific setting or environment.
>
> **District.** A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

Significance Criteria

When a project might affect a cultural resource, the project proponent is required to conduct an assessment to determine whether the effect may be one that is significant. Consequently, it is necessary to determine the importance of resources that could be affected. The importance of a resource is measured in terms of criteria for inclusion on the California Register of Historical Resources (Title 14 CCR, §4852) as listed below. A resource may be important if it meets any one of the criteria below, or if it is already listed on the California Register of Historical Resources or a local register of historical resources.

An important historical resource is one which:

1. Is associated with 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.

2. Is associated with the lives of persons important to local, California, or national history.

3. It 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.

4. It has yielded, or may be likely to yield, information important to the pre-history or history of the local area, California, or the nation.

In addition to meeting one or more of the above criteria, eligibility for the California Register requires that a resource retains sufficient integrity to convey a sense of its significance or importance. Seven elements are considered key in considering a property's integrity: location, design, setting, materials, workmanship, feeling, and association.

The OHP advocates that all historical resources over 45 years old be recorded for inclusion in the OHP filing system (OHP 1995:2), although professional judgment is urged in determining whether a resource warrants documentation.

PROJECT DESCRIPTION AND SETTING

Study Area Location and Description

The study area is located in northwestern Santa Clara County, two miles southwest of the city of Saratoga, as shown on the Cupertino and Castle Rock Ridge, California 7.5' USGS quadrangles (Figure 2). It includes 64.35 acres of wooded uplands on the south side of Highway 9 (Big Basin Way).

Geologically, this area consists of rocks of the Jurassic and Cretaceous Franciscan Formation that range from 205 to 65 million old. Included in the Franciscan Formation are greywacke sandstone, shale, chert, and conglomerates (Jenkins and Burnett 1961). Soils mapped for the study area are primarily those of the Katykat-Mouser-Sanikara complex (Natural Resources Conservation Service 2013). Soils associated with this complex are well-drained loam and gravelly, sandy loam found on slopes ranging from 30 to 50 percent. In an uncultivated state, these soils support the growth of annual grasses, poison oak, California live oak, bay laurel, and buckeye. Historically, parcels with these soils have been used for wildlife habitat, watershed, and recreation.

Cultural Setting

Prehistoric

Archaeological evidence indicates that human occupation of California began at least 12,000 years ago (Fredrickson 1984:506). Early occupants appear to have had an economy based largely on hunting, with limited exchange, and social structures based on extended family units. Later, milling technology and an inferred acorn economy were introduced. This diversification of economy appears coeval with the development of sedentism, population growth, and expansion. Sociopolitical complexity and status distinctions based on wealth are also observable in the archaeological record, as evidenced by an increased range and distribution of trade goods (e.g., shell beads, obsidian tool stone), which are possible indicators of both status and increasingly complex exchange systems.

Ethnographic

At the time of European settlement, the study area was included in the territory controlled by the Ohlone, who are also referred to as Costanoans (Levy 1978:485-495). The Ohlone were hunter-gatherers who lived in rich environments that allowed for dense populations with complex social structures (Levy 1978:485-495; Kroeber 1925:462-473). They settled in large, permanent villages about which were distributed seasonal camps and task-specific sites. Primary village sites were occupied throughout the year and other sites were visited in order to procure particular resources that were especially abundant or available only during certain seasons. Sites often were situated near fresh water sources and in ecotones where plant life and animal life were diverse and abundant.

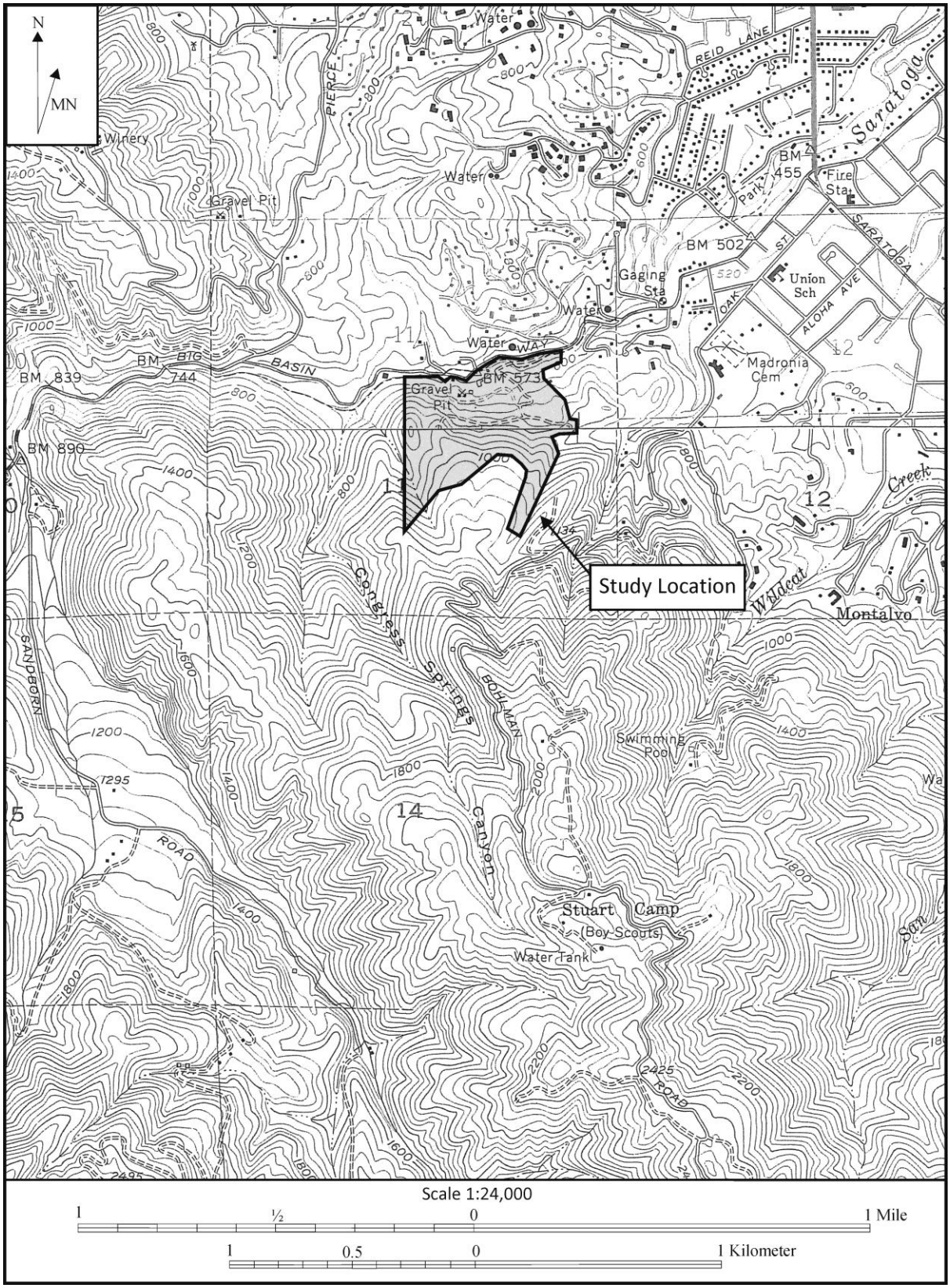

Figure 2. Study location (adapted from the USGS 1980 Cupertino and 1955 Castle Rock Ridge 7.5' maps).

Historical

Saratoga began with the opening of a sawmill in 1848 by William Campbell. Campbell's mill was located two miles east of the present city of Saratoga. During the 1850s, the mill was leased by Martin McCarthy, who then built a toll road to the Santa Clara Valley and founded the town of McCarthysville. In the 1850s, Jud Caldwell discovered mineral springs east of Saratoga and these were developed as Pacific Congress Springs, named for the famous Congress Springs in Saratoga, New York, because the waters had very similar mineral contents. Having changed its name more than once over the previous 15 years, the town was finally named Saratoga in 1865, the same year that a hotel was built at Pacific Congress Springs. The resort proved so popular that the Peninsular Railroad Company ran a spur to the hotel from Saratoga (Figure 2), where travelers could connect with the Southern Pacific Railroad.

Figure 3. Postcard from the turn of the 20th century showing electric railway to Congress Springs.

The resort springs emanated from a canyon just west of the current study area, and the mineral content of the spring water was due in part to the limestone through which it passed. This same limestone brought about another important industry in Saratoga. Within the current study area, limestone was mined and kilns were used to produce lime for use in gold and silver mining during the mid-1850s. In 1956, John Hutchinson took over the operation and ran the kiln for about two years before focusing his efforts on farming. He would later become a merchant in nearby Saratoga Village, but the property remained in the Hutchinson family until near the end of the century.

STUDY PROCEDURES AND RESULTS

Archival Study Procedures

Archival research included examination of the library and project files at Tom Origer & Associates. A review (NWIC File No. 12-1506) was completed of the archaeological site base maps and records, survey reports, and other materials on file at the Northwest Information Center (NWIC), Sonoma State University, Rohnert Park. Sources of information included but were not limited to the current listings of properties on the National Register of Historic Places (National Register), California Historical Landmarks, California Register of Historical Resources (California Register), and California Points of Historical Interest as listed in the Office of Historic Preservation's *Historic Property Directory* (OHP 2012).

The State Office of Historic Preservation has determined that structures in excess of 45 years of age should be considered to be potentially important resources, and former building and structure locations could be potentially important historic archaeological sites. Archival research included an examination of historical maps to gain insight into the nature and extent of historical development in the general vicinity, and especially within and adjacent to the study area. Maps ranged from hand-drawn maps of the 1800s to topographic quadrangles issued by the United States Geological Survey (USGS). Included were General Land Office (GLO) survey plats and early USGS topographic maps.

Archival Study Results

A search of the archaeological base maps at the NWIC found no previous survey and no recorded resources within the project area. Surveys of nearby lands included those by Chavez (1978), Flynn and Roop (1978), Archaeological Resource Management (2000), and Zogg, Pape, and Bryne (2009). As a result of the Flynn and Roop survey, a bedrock mortar (CA-SCL-367) and remains of the Pacific Congress Springs resort (CA-SCL-368H) were identified, and records were completed by S. Kerr (1979a, 1979b). In 2009, Zogg *et al.* further documented the resort and added the Hakone Gardens (P-43-2394) to the number of known resources within a one-half mile radius of the current project area. A fourth nearby resource is CA-SCL-65, a prehistoric habitation site first recorded by L. King in 1973. None of these resources appear to extend onto the Quarry Park property.

There are no reported ethnographic sites within or near the project area (Kroeber 1925; Levy 1985:485).

Review of historical maps found that there was one building on the property in 1899 (USGS 1899).

There are no federally recognized historic properties within the study area (OHP 2012). Hakone Garden, located on the parcel east of the study area, was determined eligible for the National Register in 1998. Additionally, the following entry describes California Historical Landmark No. 435:

> **No. 435 SARATOGA** - The Anza exploring party passed through the Saratoga area March 25, 1776. Lumbering in the mountains, which began in 1847 and continued many years, brought the area's first settlers in 1850. Among other industries established were a lime quarry (1850s), grist mill (1854), tannery (1863), paper mill (1868), and paste-board mill (1870). Pacific Congress Springs was a popular resort from 1866 to 1942. Farmers here pioneered in fruit industry and held Blossom Festivals beginning in 1900, after the end of a drought. [OHP 2013].

Native American Contact

A letter was sent to the State of California's Native American Heritage Commission seeking information from the sacred lands files, which track Native American cultural resources, and the names of Native American individuals and groups that would be appropriate to contact regarding this project. The Native American Heritage Commission replied with a letter dated June 5, 2013, in which they indicated that the sacred land file has no information about the presence of Native American cultural resources in the immediate project area.

Letters were also sent to the following Native American groups and individuals:

Muwekma Ohlone Indian Tribe of the San Francisco Bay Area
Amah/Mutsun Tribal Band
The Ohlone Indian Tribe
Trina Marine Ruano Family
Indian Canyon Mutsun Band of Costanoan
Jakki Kehl
Katherine Erolinda Perez
Linda Yamane

A log of contact efforts is provided at the end of this report (Appendix A), along with copies of correspondence. No comments have been received as of the date of this report.

Field Survey Procedures

A mixed-strategy field survey was completed by Vicki Beard, Eileen Barrow, and Yesenia Chavez on June 12, 2013. Field survey was intensive in areas where the land was flat or gently sloped, and where the presence of environmental attributes such as springs, meadows, ridge crests, benches, and terraces marked the area as having higher archaeological sensitivity. Less attention was given to moderate and steeply-sloped areas, although all areas were visually scanned. Mapped or otherwise known areas of historical use were also sought out. Visibility ranged from good to poor with vegetation being the chief hindrance. Where needed, hoes were used to clear small patches of vegetation so that the ground surface could be inspected.

Prehistoric archaeological site indicators expected to be found in the region include but are not limited to: obsidian and chert flakes and chipped stone tools; slabs and handstones, and mortars and pestles; and locally darkened soils containing some of the previously listed items plus fragments of bone, shellfish, and fire affected stones. Historic period site indicators generally include: fragments of glass, ceramic, and metal objects; milled and split lumber; and structure and feature remains such as building foundations and discrete trash deposits (e.g., wells, privy pits, dumps).

Field Survey Results

No prehistoric resources were found.

Several features of the 20th century quarry were found, primarily in the north-central part of the property (Figure 4). The concrete base of the processing/loading building sits at the base of the hill, just south of the highway. Upslope from this feature is a concrete structure with projecting I-beams that was part of the crusher foundation. A small concrete building was found nearby, as was a concrete-

lined tunnel leading into the hillside. The tunnel has a rectangular opening and is closed with opposing wooden doors. Water seeps from around the tunnel opening and a rock-lined drainage funnels the water toward a picnic area. Upslope from these features is quarry machinery that rides on a track. A road leading to a second concrete-lined tunnel is further upslope. This tunnel was blocked with a wrought iron gate. A dam and a covered, concrete reservoir were found near the central part of the property.

Interspersed with the quarry structures on the hillside above the loading facility are picnic grounds where rock retaining walls and platforms define discreet picnic and barbeque areas. These features were constructed during the 1960s by county road workers. Rocks used to create the structures appear to be native to the site. Pieces of quarry equipment were used to create barbeque pits and were incorporated into the landscaping. A rock grotto is located on the slope below the picnic ground and above the loading facility. Sprinkler heads and faucets were observed in this area and it assumed that these were supplied with water from the reservoir noted above.

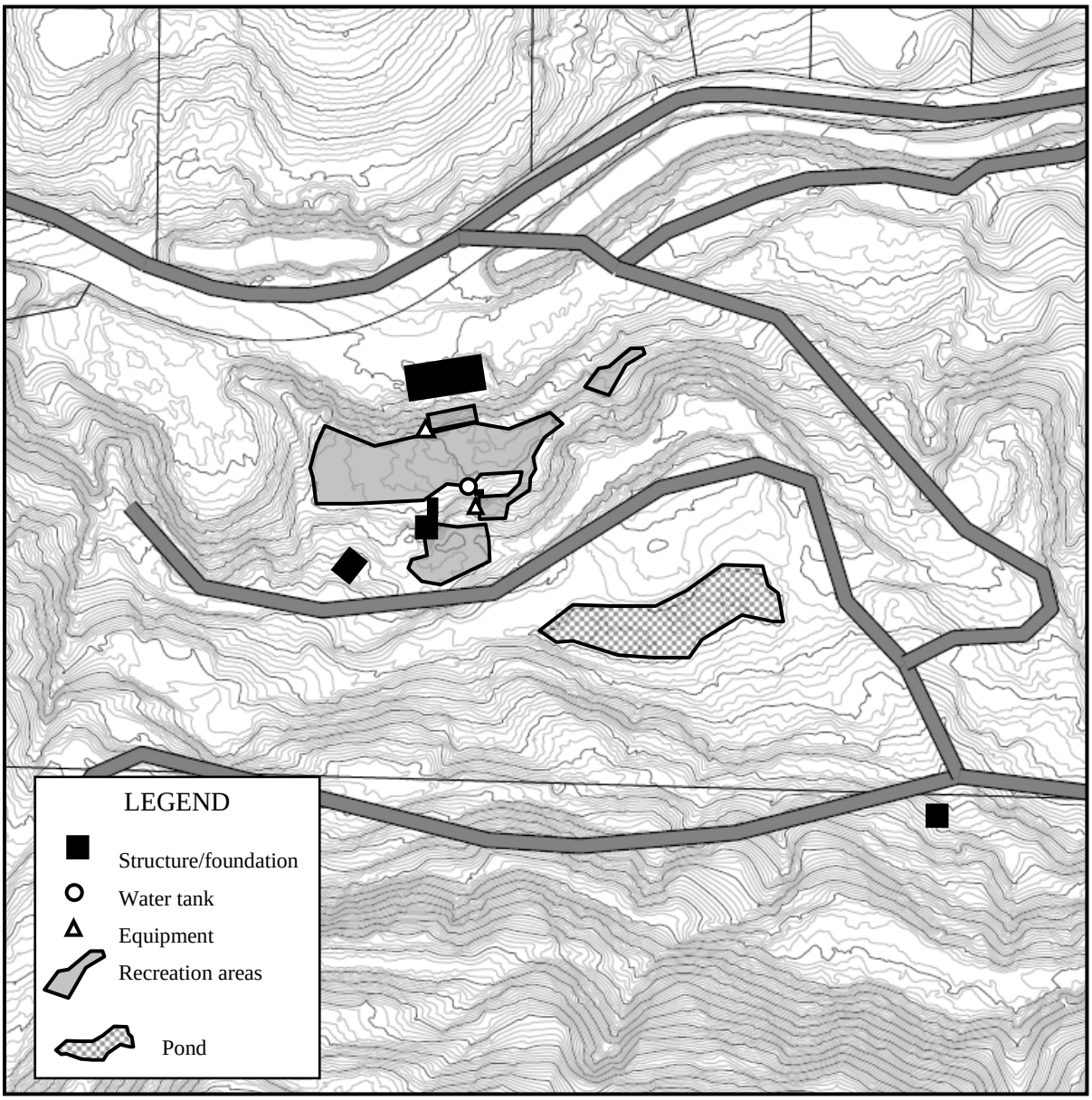

Figure 4. Map of quarry and recreation features.

Historical Research Procedures

Historical research was completed at the Santa Clara County Recorder's Office, the office of the County Assessor, the Santa Clara County Library, the Saratoga Historical Foundation Museum, the offices of Tom Origer & Associates, and various online archives (such as Ancestry.com and Family Search). In addition, efforts were made to interview people familiar with the history of the property.

Historical Research Results

Research found that beginning in the mid-1800s and continuing for more than 100 years, mining was the focal activity occurring on the property. After the closure of the quarry in 1966, the County Roads Department created a picnic facility primarily used by county workers and their families. Below is a synopsis of the property's history.

Quarry History

The Quarry Park property consists two parcels referred to here as the north and south parcels. John C. Hutchinson purchased the south parcel circa 1860 and took over an existing lime kiln operation. At that time, lime was a much need commodity at nearby quicksilver (mercury) mines. Hutchinson abandoned the lime kilns within two years and turned to farming. In later years, Hutchinson became a prominent Saratoga merchant. The Hutchinson family owned the property for about 50 years.

The history of the north parcel revolves around mining in one form or another. Historical accounts indicate that brothers Elisha and David Hughes located a copper vein on the property in 1854 (Cunningham 1967). The Hughes brothers, together with Franklin Farwell and several San Jose business men, founded the Campbell Creek Copper Mining Company. Very little copper was found despite costly investments to get the mine up and running.

Later in the century, the north parcel belonged to Lewis Sage, who owned and operated the Pacific Congress Springs Resort on an adjacent parcel. By 1890, John Shields had purchased this 40-acre property from Sage and began a limestone quarry. The 1899 USGS map of this area shows one building that might have been Shields quarry operation.

Following Shields, the property was purchased by F.W. Knowles and J.J. Stansfield who converted the property to a gravel quarry in 1908. A spur from the electric railway was eventually installed to the quarry. Knowles, a County Supervisor, had previously urged the County to take advantage of the extensive gravel deposit (Garrod 1962). In 1921, the County did indeed purchase the property (*San Jose Mercury Herald* 1921), and for more than fifty years, rock and gravel from the quarry was used for construction and maintenance of the county's roads. Figure 5 is based on a 1948 aerial photograph showing the area that had been mined by that that time.

Information about the quarry is provided by the California State Mining Bureau in 1921 and by the California Division of Mines in 1954. Reporting for the year 1920, the State Mining Bureau described how a steam shovel was used to load rock, loosened by blasting, into railway cars and transported to the crusher for processing (Huguenin and Castillo 1921:226). The quarry used a gyratory crusher sited on a bench near the quarry face. Concrete-lined tunnels excavated into the hillside facilitated delivery of rock to the loading bins via conveyor belts. By 1954, the quarry was operating somewhat differently. Data furnished by the Division of Mines (Davis and Jennings 1954: Table 6) indicate that a jaw crusher rather than a gyratory crusher was in use, and bulldozers had replaced the steam shovel. A note

in Table 6 indicates that the quarry was the oldest operating quarry in the county. The quarry was actively mined from 1908 to about 1966. Figure 6 shows the quarry operation near the middle part of the 20th century.

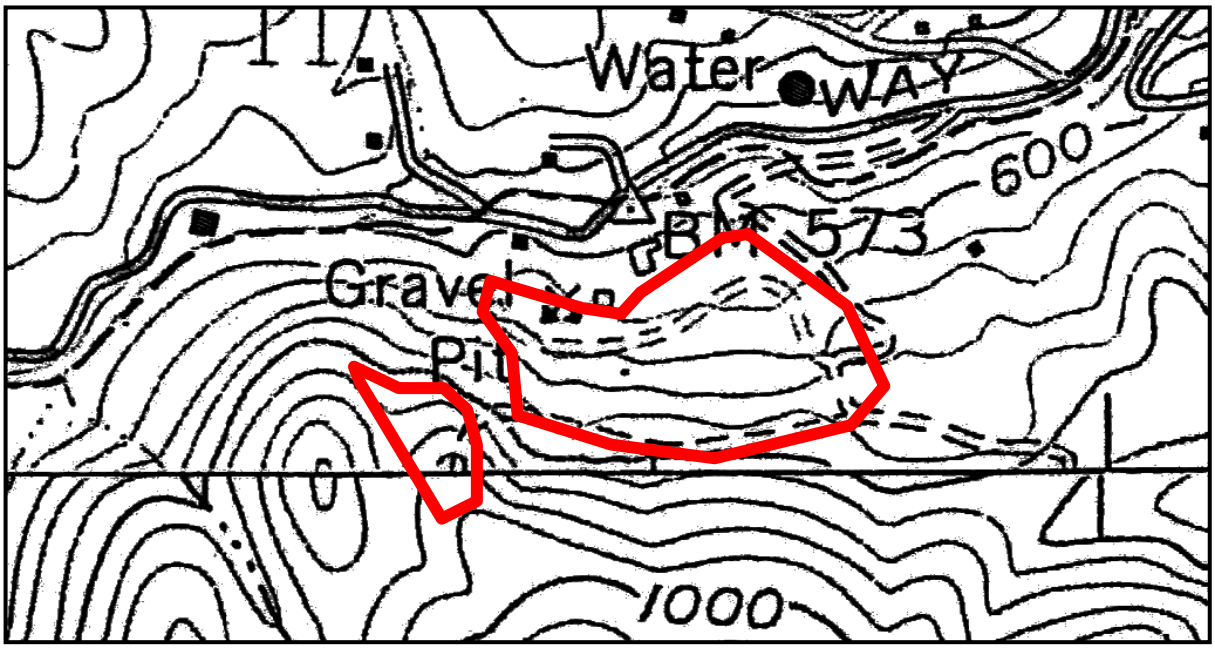

Figure 5. Extent of quarried land in 1948.

Figure 6. Photograph of the loading house and conveyor system with scales and scale house at bottom right (Courtesy of the Saratoga Historical Foundation).

Recreation Area

After the quarry was closed, a recreation area was created by the Santa Clara County Roads Department that included picnic tables, barbeque pits, and sitting areas. Information about this endeavor comes exclusively from interviews with former County employees. Roger Piazza, former County Roads supervisor, pointed out that work to create the recreation area began in 1967 "with the County's blessing," and that Skeets Guidotti, who worked at the quarry prior to its closure, crafted most of the stonework and landscaping. County worker Bill DeCoursey said that Road Department workers took care of the facility on their own time, and that it was a very nice setting sometimes used for weddings. An example of the stonework recreation features is shown in Figure 7.

Figure 7. Example of stonework at picnic area.

FINDINGS AND RECOMMENDATIONS

The remains of a historical quarry and recreational area were found within the study area. While historical accounts indicate that there had been mining on this property as early as the 1850s, no features were found that can be attributed to that era. The remains identified during this survey are features of the 20th-century quarry activity. The recreation features date to the 1960s. These resources were documented with a DPR Primary Record (see Appendix B). Although no formal evaluation was completed, it is likely that the quarry would be eligible for the California Register under Criterion 1 because it was an important part of the local economy during the late 19th and early to mid-20th centuries. We recommend that this resource be protected. The City of Saratoga plans to use the property as a park and open space, and there are no plans to alter the landscape beyond creating additional trails. Trails would not constitute an impact to this resource.

Accidental Discovery

There is a slight possibility that buried archaeological deposits could be present and accidental discovery could occur. Prehistoric and historical archaeological site indicators are described above. In keeping with the CEQA guidelines, if archaeological remains are uncovered, work at the place of discovery should be halted immediately until a qualified archaeologist can evaluate the finds (§15064.5 [f]).

The following actions are promulgated in Public Resources Code 5097.98 and Health and Human Safety Code 7050.5, and pertain to the discovery of human remains. If human remains are encountered, excavation or disturbance of the location must be halted in the vicinity of the find, and the county coroner contacted. If the coroner determines the remains are Native American, the coroner will contact the Native American Heritage Commission. The Native American Heritage Commission will identify the person or persons believed to be most likely descended from the deceased Native American. The most likely descendent makes recommendations regarding the treatment of the remains with appropriate dignity.

SUMMARY

Tom Origer & Associates conducted a cultural resources survey for the City of Saratoga's Quarry Park Master Plan in Santa Clara County, California. The study was requested by The Planning Center | DC&E, and was designed to meet CEQA guidelines. No prehistoric resources were found. The remains of an early to mid 20th century quarry and a mid-20th century recreation area were found and recommendations were made for their protection.

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Persons Interviewed

Katie Alexander, Saratoga Historical Foundation
Michael Whalen, Saratoga Historical Foundation
John Cherbone, Saratoga Public Works Director
Ron Neal, Santa Clara County Roads and Airports Department
Roger Piazza, former Santa Clara County Road Department employee
Bill DeCoursey, former Santa Clara County Road Department employee
Dave Miljarack, former Santa Clara County Road Department employee
Edward Niland, former Santa Clara County Road Department employee

APPENDIX A: Native American Correspondence

Contact Log
Correspondence

Native American Contact Efforts
Quarry Park Master Plan
Sarasota, Santa Clara County, California

Organization	Contact	Letters	Results
Native American Heritage Commission	Debbie Pilas-Treadway	6/4/13	Faxed letter received 6/5/13 stating that the sacred land file failed to indicate the presence of Native American cultural resources in the immediate project area.
Muwekma Ohlone Indian Tribe of the San Francisco Bay Area	Rosemary Cambra	6/4/13	Letter returned with incorrect address. Notified NAHC
Amah/Mutsun Tribal Band	Jean-Mari Feyling Irene Zwierlein	6/4/13	No comments received as of the date of this report
The Ohlone Indian Tribe	Andrew Galvan	6/4/13	No comments received as of the date of this report
Trina Marine Ruano Family	Ramona Garibay	6/4/13	No comments received as of the date of this report
Indian Canyon Mutsun Band of Costanoan	Ann Marie Sayers	6/4/13	No comments received as of the date of this report
	Linda G. Yamane	6/4/13	No comments received as of the date of this report
	Jakki Kehl	6/4/13	No comments received as of the date of this report
	Katherine Erolinda Perez	6/4/13	No comments received as of the date of this report

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
915 Capitol Mall, RM 364
Sacramento, CA 95814
(916) 653-4082
(916) 657-5390 – Fax
nahc@pacbell.net

Information Below is Required for a Sacred Lands File Search

Project: Quarry Park Master Plan

County: Santa Clara

USGS Quadrangles

Name: Cupertino and Castle Rock Ridge, California

Township 8S Range 2W Section(s) 11

Company/Firm/Agency: Tom Origer & Associates

Contact Person: Vicki Beard

Street Address: PO Box 1531

City: Rohnert Park Zip: 94927

Phone: (707) 584-8200 Fax: (707) 584-8300

Email: vbeard@origer.com

Project Description: Master Plan for City of Saratoga park/open space

.

Tom Origer & Associates
Archaeology / Historical Research

June 4, 2013

Rosemary Cambra
Muwekma Ohlone Indian Tribe of the San Francisco Bay Area
2574 Seaboard Avenue
San Jose, California 95131

Re: Master Plan for the City of Saratoga's Quarry Park Project, Santa Clara County

Dear Ms. Cambra:

I write to notify you of a cultural resources study our firm is conducting for a Master Plan being prepared by the City of Saratoga for a park/open space project. The study area includes about 64 acres located on Highway 9 (Congress Springs Road/Big Basin Way) southwest of Saratoga, as shown on the enclosed portion of the Cupertino and Castle Rock Ridge, California 7.5' USGS quadrangles.

Plans for the property include recreational hiking trails and other park facilities.

While this notification does not constitute SB 18 or formal Section 106 consultation, if you have any information or concerns we would be happy to convey them to our client.

Please contact us at (707) 584-8200 if you need additional information. Thank you for your help.

Sincerely,

Vicki Beard
Senior Associate

P.O. Box 1531, Rohnert Park, California 94927 ♦ Phone (707) 584-8200 Fax (707) 584-8300

Tom Origer & Associates
Archaeology / Historical Research

June 4, 2013

Jean-Mari Feyling
Amah/Mutsun Tribal Band
19350 Hunter Court
Redding, California 96003

Re: Master Plan for the City of Saratoga's Quarry Park Project, Santa Clara County

Dear Ms. Feyling:

I write to notify you of a cultural resources study our firm is conducting for a Master Plan being prepared by the City of Saratoga for a park/open space project. The study area includes about 64 acres located on Highway 9 (Congress Springs Road/Big Basin Way) southwest of Saratoga, as shown on the enclosed portion of the Cupertino and Castle Rock Ridge, California 7.5' USGS quadrangles.

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Senior Associate

P.O. Box 1531, Rohnert Park, California 94927 ♦ Phone (707) 584-8200 Fax (707) 584-8300

Tom Origer & Associates
Archaeology / Historical Research

June 4, 2013

Andrew Galvan
The Ohlone Indian Tribe
PO Box 3152
Fremont, California 94539

Re: Master Plan for the City of Saratoga's Quarry Park Project, Santa Clara County

Dear Mr. Galvan:

I write to notify you of a cultural resources study our firm is conducting for a Master Plan being prepared by the City of Saratoga for a park/open space project. The study area includes about 64 acres located on Highway 9 (Congress Springs Road/Big Basin Way) southwest of Saratoga, as shown on the enclosed portion of the Cupertino and Castle Rock Ridge, California 7.5' USGS quadrangles.

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Senior Associate

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Tom Origer & Associates
Archaeology / Historical Research

June 4, 2013

Ramona Garibay
Trina Marine Ruano Family
30940 Watkins Street
Union City, California 94587

Re: Master Plan for the City of Saratoga's Quarry Park Project, Santa Clara County

Dear Ms. Ruano:

I write to notify you of a cultural resources study our firm is conducting for a Master Plan being prepared by the City of Saratoga for a park/open space project. The study area includes about 64 acres located on Highway 9 (Congress Springs Road/Big Basin Way) southwest of Saratoga, as shown on the enclosed portion of the Cupertino and Castle Rock Ridge, California 7.5' USGS quadrangles.

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Sincerely,

Vicki Beard
Senior Associate

P.O. Box 1531, Rohnert Park, California 94927 ♦ Phone (707) 584-8200 Fax (707) 584-8300

Tom Origer & Associates
Archaeology / Historical Research

June 4, 2013

Jakki Kehl
720 North 2nd Street
Patterson, California 95363

Re: Master Plan for the City of Saratoga's Quarry Park Project, Santa Clara County

Dear Ms. Kehl:

I write to notify you of a cultural resources study our firm is conducting for a Master Plan being prepared by the City of Saratoga for a park/open space project. The study area includes about 64 acres located on Highway 9 (Congress Springs Road/Big Basin Way) southwest of Saratoga, as shown on the enclosed portion of the Cupertino and Castle Rock Ridge, California 7.5' USGS quadrangles.

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Vicki Beard
Senior Associate

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Tom Origer & Associates
Archaeology / Historical Research

June 4, 2013

Katherine Erolinda Perez
PO Box 717
Linden, CA 95236

Re: Master Plan for the City of Saratoga's Quarry Park Project, Santa Clara County

Dear Ms. Perez:

I write to notify you of a cultural resources study our firm is conducting for a Master Plan being prepared by the City of Saratoga for a park/open space project. The study area includes about 64 acres located on Highway 9 (Congress Springs Road/Big Basin Way) southwest of Saratoga, as shown on the enclosed portion of the Cupertino and Castle Rock Ridge, California 7.5' USGS quadrangles.

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P.O. Box 1531, Rohnert Park, California 94927 ♦ Phone (707) 584-8200 Fax (707) 584-8300

Tom Origer & Associates
Archaeology / Historical Research

June 4, 2013

Ann Marie Sayers
Indian Canyon Mutsun Band of Costanoan
PO Box 28
Hollister, California 95024

Re: Master Plan for the City of Saratoga's Quarry Park Project, Santa Clara County

Dear Ms. Sayers:

I write to notify you of a cultural resources study our firm is conducting for a Master Plan being prepared by the City of Saratoga for a park/open space project. The study area includes about 64 acres located on Highway 9 (Congress Springs Road/Big Basin Way) southwest of Saratoga, as shown on the enclosed portion of the Cupertino and Castle Rock Ridge, California 7.5' USGS quadrangles.

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Tom Origer & Associates
Archaeology / Historical Research

June 4, 2013

Linda G. Yamane
1585 Mira Mar Ave.
Seaside, California 93955

Re: Master Plan for the City of Saratoga's Quarry Park Project, Santa Clara County

Dear Ms. Yamane:

I write to notify you of a cultural resources study our firm is conducting for a Master Plan being prepared by the City of Saratoga for a park/open space project. The study area includes about 64 acres located on Highway 9 (Congress Springs Road/Big Basin Way) southwest of Saratoga, as shown on the enclosed portion of the Cupertino and Castle Rock Ridge, California 7.5' USGS quadrangles.

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Please contact us at (707) 584-8200 if you need additional information. Thank you for your help.

Sincerely,

Vicki Beard
Senior Associate

P.O. Box 1531, Rohnert Park, California 94927 ♦ Phone (707) 584-8200 Fax (707) 584-8300

Tom Origer & Associates
Archaeology / Historical Research

June 4, 2013

Irene Zwierlein
Amah/Mutsun Tribal Band
789 Canada Road
Woodside, California 94062

Re: Master Plan for the City of Saratoga's Quarry Park Project, Santa Clara County

Dear Ms. Zwierlein:

I write to notify you of a cultural resources study our firm is conducting for a Master Plan being prepared by the City of Saratoga for a park/open space project. The study area includes about 64 acres located on Highway 9 (Congress Springs Road/Big Basin Way) southwest of Saratoga, as shown on the enclosed portion of the Cupertino and Castle Rock Ridge, California 7.5' USGS quadrangles.

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Sincerely,

Vicki Beard
Senior Associate

P.O. Box 1531, Rohnert Park, California 94927 ♦ Phone (707) 584-8200 Fax (707) 584-8300

Native American Contacts
Santa Clara County
June 4, 2013

Jakki Kehl
720 North 2nd Street
Patterson , CA 95363
(209) 892-1060

Ohlone/Costanoan

Amah/MutsunTribal Band
Jean-Marie Feyling
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Redding , CA 96003
jmfgmc@sbcglobal.net
530-243-1633

Ohlone/Costanoan

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canutes@verizon.net
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Ohlone/Costanoan
Northern Valley Yokuts
Bay Miwok

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
P.O. Box 28
Hollister , CA 95024
ams@indiancanyon.org
831-637-4238

Ohlone/Costanoan

Amah MutsunTribal Band
Valentin Lopez, Chairperson
PO Box 5272
Galt , CA 95632
vlopez@amahmutsun.org
916-743-5833

Ohlone/Costanoan

Muwekma Ohlone Indian Tribe of the SF Bay Area
Rosemary Cambra, Chairperson
PO Box 360791
Milpitas , CA 95036
muwekma@muwekma.org
408-205-9714
510-581-5194

Ohlone / Costanoan

Amah MutsunTribal Band
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aerieways@aol.com

Ohlone/Costanoan
Northern Valley Yokuts

The Ohlone Indian Tribe
Andrew Galvan
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Fremont , CA 94539
chochenyo@AOL.com
(510) 882-0527 - Cell
(510) 687-9393 - Fax

Ohlone/Costanoan
Bay Miwok
Plains Miwok
Patwin

Amah/MutsunTribal Band
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650-400-4806 cell preferred
(650) 851-7489 - Fax

Ohlone/Costanoan

Trina Marine Ruano Family
Ramona Garibay, Representative
30940 Watkins Street
Union City , CA 94587
510-972-0645-home

Ohlone/Costanoan
Bay Miwok
Plains Miwok
Patwin

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Quarry Park Master Plan, Santa Clara County

USGS 1980 Cupertino and 1955 Castle Rock Ridge, California

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd.
West SACRAMENTO, CA 95691
(916) 373-3710
Fax (916) 373-5471

June 5, 2013

Vicki Beard
PO Box 1531
Rohnert Park, CA 94927

Sent by Fax: ~~717~~ 707-584-8300
Number of Pages 2

Re: Quarry Park Master Plan, Santa Cara County

Dear Ms. Beard:

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe or group. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 373-3713.

Sincerely,

Leyta Wenston for

Debbie Pilas-Treadway
Environmental Specialist III

Native American Contacts
Santa Clara County
June 4, 2013

Jakki Kehl
720 North 2nd Street
Patterson , CA 95363
(209) 892-1060

Ohlone/Costanoan

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Irene Zwierlein, Chairperson
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Ohlone/Costanoan

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APPENDIX B: Resource Documentation

Saratoga Quarry

APPENDIX B:
Biological Site Assessment

H. T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS

Memorandum

26 July 2013 **Project# 3494-01**

To: **Isabelle Minn, The Planning Center/DC&E**

From: **Melissa Newman**
Cc: **Dan Stephens, Joe Howard**
Subject: **Preliminary Biological Resources Assessment and Summary of Major Biological Constraints and Opportunities**

We have prepared this memorandum to (1) summarize the results of our reconnaissance-level field surveys and preliminary biological resources assessment of the Saratoga Quarry Park Master Plan Project (Project) site; (2) describe major biotic constraints or limiting factors that could influence the development of the Master Plan; and (3) provide initial design suggestions for the Project alternatives. Please note that the constraints and opportunities presented in this memorandum are based on our initial review of the Project site, and will be refined as the Project moves forward through the design process.

Preliminary Resource Assessment

Background Review

Prior to conducting a field visit, we reviewed information concerning threatened, endangered, or other special-status species that could occur in the Project region, including information from the following sources:

- The California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) and its associated species accounts (CNDDB 2013)
- Species lists from the U.S. Fish and Wildlife Service (USFWS) (USFWS 2013)
- California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California (CNPS 2013)
- Calflora (2013) database and the Consortium of California Herbaria (CCH 2013)
- Cornell Lab of Ornithology eBird Database (Cornell Lab of Ornithology 2013)

Our search of CNDDB Rarefind published accounts (CDFW 2013) and USFWS species lists (USFWS 2013) was conducted for special-status plant and wildlife species occurring in the Cupertino and Castle Rock Ridge, California U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle and the ten surrounding quadrangles (Big Basin, Mindego Hill, Palo Alto, Mountain View, Milpitas, San Jose, Los Gatos, Laurel,

Davenport, and Felton). In addition, for plants, we reviewed all species on current CNPS Lists 1A, 1B, 2, 3, or 4 occurring in any of the twelve USGS quadrangles listed above. We also considered the CNPS plant list for Santa Clara County and Santa Cruz County, as the CNPS does not maintain quadrangle-level records for all List 3 or 4 species.

Site Visits

Following our background review, H. T. Harvey & Associates ecologists conducted reconnaissance-level surveys of the Project site on 1, 13, and 15 July 2013 to characterize the existing biological conditions within the Project site, including the presence and distribution of dominant biological habitats and the potential for occurrence of regulated habitats and special-status species. Due to the inaccessibility of some areas the surveys did not penetrate every part of the site, but they were adequate to allow us to field truth the dominant habitat signatures on the aerial photograph, and thereby accurately map dominant habitat for the entire site. Additional more detailed surveys will be required once the Project develops specific use and development plans.

General Habitat Conditions

The dominant biotic habitats we observed during our reconnaissance-level field surveys are described below. Attached we have also included:

1. list of flora observed during our reconnaissance-level surveys (Table 1)
2. list of fauna observed during our reconnaissance-level surveys (Table 2)
3. table of special-status plant species that we have assessed for occurrence in the Project site (Table 3)
4. table of special-status animal species that we have assessed for occurrence in the Project site (Table 4)
5. general map of the dominant biotic habitats (Figure 1)
6. CNDDB map (Figure 2)

A detailed write up of existing conditions will be included under our deliverable for "Task E, Environmental Document".

Dominant Biotic Habitats at Project Site

Riparian forest. This habitat occurs adjacent to Saratoga Creek, where tall riparian trees form a dense canopy over a sparsely vegetated understory. Disturbances to this habitat include erosion of soil and debris (e.g., large concrete blocks from a former retaining wall) along the banks, and the invasion of non-native plant species in the under story. However, overall habitat quality is good, and native plant species still dominate this riparian corridor. Dominant tree species include native white alder (*Alnus rhombifolia*) and big leaf maple (*Acer macrophylla*). Other common tree species include native Fremont's cottonwood (*Populus fremontii*), willows (*Salix* spp.), California bay (*Umbellularia californica*), and coast live oak (*Quercus agrifolia*). The understory includes native

stinging nettle (*Urtica dioica*), common horsetail (*Equisetum arvense*), blue wildrye (*Elymus glaucus*), poison oak (*Toxicodendron diversilobum*), and invasive poison hemlock (*Conium maculatum*).

Northern Coastal Scrub. This habitat occurs on dry exposed slopes with coarse sandy soils. This area was likely once forested, but was converted after logging and disturbance associated with quarry activities. After several decades without disturbance, this habitat is recovering and now supports many native plant species. Dominant species in the shrub layer include native coyote brush (*Baccharis pilularis*), and sticky monkey flower (*Mimulus aurantiacus*). The understory is composed of a mixed of both native and exotic non-native annual grasses and forbs.

Broadleaved Upland Forest. This habitat typically occurs on higher slopes and in areas that are difficult to access. This is the least disturbed and highest quality habitat in the Project site and within this habitat native plant species predominate. Native coast live oak and California bay are common throughout this habitat and form a dense canopy. Other native tree species including big leaf maple, madrone (*Arbutus menziesii*), and Douglas fir (*Pseudotsuga menziesii*) co-dominate with oak and bay and vary in abundance depending on slope and aspect. The understory is mostly dominated by native species including oceanspray (*Holodiscus discolor*), poison oak, chain fern (*Woodwardia fimbriata*), common snowberry (*Symphoricarpos album*), pink honeysuckle (*Lonicera hispidula*), and common wood fern (*Dryopteris expansa*). Although this habitat is mostly undisturbed, several cleared trails support dense stands of invasive French broom (*Genista monspessulana*).

Mixed Native/Non-Native Woodland. This habitat encompasses most of the northern parcel within the Project site. It includes a mix of highly disturbed areas of relatively lower habitat quality, dominated by non-native invasive weeds and supports few native plant species, as well as less disturbed areas that have retained a high native component in the canopy layer and are of relatively high habitat quality. Slopes in this habitat are typically less steep than in the broadleaved upland forest habitat, making this area more accessible for development. As a result, most of the structures, roads, trails, campsites, and other developed areas are located here. The canopy in this habitat is generally more open than in the broadleaved upland forest habitat, largely due to the extensive road and trail network. Tree cover within this habitat includes a mix of naturally occurring native species (e.g. coast live oak, California bay, and big leaf maple), planted native species (e.g. coast redwood [*Sequoia sempervirens*], giant sequoia [*Sequoiadendron giganteum*], Monterey pine [*Pinus radiata*], and Monterey cypress [*Hesperocyparis macrocarpa*]) mainly occurring in undisturbed areas, and planted and naturalized non-native species (e.g. blue gum [*Eucalyptus globulus*] and cotoneaster [*Cotoneaster pannosus*]) mainly occurring in disturbed areas. The trails, canopy openings, and canopy edges are largely dominated by invasive weeds including French broom, yellow star thistle (*Centaurea solstitialis*), fennel (*Foeniculum vulgare*), Italian thistle (*Carduus pycnocephalus*), poison hemlock, and ripgut brome (*Bromus diandrus*).

Biological Resource Constraints

Sensitive Regulated Habitats

The Project site has several sensitive regulated habitats, including Saratoga Creek and its riparian forest corridor, along the northern border of the site; the on-site perennial pond/seasonal wetland feature in the approximate center of the site; and several intermittent drainage features (some with wetland vegetation) bisecting the site. The intermittent drainage features include a variety of small drainages occurring across the site, which likely flow during wet times of the year and are dry the remainder of the year. Many of the intermittent drainage features across the site, as well as the on-site pond/seasonal wetland feature in the middle of the site, likely created or were heavily manipulated during previous quarry activities.

Because Saratoga Creek and its riparian forest corridor provide some of the highest value habitat in the Project site, we see this area as an important biological constraint and recommend no development occur in Saratoga Creek. Ideally, development such as roadways or high use areas would be setback from the edge of the riparian corridor by a 100 foot setback. Lesser setbacks can be considered on a case by case basis depending on the nature of the proposed development and the incorporation of mitigation measures. It should be noted that there are existing overhead utility lines that run parallel to the riparian corridor that may limit the type of features that can be considered for that area, including tree planting.

Because the on-site pond/seasonal wetland feature and many of the intermittent drainage features at the Project site were likely created or heavily manipulated as a result of the previous quarry activities, these features are not considered pristine; nonetheless, they provide some habitat functions and values. We recommend avoiding the on-site pond/seasonal wetland and intermittent drainage features, if possible. However, impacts to these features would likely be more easily mitigated than impacts to Saratoga Creek and its riparian corridor.

If regulated habitats, such as those described above, cannot be avoided as part of Project design, impacts to these habitats will require permits from regulatory agencies with jurisdiction over these resources, as well as Project specific mitigation. Regulatory permits may include a U.S. Army Corps of Engineers Section 404 Permit, a Regional Water Quality Control Board Section 401 Certification, and a California Department of Fish and Wildlife Streambed Alteration Agreement. If impacts to sensitive regulated habitats are determined to be a necessary as a part of Project design (e.g., to install an interpretive boardwalk trail at the on-site pond/seasonal wetland feature), the Project would likely be able to identify mitigation elements (e.g., restore or enhance the wetland to improve habitat by removing non-native plants, restore native hydrology, etc.) to be incorporated into the Master Plan that fully mitigate these impacts. Care and design will be needed around regulated habitats when these habitats are used for educational or restoration opportunities.

Special-Status Plant Species

Special-status plants are not likely to constrain the development of Project design. While there is a variety of special-status plant species that may be present at the Project site (Table 1), none of the special-status plant

species that may be present are federally or state listed. If occurrences of any regionally rare CEQA plant species are identified during future protocol-level plant surveys at the site, avoidance should be incorporated into Project design, if possible. However, if impacts to these species are determined to be necessary as a part of Project design, the Project would likely be able to identify mitigation elements (e.g., translocation and protection of species at an on-site location) to be incorporated into the Master Plan that fully mitigate these impacts.

Special-Status Animal Species

The federally threatened California red-legged frog (*Rana draytonii*) has the possibility of posing constraints for the Project. The California red-legged frog has been recorded less than 1,000 feet downstream of the Project site, along Saratoga Creek in 1997, just east of Toll House Road Bridge (CNDDB 2013). Although not ideal habitat, the Project site provides potential breeding habitat (e.g., Saratoga Creek, on-site pond/seasonal wetland feature) and foraging and dispersal habitat (i.e., undisturbed areas of Project site) for this species. Presence of exotic predators (e.g., bullfrogs [*Rana catesbeiana*]) in the on-site perennial pond/seasonal wetland feature diminishes the value of this feature as breeding habitat for the California red-legged frog. The on-site pond provides good breeding habitat for invasive predators such as the bullfrog, which requires perennially ponded water to complete its lifecycle.

Because the California red-legged frog may be present at the Project site, if habitats suitable for this species cannot be avoided as part of Project design, and the species may be adversely affected as a result of the Project, coordination with the U.S. Fish and Wildlife Service and/or federal Endangered Species Act Section 7 consultation with this agency may be necessary. If impacts to habitats for the frog are determined to be necessary as part of Project design (e.g., to install an interpretive boardwalk trail at the on-site pond/seasonal wetland feature), the Project may be able to identify mitigation elements (e.g., restore or enhance the wetland to improve habitat by removing non-native plants, restore native hydrology, etc.) to be incorporated into the Master Plan that mitigate these impacts.

The Townsend's big-eared bat (*Corynorhinus townsendii*), a state candidate species, is unlikely to significantly constrain Project design, but care and design will be needed around habitats suitable for this species when these habitats are used for educational or restoration opportunities. This special-status bat species may be present in cave-like habitat at the Project site, such as the on-site mine. Because the mine is fairly open, it is too cool to be used as a maternity roost by this species during the summer months. However, males may occasionally use the mine as hibernaculum during winter months (Dave Johnston, pers. comm.). We recommend incorporating avoidance and minimization measures (e.g., restriction of nighttime lighting near the mine) into Project design near the mine, and coordinating with the California Department of Fish and Wildlife to obtain their approval of these measures, as necessary.

Other sensitive wildlife species present at the Project site, such as the San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), a California species of concern, and nesting birds, which are protected by the federal Migratory Bird Treaty Act and California Fish and Game Code, are not likely to constrain the development of

Project design. However, appropriate mitigation measures for these species (e.g., pre-construction surveys, buffers around active bird nests, and relocation of nesting materials from woodrat nests that cannot be avoided) will need to be incorporated into the environmental documents for the Project (e.g., California Environmental Quality Act [CEQA] evaluation) and implemented during the Project construction phase.

Conclusions

We recommend concentrating Project impacts and new Master Plan development into areas of the site that are already developed or disturbed (i.e., lacking vegetation, especially native vegetation). These areas mainly occur in the northern two-thirds of the site. Examples of these areas include the footprints of the existing roads, trails, picnic areas, and fill stockpile areas. Also included are historical quarry structures which could be incorporated into development for educational purposes. While we were not able to survey the southern one-third of the site due to access issues (e.g., steep slopes, lack of trail system), that area appears undisturbed, and likely has the most pristine native habitats. It therefore likely provides better conditions than disturbed portions of the site for sensitive native plants and animals, and should be conserved in its current state.

Overall, the Project site is fairly malleable with few major constraints to development. Impacts to regulated habitats and undisturbed habitats should be avoided, if possible, as impacts to these areas would likely result in regulatory permitting issues for the Project. However, if impacts to these habitats are necessary, these impacts would likely be mitigable through Project design (e.g., incorporation of restoration opportunities). As the Project design footprint evolves, additional biological resource constraints may be identified during the evaluation of future Project designs and alternatives. Additional biological constraints may also be identified as a result of more detailed field surveys of the Project site in the future, which may include areas of the Project site not accessible during our reconnaissance-level surveys.

Biological Resource Opportunities

A number of biological resource opportunities exist that would preserve, enhance, and/or restore sensitive biological features and provide a resource for public educational programs and enjoyment at the site. These opportunities could also partially, and in some cases fully, mitigate Master Plan habitat and species impacts. Our initial ideas for these opportunities include:

1. **Saratoga Creek and Riparian Corridor**: Restore and expand the edge of the riparian corridor at the top of bank along Saratoga Creek by removing non-native plants, installing native riparian plantings, and limiting access into riparian habitat with an interpretative trail/pathway parallel to the site access road/parking area.
2. **Seasonal Wetland/Pond**: Restore and enhance the on-site wetland to improve habitat by removing non-native plants, improving supporting hydrology, and limiting access with an interpretative boardwalk trail.

3. **Invasive, Non-native Plants**: Undertake targeted invasive, non-native plant removal. This could be an opportunity to involve the community in volunteer stewardship activities, and to improve habitat values. Initially target invasive species along roads, trails, and proposed development areas, including French broom (*Genista monspessulana*) and Spanish broom (*Spartium junceum*), yellow star thistle (*Centaurea solstitialis*), poison hemlock (*Conium maculatum*), and pampas grass (*Cortaderia selloana*).
4. **Arboretum**: Label (e.g., with placards, and/or using a mobile interactive platforms) native plants and non-native plants of particular interest, beauty, or educational value as part of a walking tour at the site.
5. **Quarry in Northern Coastal Scrub**: While the majority of the vegetation in this area was likely removed during quarry activities, tit is now filling in extensively with native sticky-monkey flower (*Mimulus aurantiacus*) as well as invasive non-native broom, to a lesser extent. Highlight nature's reclaiming of this heavily disturbed area as part of a walking tour or educational materials about the cultural history and biology of the site.

Ideas for biological resource opportunities will be further developed as the Project design process and alternatives evaluation move forward.

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Attachments

Table 1. List of Plant Species Observed at the Saratoga Quarry Project Site during Reconnaissance-Level Plant Field Surveys on 1 July and 13 July 2013*

Family Name	Scientific Name	Common Name	Status (CAL-IPC Rating) **
Adoxaceae	*Sambucus nigra* ssp. *caerulea*	blue elderberry	Native
Agavaceae	*Chlorogalum pomeridianum*	soap plant	Native
Anacardiaceae	*Toxicodendron diversilobum*	poison oak	Native
Apiaceae	*Conium maculatum*	poison hemlock	Invasive (moderate)
	Daucus pusillus	American wild carrot	Native
	Foeniculum vulgare	fennel	Invasive (high)
	Sanicula crassicaulis	gamble weed	Native
	Torilis arvensis	hedge parsley	Invasive (moderate)
Apocynaceae	*Nerium oleander*	oleander	Non-native
Apocynaceae	*Vinca major*	periwinkle	Invasive (moderate)
Araceae	*Lemna minuta*	duckweed	Native
Araliaceae	*Hedera helix*	English ivy	Invasive (high)
Asteraceae	*Anaphalis margaritacea*	pearly everlasting	Native
	Artemisia californica	California sagebrush	Native
	Artemisia douglasiana	mugwort	Native
	Baccharis pilularis	coyote brush	Native
	Carduus pycnocephalus	Italian thistle	Invasive (moderate)
	Centaurea melitensis	tocalote	*Centaurea melitensis*
	Centaurea solstitialis	yellow star thistle	Invasive (high)
	Cirsium vulgare	bull thistle	Invasive (moderate)
	Dittrichia graveolens	stinkwort	Invasive (moderate)
	Lactuca serriola	prickly lettuce	Not-native
	Madia sativa	coast tarweed	Native
	Petasites frigidus	coltsfoot	Native
	Silybum marianum	milk thistle	Invasive (limited)
	Sonchus asper	spiny sowthistle	Not-native
Betulaceae	*Alnus rhombifolia*	white alder	Native
	Corylus cornuta	hazelnut	Native
Blechnaceae	*Woodwardia fimbriata*	chain fern	Native
Boraginaceae	*Eriodictyon californicum*	yerba santa	Native
	Heliotropium curassavicum	seaside heliotrope	Native
Brassicaceae	*Brassica nigra*	black mustard	Invasive (moderate)
	Hirschfeldia incana	short podded mustard	Invasive (moderate)
	Nasturtium officinale	watercress	Native
	Raphanus sativus	wild radish	Invasive (limited)
Caprifoliaceae	*Lonicera hispidula*	pink honeysuckle	Native
	Lonicera interrupta	chaparral honeysuckle	Native
	Symphoricarpos album	common snowberry	Native
Caryophyllaceae	*Cerastium globeratum*	mouse-ear chickweed	Non-native
Cucurbitaceae	*Marah fabacea*	California man-root	Native
Cupressaceae	*Calocedrus decurrens*	incense cedar	Native
	Hesperocyparis macrocarpa	Monterey cypress	Planted Native

Family Name	Scientific Name	Common Name	Status (CAL-IPC Rating) **
	Juniperus californica	California juniper	Planted Native
	Sequoia sempervirens	coast redwood	Native
	Sequoiadendron giganteum	giant sequoia	Planted Native
Cyperaceae	*Cyperus eragrostis*	tall flatsedge	Native
	Cyperus esculentus	nut grass	Native
Dryopteridaceae	*Dryopteris expansa*	Common wood fern	Native
Equisetaceae	*Equisetum arvense*	common horsetail	Native
Ericaceae	*Arbutus menziesii*	madrone	Native
Fabaceae	*Acacia baileyana*	Bailey acacia	Non-native
	Acmispon glaber	deerweed	Native
	Genista monspessulana	French broom	Invasive (high)
	Medicago polymorpha	bur clover	Invasive (limited)
	Melilotus albus	white sweetclover	Non-native
	Spartium junceum	Spanish broom	Invasive (high)
	Vicia sp.	vetch	Unknown
Fagaceae	*Quercus agrifolia*	coast live oak	Native
	Quercus berberidifolia	scrub oak	Native
Gentianaceae	*Zeltnera muehlenbergii*	Muehlenberg's centaury	Native
Geraniaceae	*Erodium cicutarium*	redstem stork's bill	Invasive (limited)
	Geranium dissectum	cutleaf geranium	Invasive (moderate)
	Geranium pusillum	small-flowered geranium	Non-native
Hamamelidaceae	*Liquidambar styraciflua*	sweetgum	Non-native
Hypericaceae	*Hypericum canariense*	Canary Island St. Johnswort	Invasive (moderate)
Iridaceae	*Iris* sp.	iris	Unknown
Juglandaceae	*Juglans hindsii*	black walnut	Planted Native
Juncaceae	*Juncus effusus*	common rush	Unknown
	Juncus xiphioides	iris leaved rush	Native
Lamiaceae	*Clinopodium douglasii*	yerba buena	Native
	Rosmarinus officinalis	rosemary	Non-native
	Stachys ajugoides	hedge nettle	Native
Lauraceae	*Umbellularia californica*	California bay	Native
Montiaceae	*Claytonia perfoliata*	miner's lettuce	Native
Moraceae	*Ficus carica*	common fig	Invasive (moderate)
Myrsinaceae	*Anagallis arvensis*	pimpernel	Non-native
Myrtaceae	*Callistemon citrinus*	crimson bottlebrush	Non-native
	Eucalyptus globulus	blue gum	Invasive (moderate)
Oleaceae	*Ligustrum* sp.	privet	Non-native
	Olea europaea	olive	Invasive (limited)
Onagraceae	*Clarkia* sp.	clarkia	Native
	Epilobium ciliatum	fringed willowherb	Native
Orobanchaceae	*Pedicularis densiflora*	Indian warrior	Native
Papaveraceae	*Eschscholzia californica*	California poppy	Native
Phrymaceae	*Mimulus aurantiacus*	sticky monkey flower	Native
Pinaceae	*Cedrus deodara*	Deodar cedar	Non-native

Family Name	Scientific Name	Common Name	Status (CAL-IPC Rating) **
	Pinus radiata	Monterey pine	Planted Native
	Pinus sabiniana	California foothill pine	Native
	Pseudotsuga menziesii	Douglas fir	Native
Pittosporaceae	*Pittosporum undulatum*	Australian cheesewood	Non-native
Platanaceae	*Platanus racemosa*	western sycamore	Native
Poaceae	*Aira caryophyllea*	silver hairgrass	Non-native
	Avena fatua	wild oats	Invasive (moderate)
	Bromus carinatus	California brome	Native
	Bromus diandrus	ripgut brome	Invasive (moderate)
	Bromus hordeaceus	soft chess	Invasive (limited)
	Bromus madritensis ssp. *madritensis*	foxtail chess	Non-Native
	Cortaderia selloana	pampas grass	Invasive (high)
	Cynodon dactylon	Bermuda grass	Invasive (moderate)
	Cynosurus echinatus	annual dogtail	Invasive (moderate)
	Elymus glaucus	blue wildrye	Native
	Festuca microstachys	small fescue	Native
	Festuca myuros	rattail sixweeks grass	Invasive (moderate)
	Festuca perennis	Italian ryegrass	Invasive (moderate)
	Hordeum murinum	foxtail barley	Invasive (moderate)
	Koeleria macrantha	junegrass	Native
	Melica californica	California melic	Native
	Phalaris aquatica	Harding grass	Invasive (moderate)
	Poa annua	annual bluegrass	Non-native
	Polypogon monspeliensis	rabbitsfoot grass	Invasive (limited)
	Stipa miliacea	smilo grass	Invasive (limited)
Polemoniaceae	*Navarretia mellita*	skunk navarretia	Native
Polygonaceae	*Polygonum aviculare*	prostrate knotweed	Non-native
	Rumex acetosella	common sheep sorrel	Invasive (moderate)
Polypodiaceae	*Polypodium californicum*	California polypody	Native
Pteridaceae	*Adiantum jordanii*	California maiden hair	Native
	Pentagramma triangularis	goldenback fern	Native
Ranunculaceae	*Clematis lasiantha*	pipestem	Native
Rosaceae	*Cotoneaster pannosus*	cotoneaster	Invasive (moderate)
	Heteromeles arbutifolia	toyon	Native
	Holodiscus discolor	oceanspray	Native
	Potentilla sp.	cinquefoil	Native
	Prunus sp.	cherry	Non-native
	Pyracantha coccinea	scarlet firethorn	Invasive (limited)
	Rosa californica	California wild rose	Native
	Rubus armeniacus	Himalayan blackberry	Invasive (high)
	Rubus parviflorus	thimbleberry	Native
	Rubus ursinus	California blackberry	Native
Rubiaceae	*Galium aparine*	common bedstraw	Native

Family Name	Scientific Name	Common Name	Status (CAL-IPC Rating) **
Ruscaceae	*Maianthemum racemosum*	feathery false lily of the valley	Native
Salicaceae	*Populus fremontii*	Fremont cottonwood	Native
	Salix laevigata	red willow	Native
	Salix lasiolepis	arroyo willow	Native
Sapindaceae	*Acer macrophyllum*	big leaf maple	Native
	Aesculus californica	buckeye	Native
Scrophulariaceae	*Scrophularia californica*	California figwort	Native
Simaroubaceae	*Ailanthus altissima*	tree of heaven	Invasive (moderate)
Solanaceae	*Solanum americanum*	American black nightshade	Native
Typhaceae	*Typha* sp.	cattail	Unknown
Urticaceae	*Soleirolia soleirolii*	baby's tears	Non-native
	Urtica dioica	stinging nettle	Native
	Urtica urens	dwarf nettle	Non-native

* This list of plant species is preliminary and does not represent a comprehensive list of all of the species occurring at the 64-acre Project site.

** Status

Native = Species is native to San Francisco Bay Area and/or Central Coast of California

Non-native = Species is not native to San Francisco Bay Area and/or Central Coast of California

Planted Native = Species is native to California and grows naturally in some regions of the state; however, these species are widely cultivated and the individuals found on the Project site are cultivars that are genetically distinct from the native populations.

Cal-IPC Rating Categories:

High – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Moderate – These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

California Invasive Plant Inventory Database. Available at: http://www.cal-ipc.org/paf/. Accessed through July 2013.

Table 2. List of Wildlife Species Observed at the Saratoga Quarry Project Site during Reconnaissance-Level Wildlife Field Surveys on 13 and 16 July 2013*

Scientific Name	Common Name	Status**
Ariolimax columbianus	Banana slug	--
Oncorhynchus mykiss	Rainbow trout	--
Pseudacris sierra	Sierran chorus frog	--
Lithobates catesbeianus	Bullfrog	--
Callipepla californica	California quail	--
Buteo lineatus	Red-shouldered hawk	--
Buteo jamaicensis	Red-tailed hawk	--
Patagioenas fasciata	Band-tailed pigeon	--
Calypte anna	Anna's hummingbird	--
Selasphorus sasin	Allen's hummingbird	--
Melanerpes formicivorus	Acorn woodpecker	--
Picoides villosus	Hairy woodpecker	--
Colaptes auratus	Northern flicker	--
Empidonax difficilis	Pacific-slope flycatcher	--
Sayornis nigricans	Black phoebe	--
Vireo huttoni	Hutton's vireo	--
Vireo gilvus	Warbling vireo	--
Cyanocitta stelleri	Steller's jay	--
Aphelocoma californica	Western scrub-jay	--
Corvus brachyrhynchos	American crow	--
Poecile rufescens	Chestnut-backed chickadee	--
Baeolophus inornatus	Oak titmouse	--
Psaltriparus minimus	Bushtit	--
Thryomanes bewickii	Bewick's wren	--
Chamaea fasciata	Wrentit	--
Pipilo maculatus	Spotted towhee	--
Junco hyemalis	Dark-eyed junco	--
Haemorhous mexicanus	House finch	--
Neotoma fuscipes annectens	San Francisco dusky-footed woodrat	CSSC
Odocoileus hemionus columbianus	Columbian black-tailed deer	--

* This list of wildlife species is preliminary and does not represent a comprehensive list of all of the species occurring at the 64-acre Project site.

** Status: California Species of Special Concern

Table 3. Special-status Plant Species, Their Status, and Potential Occurrence in the Saratoga Quarry Park Project Site

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project Site
Federal or State Endangered, Threatened, or Candidate Species			
San Mateo thorn-mint (*Acanthomintha duttonii*)	FE, SE, CNPS Rank 1B.1	Chaparral, Valley and foothill grassland/serpentinite	**Absent.** Strict serpentine endemic (Safford et al. 2005); no suitable chaparral or grassland habitat with serpentine soil.
Marsh sandwort (*Arenaria paludicola*)	FE, SE, CNPS Rank 1B.1	Marshes and swamps (freshwater or brackish)/sandy, openings	**Absent.** Site contains freshwater marsh habitat, but marsh habitat is densely vegetated with cattails and contains no suitable openings.
Ben Lomond spineflower (*Chorizanthe pungens* var. *hartwegiana*)	FE, CNPS Rank 1B.1	Lower montane coniferous forest (maritime ponderosa pine sandhills)	**Absent.** No suitable coniferous forest habitat with maritime sand deposits.
Scotts Valley spineflower (*Chorizanthe robusta* var. *hartwegii*)	FE, CNPS Rank 1B.1	Meadows and seeps (sandy), Valley and foothill grassland (mudstone and Purisima outcrops)	**Absent.** No suitable meadow or grassland habitat with sandstone or mudstone outcrops.
Robust spineflower (*Chorizanthe robusta* var. *robusta*)	FE, CNPS Rank 1B.1	Chaparral (maritime), Cismontane woodland (openings), Coastal dunes, Coastal scrub/sandy or gravelly	**Absent.** Presumed extirpated from Santa Clara County (CNPS 2013); distribution is restricted to areas with a strong coastal or maritime influence.
Crystal Springs fountain thistle (*Cirsium fontinale* var. *fontinale*)	FE, SE, CNPS Rank 1B.1	Chaparral, Cismontane woodland, Valley and foothill grassland/serpentinite seeps	**Absent.** Strict serpentine endemic (Safford et al. 2005); no suitable chaparral, woodland, or grassland habitat with serpentine soil.
Santa Clara Valley dudleya (*Dudleya abramsii* ssp. *setchellii*)	FE, CNPS Rank 1B.1	Cismontane woodland, Valley and foothill grassland/serpentinite, rocky	**Absent.** Strict serpentine endemic (Safford et al. 2005); no suitable woodland or grassland habitat with serpentine or rocky soil.
San Mateo woolly sunflower (*Eriophyllum latilobum*)	FE, SE, CNPS Rank 1B.1	Chaparral, Cismontane woodland, Coastal scrub/sometimes serpentinite	**Absent.** Strict serpentine endemic (Safford et al. 2005); no suitable chaparral, woodland, or scrub habitat with serpentine soil.
Santa Cruz wallflower (*Erysimum teretifolium*)	FE, SE, CNPS Rank 1B.1	Chaparral, Lower montane coniferous forest/inland marine sands	**Absent.** Strict serpentine endemic (Safford et al. 2005); no suitable chaparral or forest habitat with serpentine soil.
Santa Cruz cypress (*Hesperocyparis abramsiana* var. *abramsiana*)	FE, SE, CNPS Rank 1B.2	Closed-cone coniferous forest, Chaparral, Lower montane coniferous forest/sandstone or granitic	**Absent.** No suitable coniferous forest or chaparral habitat with sandstone or granitic soil.
Butano Ridge cypress (*Hesperocyparis abramsiana* var. *butanoensis*)	FE, SE, CNPS Rank 1B.2	Closed-cone coniferous forest, Chaparral, Lower montane coniferous forest/sandstone or granitic	**Absent.** No suitable coniferous forest or chaparral habitat with sandstone or granitic soil.

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project Site
Marin western flax (*Hesperolinon congestum*)	FT, ST, CNPS Rank 1B.1	Closed-cone coniferous forest, Chaparral, Lower montane coniferous forest/sandstone or granitic	**Absent.** Strict serpentine endemic (Safford et al. 2005); no suitable forest or chaparral habitat with serpentine soil.
Santa Cruz tarplant (*Holocarpha macradenia*)	FT, SE, CNPS Rank 1B.1	Coastal prairie, Coastal scrub, Valley and foothill grassland/often clay, sandy	**Absent.** Does not occur in Santa Clara County (CNPS 2013); distribution is restricted to areas with a strong coastal or maritime influence.
Contra Costa goldfields (*Lasthenia conjugens*)	FE, CNPS Rank 1B.1	Cismontane woodland, Playas (alkaline), Valley and foothill grassland, Vernal pools/mesic	**Absent.** No suitable mesic cismontane woodland, alkaline grassland or vernal pool habitat.
Dudley's lousewort (*Pedicularis dudleyi*)	CR, CNPS Rank 1B.2	Chaparral (maritime), Cismontane woodland, North Coast coniferous forest, Valley and foothill grassland	**Absent.** No suitable chaparral, woodland, coniferous forest, or grassland habitat.
White-rayed pentachaeta (*Pentachaeta bellidiflora*)	FE, SE, CNPS Rank 1B.1	Cismontane woodland, Valley and foothill grassland (often serpentinite)	**Absent.** No suitable woodland or grassland habitat; no serpentine soil.
San Francisco popcorn-flower (*Plagiobothrys diffusus*)	SE, CNPS Rank 1B.1	Coastal prairie, Valley and foothill grassland	**Absent.** No suitable coastal prairie or valley and foothill grassland habitat.
Scotts Valley polygonum (*Polygonum hickmanii*)	FE, SE, CNPS Rank 1B.1	Valley and foothill grassland (mudstone and sandstone)	**Absent.** No suitable grassland habitat with mudstone or sandstone soil.
Metcalf Canyon jewel-flower (*Streptanthus albidus* ssp. *albidus*)	FE, CNPS Rank 1B.1	Valley and foothill grassland (serpentinite)	**Absent.** Serpentine endemic (Safford et al. 2005); no suitable serpentine grassland habitat.
California seablite (*Suaeda californica*)	FE, CNPS Rank 1B.1	Marshes and swamps (coastal salt)	**Absent.** No suitable coastal salt marsh habitat.
Two-fork clover (*Trifolium amoenum*)	FE, CNPS Rank 1B.1	Coastal bluff scrub, Valley and foothill grassland (sometimes serpentinite)	**Absent.** No suitable coastal bluff or grassland habitat.
California Native Plant Society Rare Species			
Coast rockcress (*Arabis blepharophylla*)	CNPS Rank 4.3	Broadleafed upland forest, Coastal bluff scrub, Coastal prairie, Coastal scrub/rocky	**Absent.** No suitable rocky outcrops.
Santa Clara thorn-mint (*Acanthomintha lanceolata*)	CNPS Rank 4.2	Chaparral (often serpentinite), Cismontane woodland, Coastal scrub/rocky	**Absent.** No suitable chaparral, woodland, or scrub habitat with rocky soil; no serpentinite.
Franciscan onion (*Allium peninsulare* var. *franciscanum*)	CNPS Rank 1B.2	Cismontane woodland, Valley and foothill grassland/clay, volcanic, often serpentinite	**Absent.** No suitable woodland or grassland habitat with clay, volcanic, or serpentinite soil.
Bent-flowered fiddleneck (*Amsinckia lunaris*)	CNPS Rank 1B.2	Coastal bluff scrub, Cismontane woodland, Valley and foothill grassland	**Absent.** No suitable coastal bluff scrub, woodland, or grassland habitat.

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project Site
California androsace (*Androsace elongata* ssp. *acuta*)	CNPS Rank 4.2	Chaparral, Cismontane woodland, Coastal scrub, Meadows and seeps, Pinyon and juniper woodland, Valley and foothill grassland	**May be Present.** Site contains degraded northern coastal scrub habitat.
Slender silver moss (*Anomobryum julaceum*)	CNPS Rank 2B.2	Broadleafed upland forest, Lower montane coniferous forest, North Coast coniferous forest/damp rock and soil on outcrops, usually on road cuts	**May be Present.** Site contains broadleafed upland forest with road cuts.
Anderson's manzanita (*Arctostaphylos andersonii*)	CNPS Rank 1B.2	Broadleafed upland forest, Chaparral, North Coast coniferous forest/openings, edges	**May be Present.** Site contains broadleafed upland forest.
Schreiber's manzanita (*Arctostaphylos glutinosa*)	CNPS Rank 1B.2	Closed-cone coniferous forest, Chaparral/diatomaceous shale	**Absent.** No suitable forest or chaparral habitat with diatomaceous shale.
Ohlone manzanita (*Arctostaphylos ohloneana*)	CNPS Rank 1B.1	Closed-cone coniferous forest, Coastal scrub/siliceous shale	**Absent.** No suitable coniferous forest or scrub habitat with siliceous shale.
Pajaro manzanita (*Arctostaphylos pajaroensis*)	CNPS Rank 1B.1	Chaparral (sandy)	**Absent.** No suitable sandy chaparral habitat.
Kings Mountain manzanita (*Arctostaphylos regismontana*)	CNPS Rank 1B.2	Broadleafed upland forest, Chaparral, North Coast coniferous forest/granitic or sandstone	**May be Present.** Site contains broadleafed upland forest with some sandstone inclusions.
Bonny Doon manzanita (*Arctostaphylos silvicola*)	CNPS Rank 1B.2	Closed-cone coniferous forest, Chaparral, Lower montane coniferous forest/inland marine sands	**Absent.** No suitable coniferous forest or chaparral habitat with inland marine sand.
Alkali milk-vetch (*Astragalus tener* var. *tener*)	CNPS Rank 1B.2	Playas, Valley and foothill grassland (adobe clay), Vernal pools/alkaline	**Absent.** Out of elevation range; no suitable alkaline playa, grassland, or vernal pool habitat.
Brittlescale (*Atriplex depressa*)	CNPS Rank 1B.2	Playas, Valley and foothill grassland (adobe clay), Vernal pools/alkaline	**Absent.** No suitable alkaline playa, grassland, or vernal pool habitat.
San Joaquin spearscale (*Atriplex joaquinana*)	CNPS Rank 1B.2	Chenopod scrub, Meadows and seeps, Playas, Valley and foothill grassland/alkaline	**Absent.** No suitable alkaline chenopod scrub, meadow, playa, or grassland habitat.
Lesser saltscale (*Atriplex minuscula*)	CNPS Rank 1B.1	Chenopod scrub, Meadows and seeps, Playas, Valley and foothill grassland/alkaline	**Absent.** No suitable alkaline chenopod scrub, meadow, playa, or grassland habitat.
Mexican mosquito fern (*Azolla microphylla*)	CNPS Rank 4.2	Marshes and swamps (ponds, slow water)	**May be Present.** Site contains degraded marsh/pond habitat.
Brewer's calandrinia (*Calandrinia breweri*)	CNPS Rank 4.2	Chaparral, Coastal scrub/sandy or loamy, disturbed sites and burns	**May be Present.** Site contains disturbed/degraded northern coastal scrub habitat with sandy loam soil.

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project Site
Oakland star-tulip (*Calochortus umbellatus*)	CNPS Rank 4.2	Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland/often serpentinite	**May be Present.** Site contains broadleafed upland forest; however, absence of serpentine soils makes occurrence unlikely.
Large-flowered mariposa lily (*Calochortus uniflorus*)	CNPS Rank 4.2	Coastal prairie, Coastal scrub, Meadows and seeps, North Coast coniferous forest	**May be Present.** Site contains degraded northern coastal scrub habitat.
Santa Cruz Mountains pussypaws (*Calyptridium parryi* var. *hesseae*)	CNPS Rank 1B.1	Chaparral, Cismontane woodland/sandy or gravelly, openings	**Absent.** No suitable chaparral or woodland habitat.
South Coast Range morning-glory (*Calystegia collina* ssp. *venusta*)	CNPS Rank 4.3	Chaparral, Cismontane woodland, Valley and foothill grassland/serpentinite or sedimentary	**Absent.** Serpentine endemic (Safford et al. 2005); no suitable chaparral, woodland, or forest habitat with serpentine soil.
Swamp harebell (*Campanula californica*)	CNPS Rank 1B.2	Bogs and fens, Closed-cone coniferous forest, Coastal prairie, Meadows and seeps, Marshes and swamps(freshwater), North Coast coniferous forest/mesic	**Absent.** Site contains freshwater marsh habitat, but the marsh habitat is densely vegetated with cattails and is not suitable.
Bristly sedge (*Carex comosa*)	CNPS Rank 2B.1	Coastal prairie, Marshes and swamps (lake margins), Valley and foothill grassland	**Absent.** No suitable coastal prairie, grassland, or lake margin habitat.
Deceiving sedge (*Carex saliniformis*)	CNPS Rank 1B.2	Coastal prairie, Coastal scrub, Meadows and seeps, Marshes and swamps (coastal salt)/mesic	**Absent.** No suitable mesic prairie, scrub, meadow, or coastal salt marsh habitat.
Johnny-nip (*Castilleja ambigua* var. *ambigua*)	CNPS Rank 4.2	Coastal bluff scrub, Coastal prairie, Coastal scrub, Marshes and swamps, Valley and foothill grassland, Vernal pools margins	**Absent.** Does not occur in Santa Clara County (CNPS 2013); distribution is restricted to areas with a strong coastal or maritime influence.
Monterey Coast paintbrush (*Castilleja latifolia*)	CNPS Rank 4.3	Closed-cone coniferous forest, Cismontane woodland(openings), Coastal dunes, Coastal scrub/sandy	**Absent.** Does not occur in Santa Clara County (CNPS 2013); distribution is restricted to areas with a strong coastal or maritime influence.
Monterey ceanothus (*Ceanothus rigidus*)	CNPS Rank 4.2	Closed-cone coniferous forest, Chaparral, Coastal scrub/sandy	**May be Present.** Site contains degraded northern coastal scrub habitat with sandy soil.
Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*)	CNPS Rank 1B.1	Valley and foothill grassland(alkaline)	**Absent.** No suitable alkaline grassland habitat.
Point Reyes bird's-beak (*Chloropyron maritimum* ssp. *palustre*)	CNPS Rank 1B.2	Marshes and swamps(coastal salt)	**Absent.** No suitable coastal salt marsh habitat.
Mt. Hamilton fountain thistle (*Cirsium fontinale* var. *campylon*)	CNPS Rank 1B.2	Chaparral, Cismontane woodland, Valley and foothill grassland/serpentinite seeps	**Absent.** Strict serpentine endemic (Safford et al. 2005); no suitable serpentine soil.
lost thistle (*Cirsium praeteriens*)	CNPS Rank 1A	unknown	**Absent.** Presumed extirpated.

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project Site
Brewer's clarkia (*Clarkia breweri*)	CNPS Rank 4.2	Chaparral, Cismontane woodland, Coastal scrub/often serpentinite	**May be Present.** Site contains broadleafed upland forest; however, absence of serpentine soils makes occurrence unlikely.
Santa Clara red ribbons (*Clarkia concinna* ssp. *automixa*)	CNPS Rank 4.3	Chaparral, Cismontane woodland	**May be Present.** The CNDDB contains 3 records for this species within 3 miles of the Project site; however, 2 of the records are historic (CNDDB 2013).
San Francisco collinsia (*Collinsia multicolor*)	CNPS Rank 1B.2	Closed-cone coniferous forest, Coastal scrub/sometimes serpentinite	**May be Present.** Site contains degraded northern coastal scrub habitat; however, absence of serpentine soils makes occurrence unlikely.
Clustered lady's-slipper (*Cypripedium fasciculatum*)	CNPS Rank 4.2	Lower montane coniferous forest, North Coast coniferous forest/usually serpentinite seeps and streambanks	**Absent.** No suitable forest habitat with serpentine soil.
Mountain lady's-slipper (*Cypripedium montanum*)	CNPS Rank 4.2	Broadleafed upland forest, Cismontane woodland, Lower montane coniferous forest, North Coast coniferous forest	**May be Present.** Site contains broadleafed upland forest.
Tear drop moss (*Dacryophyllum falcifolium*)	CNPS Rank 1B.3	North Coast coniferous forest/carbonate	**Absent.** No suitable North Coast coniferous forest habitat with carbonate soil.
Norris' beard moss (*Didymodon norrisii*)	CNPS Rank 2B.2	Cismontane woodland, Lower montane coniferous forest/intermittently mesic, rock	**Absent.** Out of elevation range; no suitable intermittently mesic woodland or forest habitat.
Western leatherwood (*Dirca occidentalis*)	CNPS Rank 1B.2	Broadleafed upland forest, Closed-cone coniferous forest, Chaparral, Cismontane woodland, North Coast coniferous forest, Riparian forest, Riparian woodland/mesic	**May be Present.** Site contains broadleafed upland forest.
California bottle-brush grass (*Elymus californicus*)	CNPS Rank 4.3	Broadleafed upland forest, Cismontane woodland, North Coast coniferous forest, Riparian woodland	**Absent.** Does not occur in Santa Clara County (CNPS 2013); distribution is restricted to areas with a strong coastal or maritime influence.
Clay buckwheat (*Eriogonum argillosum*)	CNPS Rank 4.3	Cismontane woodland (serpentinite or clay)	**Absent.** No suitable cismontane woodland habitat with clay or serpentinite soil.
Ben Lomond buckwheat (*Eriogonum nudum* var. *decurrens*)	CNPS Rank 1B.1	Chaparral, Cismontane woodland, Lower montane coniferous forest (maritime ponderosa pine sandhills)/sandy	**Absent.** No suitable chaparral woodland or coniferous forest habitat with sandy soil.
Bay buckwheat (*Eriogonum umbellatum* var. *bahiiforme*)	CNPS Rank 4.2	Cismontane woodland, Lower montane coniferous forest/rocky, often serpentinite	**Absent.** Out of elevation range; no suitable woodland or forest habitat with rocky or serpentinite soil.

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project Site
Jepson's woolly sunflower (*Eriophyllum jepsonii*)	CNPS Rank 4.3	Chaparral, Cismontane woodland, Coastal scrub/sometimes serpentinite	**May be Present.** Site contains degraded northern coastal scrub habitat; however, absence of serpentine soils makes occurrence unlikely.
Hoover's button-celery (*Eryngium aristulatum* var. *hooveri*)	CNPS Rank 1B.1	Vernal pools	**Absent.** No suitable vernal pool habitat.
San Francisco wallflower (*Erysimum franciscanum*)	CNPS Rank 4.2	Chaparral, Coastal dunes, Coastal scrub, Valley and foothill grassland/often serpentinite or granitic, sometimes roadsides	**May be Present.** Site contains degraded northern coastal scrub habitat; however, absence of serpentine soils makes occurrence unlikely.
Minute pocket moss (*Fissidens pauperculus*)	CNPS Rank 1B.2	North Coast coniferous forest (damp coastal soil)	**Absent.** No suitable damp coastal coniferous forest habitat.
Stinkbells (*Fritillaria agrestis*)	CNPS Rank 4.2	Chaparral, Cismontane woodland, Pinyon and juniper woodland, Valley and foothill grassland/Clay, sometimes serpentinite	**Absent.** No suitable chaparral, woodland, or grassland habitat with clay or serpentine soil.
Fragrant fritillary (*Fritillaria liliacea*)	CNPS Rank 1B.2	Cismontane woodland, Coastal prairie, Coastal scrub, Valley and foothill grassland/Often serpentinite	**May be Present.** Site contains degraded northern coastal scrub habitat; however, absence of serpentine soils makes occurrence unlikely.
Phlox-leaf serpentine bedstraw (*Galium andrewsii* ssp. *gatense*)	CNPS Rank 4.2	Chaparral, Cismontane woodland, Lower montane coniferous forest/serpentinite, rocky	**Absent.** Serpentine endemic (Safford et al. 2005); no suitable chaparral, woodland, or forest habitat with serpentine soil.
San Francisco gumplant (*Grindelia hirsutula* var. *maritima*)	CNPS Rank 3.2	Coastal bluff scrub, Coastal scrub, Valley and foothill grassland/sandy or serpentinite	**Absent.** Does not occur in Santa Clara County (CNPS 2013); distribution is restricted to areas with a strong coastal or maritime influence.
Serpentine sunflower (*Helianthus exilis*)	CNPS Rank 4.2	Chaparral, Cismontane woodland/serpentinite seeps	**Absent.** Strict serpentine endemic (Safford et al. 2005); no suitable chaparral or woodland habitat with serpentine soil.
Short-leaved evax (*Hesperevax sparsiflora* var. *brevifolia*)	CNPS Rank 1B.2	Coastal bluff scrub (sandy), Coastal dunes, Coastal prairie	**Absent.** No suitable sandy coastal bluff, dune, or prairie habitat.
Loma Prieta hoita (*Hoita strobilina*)	CNPS Rank 1B.1	Chaparral, Cismontane woodland, Riparian woodland/usually serpentinite, mesic	**Absent.** No suitable mesic chaparral or woodland habitat with serpentinite soil.
Kellogg's horkelia (*Horkelia cuneata* var. *sericea*)	CNPS Rank 1B.1	Closed-cone coniferous forest, Chaparral (maritime), Coastal dunes, Coastal scrub/sandy or gravelly, openings	**May be Present.** Site contains degraded northern coastal scrub habitat with sandy soil.

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project Site
Point Reyes horkelia (*Horkelia marinensis*)	CNPS Rank 1B.2	Coastal dunes, Coastal prairie, Coastal scrub/sandy	**Absent.** Does not occur in Santa Clara County (CNPS 2013); distribution is restricted to areas with a strong coastal or maritime influence.
Coast iris (*Iris longipetala*)	CNPS Rank 4.2	Coastal prairie, Lower montane coniferous forest, Meadows and seeps/mesic	**Absent.** No suitable mesic prairie, coniferous forest, or meadow habitat.
Satan's goldenbush (*Isocoma menziesii* var. *diabolica*)	CNPS Rank 4.2	Cismontane woodland	**Absent.** No suitable cismontane woodland habitat.
Legenere (*Legenere limosa*)	CNPS Rank 1B.1	Vernal pools	**Absent.** No suitable vernal pool habitat.
Bristly leptosiphon (*Leptosiphon acicularis*)	CNPS Rank 4.2	Chaparral, Cismontane woodland, Coastal prairie, Valley and foothill grassland	**Absent.** No suitable chaparral, woodland, prairie, or grassland habitat.
Serpentine leptosiphon (*Leptosiphon ambiguus*)	CNPS Rank 4.2	Cismontane woodland, Coastal scrub, Valley and foothill grassland/usually serpentinite	**Absent.** Strict serpentine endemic (Safford et al. 2005); no suitable serpentine soil.
Large-flowered leptosiphon (*Leptosiphon grandiflorus*)	CNPS Rank 4.2	Coastal bluff scrub, Closed-cone coniferous forest, Cismontane woodland, Coastal dunes, Coastal prairie, Coastal scrub, Valley and foothill grassland/usually sandy	**May be Present.** Site contains degraded northern coastal scrub habitat with sandy soil.
Woolly-headed lessingia (*Lessingia hololeuca*)	CNPS Rank 3	Broadleafed upland forest, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland/clay, serpentinite	**May be Present.** Site contains broadleaved upland forest habitat.
Smooth lessingia (*Lessingia micradenia* var. *glabrata*)	CNPS Rank 1B.2	Chaparral, Cismontane woodland/serpentinite, often roadsides	**Absent.** Serpentine endemic (Safford et al. 2005); no suitable chaparral or woodland habitat with serpentine soil.
Spring lessingia (*Lessingia tenuis*)	CNPS Rank 4.3	Chaparral, Cismontane woodland, Lower montane coniferous forest/openings	**Absent.** No suitable chaparral, woodland, or coniferous forest habitat.
Redwood lily (*Lilium rubescens*)	CNPS Rank 4.2	Broadleafed upland forest, Chaparral, Lower montane coniferous forest, North Coast coniferous forest, Upper montane coniferous forest/Sometimes serpentinite, sometimes roadsides	**Absent.** Does not occur in Santa Clara County (CNPS 2013); distribution is restricted to areas with a strong coastal/maritime influence, or very mesic areas in northwest California.
Small-leaved lomatium (*Lomatium parvifolium*)	CNPS Rank 4.2	Closed-cone coniferous forest, Chaparral, Coastal scrub, Riparian woodland/serpentinite	**Absent.** No suitable forest, chaparral, scrub, or woodland habitat with serpentine soil.

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project Site
Harlequin lotus (*Hosackia gracilis*)	CNPS Rank 4.2	Broadleafed upland forest, Coastal bluff scrub, Closed-cone coniferous forest, Cismontane woodland, Coastal prairie, Coastal scrub, Meadows and seeps, Marshes and swamps, North Coast coniferous forest, Valley and foothill grassland/wetlands, roadsides	**Absent.** No suitable mesic coastal habitat.
Indian Valley bush-mallow (*Malacothamnus aboriginum*)	CNPS Rank 1B.2	Chaparral, Cismontane woodland/Rocky, granitic, often in burned areas	**Absent.** No suitable chaparral or woodland habitat with rocky or granitic soil.
Arcuate bush-mallow (*Malacothamnus arcuatus*)	CNPS Rank 1B.2	Chaparral, Cismontane woodland	**Absent.** No suitable chaparral or woodland habitat; no longer recognized as a species due to taxonomic revision (Baldwin 2012).
Davidson's bush-mallow (*Malacothamnus davidsonii*)	CNPS Rank 1B.2	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland	**May be Present.** Site contains degraded northern coastal scrub habitat.
Hall's bush-mallow (*Malacothamnus hallii*)	CNPS Rank 1B.2	Chaparral, Coastal scrub	**May be Present.** Site contains degraded northern coastal scrub habitat.
Dusky-fruited malacothrix (*Malacothrix phaeocarpa*)	CNPS Rank 4.3	Closed-cone coniferous forest, Chaparral/openings, burned or disturbed areas	**Absent.** No suitable coniferous forest or chaparral habitat.
Mt. Diablo cottonweed (*Micropus amphibolus*)	CNPS Rank 3.2	Broadleafed upland forest, Chaparral, Cismontane woodland, Valley and foothill grassland/rocky	**May be Present.** Site contains broadleaved upland forest habitat.
Marsh microseris (*Microseris paludosa*)	CNPS Rank 1B.2	Closed-cone coniferous forest, Cismontane woodland, Coastal scrub, Valley and foothill grassland	**May be Present.** Site contains degraded northern coastal scrub habitat.
Sylvan microseris (*Microseris sylvatica*)	CNPS Rank 4.2	Chaparral, Cismontane woodland, Great Basin scrub, Pinyon and juniper woodland, Valley and foothill grassland (serpentinite)	**Absent.** No suitable chaparral, woodland, scrub, or grassland habitat with serpentine soil.
Elongate copper moss (*Mielichhoferia elongata*)	CNPS Rank 2B.2	Cismontane woodland (metamorphic, rock, usually vernally mesic)	**Absent.** No suitable vernally mesic woodland habitat with metamorphic rock.
Santa Cruz County monkeyflower (*Mimulus rattanii* ssp. *decurtatus*)	CNPS Rank 4.2	Chaparral, Lower montane coniferous forest/margins, gravelly	**Absent.** No suitable chaparral or woodland habitat with gravelly soil.
Curly-leaved monardella (*Monardella undulata*)	CNPS Rank 4.2	Closed-cone coniferous forest, Chaparral, Coastal dunes, Coastal prairie, Coastal scrub, Lower montane coniferous forest (ponderosa pine sandhills)/sandy	**Absent.** Does not occur in Santa Clara County (CNPS 2013); distribution is restricted to areas with a strong coastal or maritime influence.

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project Site
Woodland woolythreads (*Monolopia gracilens*)	CNPS Rank 1B.2	Broadleafed upland forest (openings), Chaparral (openings), Cismontane woodland, North Coast coniferous forest (openings), Valley and foothill grassland/Serpentine	**Absent.** No suitable forest, chaparral, woodland, or grassland habitat with serpentine soil.
Cotula navarretia (*Navarretia cotulifolia*)	CNPS Rank 4.2	Chaparral, Cismontane woodland, Valley and foothill grassland/adobe	**Absent.** No suitable chaparral, woodland, or grassland habitat with adobe clay soil.
Prostrate vernal pool navarretia (*Navarretia prostrata*)	CNPS Rank 1B.1	Coastal scrub, Meadows and seeps, Valley and foothill grassland(alkaline), Vernal pools/Mesic	**Absent.** No suitable mesic coastal scrub, alkaline grassland or vernal pool habitat.
Kellman's bristle moss (*Orthotrichum kellmanii*)	CNPS Rank 1B.2	Chaparral, Cismontane woodland/sandstone, carbonate	**Absent.** No suitable chaparral or woodland habitat with sandstone or carbonate soil.
Santa Cruz Mountains beardtongue (*Penstemon rattanii* var. *kleei*)	CNPS Rank 1B.2	Chaparral, Lower montane coniferous forest, North Coast coniferous forest	**Absent.** No suitable chaparral or coniferous forest habitat.
Gairdner's yampah (*Perideridia gairdneri* ssp. *gairdneri*)	CNPS Rank 4.2	Broadleafed upland forest, Chaparral, Coastal prairie, Valley and foothill grassland, Vernal pools/vernally mesic	**May be Present.** Site contain broadleaved upland forest habitat.
Monterey pine (*Pinus radiata*)	CNPS Rank 1B.1	Closed-cone coniferous forest, Cismontane woodland	**Absent.** There are only three native stands left in California, located at Año Nuevo, Cambria, and the Monterey Peninsula. All other Monterey pines are cultivars that are genetically distinct from the native trees (CNPS 2013).
White-flowered rein orchid (*Piperia candida*)	CNPS Rank 1B.2	Broadleafed upland forest, Lower montane coniferous forest, North Coast coniferous forest/sometimes serpentinite	**May be Present.** Site contains broadleaved upland forest habitat.
Narrow-petaled rein orchid (*Piperia leptopetala*)	CNPS Rank 4.3	Cismontane woodland, Lower montane coniferous forest, Upper montane coniferous forest	**Absent.** No suitable woodland or coniferous forest habitat.
Michael's rein orchid (*Piperia michaelii*)	CNPS Rank 4.2	Coastal bluff scrub, Closed-cone coniferous forest, Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest	**May be Present.** Site contains degraded northern coastal scrub habitat.
Choris' popcorn-flower (*Plagiobothrys chorisianus* var. *chorisianus*)	CNPS Rank 1B.2	Chaparral, Coastal prairie, Coastal scrub/mesic	**Absent.** No suitable mesic chaparral, coastal prairie or coastal scrub habitat.
Hickman's popcorn-flower (*Plagiobothrys chorisianus* var. *hickmanii*)	CNPS Rank 4.2	Closed-cone coniferous forest, Chaparral, Coastal scrub, Marshes and swamps, Vernal pools	**May be Present.** Site contains degraded northern coastal scrub habitat.

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project Site
Hairless popcorn-flower (*Plagiobothrys glaber*)	CNPS Rank 1A	Meadows and seeps (alkaline), Marshes and swamps (coastal salt)	**Absent.** Presumed extirpated; no suitable alkaline meadow or coastal salt marsh habitat.
Delta woolly-marbles (*Psilocarphus brevissimus* var. *multiflorus*)	CNPS Rank 4.2	Vernal pools	**Absent.** No suitable vernal pool habitat.
Lobb's aquatic buttercup (*Ranunculus lobbii*)	CNPS Rank 4.2	Cismontane woodland, North Coast coniferous forest, Valley and foothill grassland, Vernal pools/mesic	**Absent.** No suitable mesic coniferous forest, woodland, grassland, or vernal pool habitat.
Pine rose (*Rosa pinetorum*)	CNPS Rank 1B.2	Closed-cone coniferous forest	**Absent.** No suitable closed-cone coniferous forest habitat.
Hoffmann's sanicle (*Sanicula hoffmannii*)	CNPS Rank 4.3	Broadleafed upland forest, Coastal bluff scrub, Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest/often serpentinite or clay	**Absent.** No suitable forest, scrub, chaparral, or woodland habitat with serpentinite or clay soil.
Chaparral ragwort (*Senecio aphanactis*)	CNPS Rank 2B.2	Chaparral, Cismontane woodland, Coastal scrub/sometimes alkaline	**May be Present.** Site contains degraded northern coastal scrub habitat.
Maple-leaved checkerbloom (*Sidalcea malachroides*)	CNPS Rank 4.2	Broadleafed upland forest, Coastal prairie, Coastal scrub, North Coast coniferous forest, Riparian woodland/Often in disturbed areas	**May be Present.** Site contains broadleaved upland forest habitat.
San Francisco campion (*Silene verecunda* ssp. *verecunda*)	CNPS Rank 1B.2	Coastal bluff scrub, Chaparral, Coastal prairie, Coastal scrub, Valley and foothill grassland/sandy	**Absent.** Does not occur in Santa Clara County (CNPS 2013); distribution is restricted to areas with a strong coastal or maritime influence.
Santa Cruz microseris (*Stebbinsoseris decipiens*)	CNPS Rank 1B.2	Broadleafed upland forest, Closed-cone coniferous forest, Chaparral, Coastal prairie, Coastal scrub, Valley and foothill grassland/open areas, sometimes serpentinite	**Absent.** Does not occur in Santa Clara County (CNPS 2013); distribution is restricted to areas with a strong coastal or maritime influence.
Most beautiful jewel-flower (*Streptanthus albidus* ssp. *peramoenus*)	CNPS Rank 1B.2	Chaparral (serpentinite), valley and foothill grassland	**Absent.** Serpentine endemic (Safford et al. 2005); no suitable serpentine soil.
Slender-leaved pondweed (*Stuckenia filiformis*)	CNPS Rank 2B.2	Marshes and swamps (assorted shallow freshwater)	**May be Present.** Site contains degraded freshwater marsh habitat.
Marsh zigadenus (*Toxicoscordion fontanum*)	CNPS Rank 4.2	Chaparral, Cismontane woodland, Lower montane coniferous forest, Meadows and seeps, Marshes and swamps/vernally mesic, often serpentinite	**Absent.** No suitable vernally mesic habitat or serpentine soil.
Santa Cruz clover (*Trifolium buckwestiorum*)	CNPS Rank 1B.1	Broadleafed upland forest, Cismontane woodland, Coastal prairie/gravelly, margins	**Absent.** Does not occur in Santa Clara County (CNPS 2013); distribution is restricted to areas with a strong coastal or maritime influence.

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project Site
Saline clover (*Trifolium hydrophilum*)	CNPS Rank 1B.2	Marshes and swamps, Valley and foothill grassland (mesic, alkaline), Vernal pools	**Absent.** No suitable marsh, alkaline grassland or vernal pool habitat.
Caper-fruited tropidocarpum (*Tropidocarpum capparideum*)	CNPS Rank 1B.1	Valley and foothill grassland (alkaline hills)	**Absent.** No suitable alkaline grassland habitat.

Key to Abbreviations:
Status: Federally Endangered (FE); Federally Threatened (FT); State Endangered (SE); State Threatened (ST); California Native Plant Society (CNPS)

CNPS Rare Plant Ranking System
California Rare Plant Ranks
1A: Presumed extirpated in California and either rare or extinct elsewhere
1B: Rare, threatened, or endangered in California and elsewhere
2A: Plants presumed extirpated in California, but more common elsewhere
2B: Plants rare, threatened, or endangered in California, but more common elsewhere
3: More information is needed
4: Limited distribution or infrequent throughout California
Threat Ranks
0.1: Seriously endangered in California
0.2: Fairly endangered in California
0.3: Not very endangered in California

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Table 4. Special-status Animal Species, Their Status, and Potential Occurrence in the Saratoga Quarry Park Project Site

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project Site
Federal or State Endangered, Threatened, or Candidate Species			
Bay checkerspot butterfly (*Euphydryas editha bayensis*)	FT	Native grasslands on serpentine soils. Larval host plants are *Plantago erecta* and/or *Castilleja* sp.	**Absent.** Serpentine habitat is absent from the Project site.
Central California coast steelhead (*Oncorhynchus mykiss*)	FT	Cool streams with suitable spawning habitat and conditions allowing migration between spawning and marine habitats.	**Absent.** Barriers to up-migration in the form of downstream drop structures preclude presence of this species in Saratoga Creek (Leidy et al. 2005, Smith 1999).
California tiger salamander (*Ambystoma californiense*)	FT, ST/CSSC	Vernal or temporary pools in annual grasslands or open woodlands.	**Likely Absent.** Absence of recent records of this species from the vicinity of the Project site (nearby occurrences are from 1893; CNDDB 2013). The density of scrub and woodland areas, lack of ground squirrel burrows and large open grassland areas, the presence of non-native predators (e.g., bullfrogs [*Rana catesbeiana*]) in the on-site pond, and the dense vegetation cover associated with the on-side pond, likely prevent persistence of any population on the site or colonization of the site by this species. More recent records of this species, at Senator Mine at Almaden Quicksilver County Park, are separated from the Project site by approximately 9 miles (CNDDB 2013).
California red-legged frog (*Rana draytonii*)	FT, CSSC	Streams, freshwater pools, and ponds with emergent or overhanging vegetation.	**May be Present.** Although not ideal habitat, the Project site provides breeding (e.g., Saratoga Creek, on-site pond), and foraging and dispersal habitat (i.e., undisturbed areas of Project site) for this species. Presence of exotic predators (e.g., bullfrogs) in the on-site pond diminishes the value of the pond as breeding habitat. The species has also been recorded less than 1,000 feet downstream of the Project site, along Saratoga Creek in 1997, just east of Toll House Road Bridge (CNDDB 2013).

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project Site
Townsend's big-eared bat (*Corynorhinus townsendii*)	SC/CSSC	Roosts in caves and mine tunnels, and occasionally in deep crevices in trees such as redwoods or in abandoned buildings, in a variety of habitats.	**May be Present.** Cave-like habitat present at Project site (i.e., mine) is too open and cool to be used as a maternity roost by this species during the summer months. However, males may occasionally use the mine as hibernaculum during winter months (Dave Johnston, pers. comm.).
California Species of Special Concern			
Foothill yellow-legged frog (*Rana boylii*)	CSSC	Partially shaded shallow streams and riffles with a rocky substrate. Occurs in a variety of habitats in coast ranges.	**Absent.** No occurrence records in vicinity; nearest CNDDB record is approximately 10 miles southwest of the Project site at Guadalupe Creek, downstream of Guadalupe Reservoir (CNDDB 2013). Saratoga Creek within the Project site may have historically provided suitable habitat for this species; however, the dense overstory vegetation and lack of open habitat along the creek in the Project site precludes it from currently being suitable habitat for this species.
Western pond turtle (*Actinemys marmorata*)	CSSC	Permanent or nearly permanent water in a variety of habitats.	**May be Present.** Saratoga Creek within the Project site and the on-site pond provide only marginal quality basking habitat due to the paucity of open water (i.e., dense vegetation cover associated with on-site pond and dense overstory vegetation along creek) and basking sites, but it is likely used for dispersal by pond turtles. With the paucity of pooled open water or basking habitat in the vicinity of the site, there is a low probability of this species using the site for nesting.
Northern harrier (*Circus cyaneus*)	CSSC (nesting)	Nests in marshes and moist fields, forages over open areas.	**Likely Absent.** Minimal open habitat present at Project site and open grassland habitat at the site is too restricted and too isolated from vast expanses of open habitat elsewhere to support this species (even for foraging by migrants).

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project Site
Long-eared owl (*Asio otus*)	CSSC (nesting)	Riparian bottomlands with tall, dense willows and cottonwood stands (also dense live oak and California Bay along upland streams); forages primarily in adjacent open areas.	**May be Present.** While the riparian forest habitat along Saratoga Creek in the Project site provides ostensible nesting habitat for this species, this species is a rare resident and occasional winter visitor in Santa Clara County (Noble 2007). No long-eared owls were detected on the site during the reconnaissance-level site visits in July 2013. If species is present, up to one pair could breed in the Project site.
Vaux's swift (*Chaetura vauxi*)	CSSC (nesting)	Nests in snags in coastal coniferous forests or, occasionally, in chimneys. Forages aerially over many habitats.	**Absent as Breeder.** In western Santa Clara County, known to nest in chimneys and may nest in snags in coniferous forest (Rottenborn 2007). Snags in mixed evergreen forest on the Project site provide ostensible nesting habitat for this species, but Vaux's swifts are not known to nest in mixed evergreen forests in Santa Clara County, and no Vaux's swifts were detected on the site during the reconnaissance-level site visits in July 2013. May forage aerially over the site.
Olive-sided flycatcher (*Contopus cooperi*)	CSSC (nesting)	Nests in mature forests with open canopies, along forest edges in more densely vegetated areas, in recently burned forest habitats, and in selectively harvested landscapes.	**May be Present.** The mixed forest habitat on the Project site provides suitable nesting habitat for this species. No olive-sided flycatchers were detected during the reconnaissance-level site visits in July 2013, but the species is known to nest in similar habitats in the vicinity (Bousman 2007a) and is often detected in nearby parks during the nesting season (Cornell Lab of Ornithology 2013). Up to a pair or two could breed in the Project site, if present.
Yellow warbler (*Setophaga petechia*)	CSSC (nesting)	Nests in dense stands of willow and other riparian habitat.	**May be Present.** The riparian habitat along Saratoga Creek provides suitable nesting habitat for this species on the Project site, and this species is known to nest in the site vicinity (Bousman 2007b). No yellow warblers were detected during the reconnaissance-level site visits in July 2013. If the species is present, one or two pairs could potentially nest on the Project site and migrants may forage throughout the site during spring and fall.
Tricolored blackbird (*Agelaius tricolor*)	CSSC (nesting colony)	Nests near fresh water in dense emergent vegetation.	**Absent.** On-site pond is too small to support a colony of this species and the Project site provides insufficient open habitat for foraging.

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project Site
Burrowing owl (*Athene cunicularia*)	CSSC	Open grasslands and ruderal habitats with suitable burrows, usually those made by California ground squirrels.	**Absent.** Minimal open habitat present at Project site and open grassland habitat at the site is too restricted and too isolated from vast expanses of open habitat elsewhere to support this species. No records of this species from anywhere in the vicinity (i.e., well-forested foothills of the Santa Cruz Mountains).
Black swift (*Cypseloides niger*)	CSSC (nesting)	Nest on cliffs and coastal bluffs; forage aerially for insects.	**Absent as Breeder**. Suitable cliff and coastal bluff habitats are not present in the Project site. Migrants may forage aerially over the site.
San Francisco common yellowthroat (*Geothlypis trichas sinuosa*)	CSSC	Nests in herbaceous vegetation, usually in wetlands or moist floodplains.	**Absent.** On-site pond provides marginal habitat and is too small to support this species. No common yellowthroats (*Geothlypis trichas*) were detected on the site during the reconnaissance-level site visits in July 2013.
Loggerhead shrike (*Lanius ludovicianus*)	CSSC (nesting)	Nests in tall shrubs and dense trees; forages in grasslands, marshes, and ruderal habitats.	**Likely Absent.** Minimal open habitat present at Project site and open grassland habitat at the site is too restricted and too isolated from vast expanses of open habitat elsewhere to support this species (even for foraging by migrants).
Pallid bat (*Antrozous pallidus*)	CSSC	Forages over many habitats; roosts in caves, rock outcrops, buildings, and hollow trees.	**May be Present.** Maternity colony likely absent; nearest maternity colony is approximately 1.9 miles north of the Project site (Dave Johnston, pers. comm.). May move through the site occasionally, as this species forages for miles surrounding a maternity colony; however, the site does not provide optimal foraging habitat due to minimal open habitat present (Dave Johnston, pers. comm.).
Western red bat (*Lasiurus blossevillii*)	CSSC	Roosts in foliage in forest or woodlands, especially in or near riparian habitat.	**May be Present.** May occur in low numbers as a migrant and winter resident, but does not breed in the Project vicinity. May roost in foliage in trees virtually anywhere in the Project site, but expected to roost primarily in riparian areas (Dave Johnston, pers. comm.).
San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*)	CSSC	Nests in a variety of habitats including riparian areas, oak woodlands, and scrub.	**Present.** Many woodrat nests observed at the site adjacent to existing trails during field surveys. Additional nests are likely scattered throughout the woodland and scrub habitats in the Project site.

Name	Regulatory Status	Habitat	Potential for Occurrence in the Project Site
American badger (*Taxidea taxus*)	CSSC	Burrows in grasslands and occasionally in infrequently disked agricultural areas.	**Absent.** Minimal open habitat present at Project site and open grassland habitat at the site is too restricted and too isolated from vast expanses of open habitat elsewhere to support this species.
State Fully Protected Species			
American peregrine falcon (*Falco peregrinus anatum*)	SP	Forages in many habitats; nests on cliffs and tall bridges and buildings.	**Absent.** Project site lacks suitable cliff-like habitat for nesting and site has minimal open habitat for foraging opportunities.
White-tailed kite (*Elanus leucurus*)	SP	Nests in tall shrubs and trees, forages in grasslands, marshes, and ruderal habitats.	**Likely Absent.** Minimal open habitat present at Project site and open grassland habitat at the site is too restricted and too isolated from vast expanses of open habitat elsewhere to support this species (even for foraging by migrants).

Key to Abbreviations:
Status: Federally Endangered (FE); Federally Threatened (FT); State Endangered (SE); State Threatened (ST); State Candidate (ST); State Fully Protected (SP); California Species of Special Concern (CSSC).

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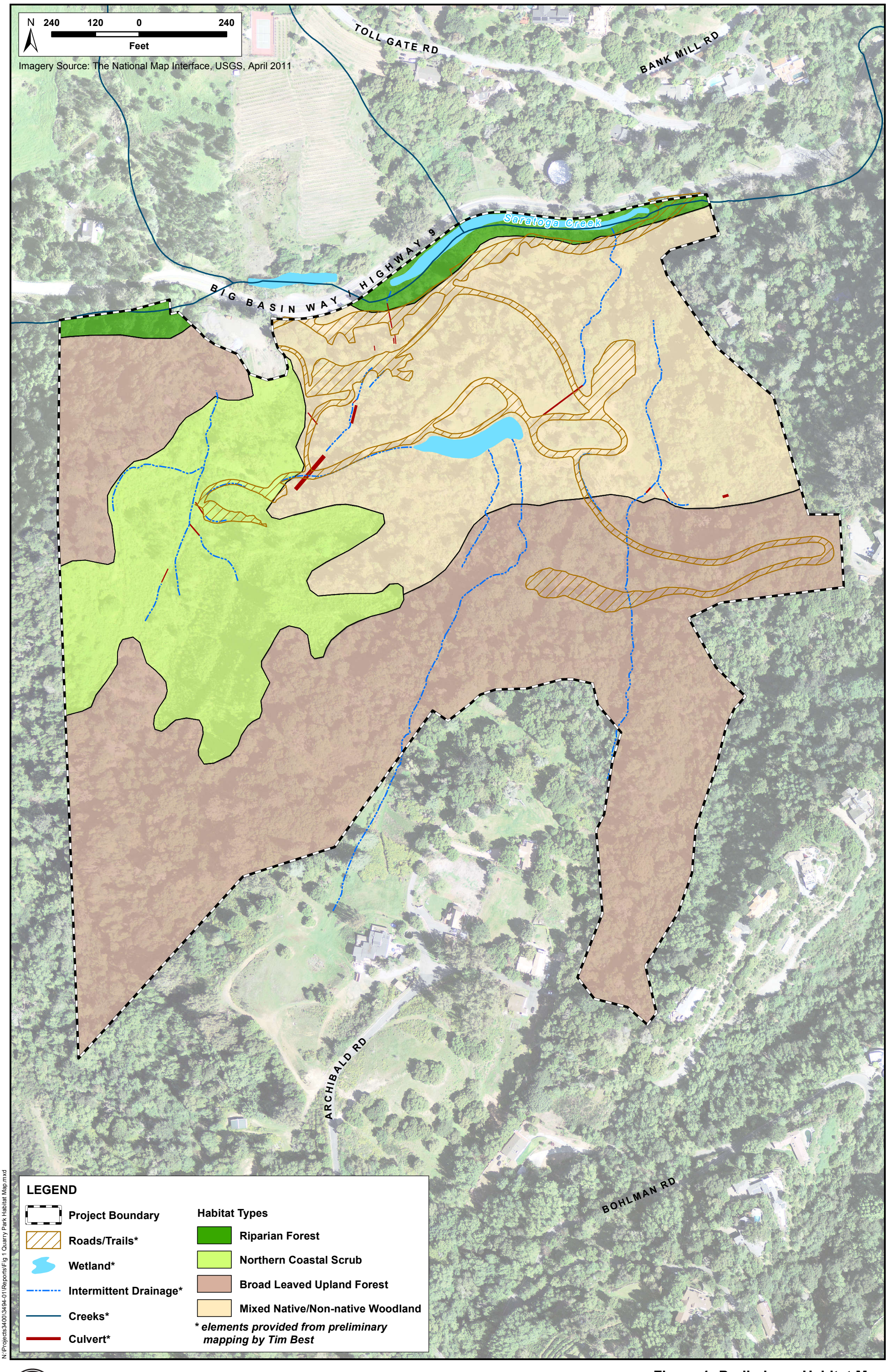

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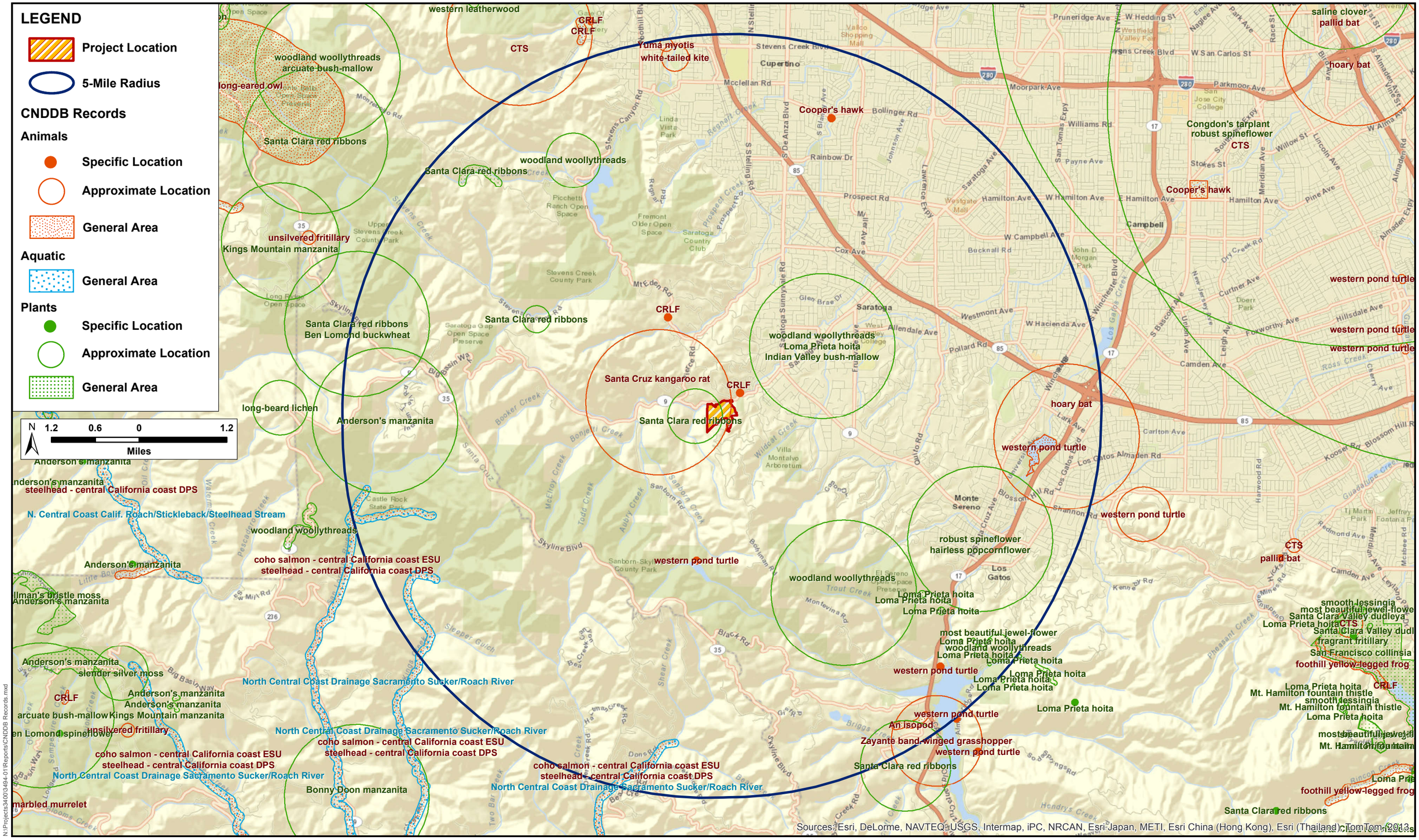
H. T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS

Figure 1: Preliminary Habitat Map
Saratoga Quarry Park Master Plan (3494-01)
July 2013



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ECOLOGICAL CONSULTANTS

Figure 2: CNDDB Records

Saratoga Quarry Park Master Plan (3494-01)

July 2013

APPENDIX C:
Civil Utilities Site Assessment

Quarry Park Master Plan

City of Saratoga

Existing Conditions Assessment

July 2, 2013

SITE:

Description – The Quarry Park Master plan is located on an approximately 61.46 acre site in the City of Saratoga, County of Santa Clara, CA containing two separate assessor's parcels (APNs 503-48-045 & 517-32-001). The property is generally bounded by Congress Springs Road (Highway 9) on the North, private low density rural residential properties to the east and south, and watershed lands of the San Jose Water Company to the west. Saratoga Creek passes through the site along the northern boundary adjacent to Congress Springs Road. A small portion (1.89 acre parcel) of the original overall quarry site located at the northwesterly corner was retained by the Santa Clara County Airports & Roads for use as a material storage yard. The property is situated on steep terrain near the easterly base of the Santa Cruz Mountains. The landscape is generally densely vegetated trees and shrubs with limited areas of open grassland. The property varies in elevation from approximately 590 feet at the lowest point adjacent to main entrance off Congress Springs Road to over 1,117 feet along a ridgeline that intersects the southerly property boundary.

SITE UTILITES:

Sanitary Sewer:

The Quarry Park property is located within the City of Saratoga at the city westerly limits in the area of the City served by the West Valley Sanitation District (WVSD); however, there is no record of public sewer service to the property. The northerly of the two Quarry Park property parcels (APN 503-48-045) is within WVSD service boundary, but the southerly parcel (APN 517-32-001) is not. Since the southerly parcel is contiguous to the service area boundary of the northern parcel, it could be annexed into the WVSD if service to both parcels was desired. There is an existing 10-inch WVSD gravity sewer main located in Congress Springs Road along the property frontage.

There is no visible evidence of a sewer system, septic tanks/leach pits are found on the property. It is unclear what sanitary sewer system was used during the time the property was used as a quarry site.

Water:

The Quarry Park property is located just outside the area of the City of Saratoga served by the San Jose Water Company (SJWC). As such, the Company has no record of water service to the quarry site. There is an existing 16-inch SJWC water transmission main located in Congress Springs Road along the property frontage. Connection to the SJWC system would require annexation into their service area.

There are remnants of the old irrigation system used since 1969 for the re-vegetation restoration of the hillsides. The system consists of several water tanks:

- A small above ground wooden water tank located at the picnic area
- Two above ground steel water storage tanks (approximately 10,000 gallons each) located mid-slope of the hillside
- A steel water tanker trailer located in the southwesterly area
- A larger wood covered concrete storage reservoir located in the southeasterly area near the property boundary. This tank has a large rupture/crack visible in the side.

It appears there may have been a well located immediately adjacent to the concrete storage reservoir. The tanks are connected by a system of galvanized 3 to 4-inch diameter pipelines and irrigation spray heads. One section of the pipeline near the picnic area is broken with a trickle of water supplying a ditch and pond. It is unclear what the source of this water is for this system. We are currently checking with Santa Clara Airports & Roads staff to determine the source of water used for the irrigation system.

Storm Drainage:

The main drainage body for the Quarry Park site is Saratoga Creek located adjacent to Congress Springs Road across the northern property boundary. The storm drainage for the site generally flows downhill towards Saratoga Creek. The access roads are generally drained by roadside ditches with a few corrugated metal culverts at crossings. There is a small pond that stores water from a portion of the ditch system. This pond also appears to be feed from a broken pipeline section of the irrigation system as noted above.

Electricity:

The Quarry Park site is served by Pacific Gas & Electric (PG&E) for electricity. There is an existing 12 KV overhead power distribution line that follows Congress Springs Road along the property frontage. There is also an overhead 12 KV power line from a connection point at Congress Springs Road that crosses the easterly portion of the property that connects to the low density residential development to the south.

There are remnants of an electrical power system on the property. Power appears to have fed the site near the main entrance at the remains of the concrete foundation of processing plant building. There is an electric service pole and abandoned meter located westerly of the concrete building foundation. There is an abandoned electrical control panel located on the easterly end of the concrete foundation. There are also abandoned electrical outlets that were found in the picnic area.

Gas:

The Quarry Park area is also served by Pacific Gas & Electric for gas. There is an existing gas main located in Congress Springs Road near the northeasterly corner of the property at Toll Gate Road. However, the gas main system ends at this intersection, and there is no evidence that the property used gas for the quarry operations.

APPENDIX D:
Roads and Trails Site Assessment

ROAD AND TRAIL ASSESSMENT
SARATOGA QUARRY

DRAFT REPORT
SUBJECT TO REVISIONS

Santa Clara County, CA

August 15, 2013

Job: DCE-QUARRYPARK-619

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DRAFT

INTRODUCTION

This report details the findings of a Road and Trail Assessment (RTA) of the 64 acre Quarry Park area located immediately south of Highway 9 and adjacent to the City of Saratoga in the unincorporated area of Santa Clara County (Figure 1).

BACKGROUND

The property was part of an aggregate quarry that was operational from approximately 1908 until 1967. The quarry was closed in 1967 and the hillside rehabilitated to minimize slope erosion of the graded slopes. The County has since used this site to store road maintenance equipment and materials. There are multiple roads and tractor trails across the property associated with the old quarry operations and subsequent restoration. Some of these roads and trails are drivable, others are overgrown and abandoned.

The long term goal for the property is to develop it for recreational use including a series of sustainable public trail corridors that would ultimately connect to nearby public parks and open space lands.

DC+E Planning Group has been retained by the City of Saratoga to develop a master plan for the property. This road and trail assessment was undertaken as part of the master plan to provide baseline information on the current condition of roads and trails on the property and the physical constraints for their inclusion into the final trail network.

GOALS AND OBJECTIVES

This Road and Trail Assessment (RTA) provides a reconnaissance-level assessment of the dominant roads and trails on the property. The objectives of the RTA are to:

- Identify and map existing roads and trails
- Systematically inventory the physical characteristics and condition of roads and trails
- Identify problem areas and physical constraints such as steep gradient trails, fall-line trails, trails with poor drainage and tread condition, and wet areas, that could impact future use and maintenance requirements.

The assessment is based on field observations coupled with observations made from aerial photographs and LiDAR imagery. The inventory is a reconnaissance level effort and therefore the results should be viewed as approximate and general.

PROJECT SETTING

GEOGRAPHIC SETTING

Topography

The Quarry Park property occupies about 64 acres of steep north facing ground above Highway 9 and Saratoga Creek (Figure 1). The project site is bordered to the west by San Jose Water Company property and on the east and the south by low-density rural residential and open space areas.

The majority of the property was part of an open aggregate rock quarry that as previously mentioned was operational from 1908 to 1967. Site topography was extensively modified by the extraction of rock and the subsequent rehabilitation efforts implemented when the quarry closed in 1967. This resulted in multiple graded pads and benches, and a high density of roads and tractor trails. Most of the roads and trails are now overgrown and no longer passable. The 1956 aerial photograph below shows what is roughly the maximum extent of the quarry operations.

Drainage

The property is drained by several narrow and steep gradient "V"-shaped ephemeral to intermittent watercourses that are locally deeply incised with steep unstable channel banks. These watercourses were heavily impacted by quarry operations with apparent high rates of channel erosion occurring shortly after quarry closure. As the slopes have become revegetated, these channels appear to have stabilized and the rate of erosion diminished.

Vegetation

Vegetation is primarily …

GEOLOGY AND SOILS

The project area is located in the central portion of the Coast Range Physiographic Province of California, a series of coastal mountain chains paralleling the pronounced northwest-southeast structural grain of northwest California. The area is geologically active, dominated by the northwest-southeast trending San Andreas Fault Zone located about 1.5 miles southwest of the preserve.

The geology of the project site is complex. The property is mapped as transected by the Berrocal Fault Zone which is a late Quaternary southwest-dipping, reverse fault zone that forms a part of what McLaughlin et al. (1996) refer to as the Southwestern Santa Clara Valley thrust belt. At this location the fault thrusts bedrock of the Mesozoic Franciscan Complex to the south over sediment of the Pliocene-Pleistocene Santa Clara Formation to the north (Brabb et al., 2000; WCA, 1977)(Figure XX). Overlying the bedrock is a large-scale active deep-seated landslide.

Bedrock Geology

Bedrock of the Franciscan Complex is mapped as underlying the majority of the property and it was this material that was mined for aggregate. Franciscan rocks are described by WCA (1977) and Brabb et al. (2000) as predominantly massive to thick bedded fractured greywacke sandstone with interbedded siltstone and shale, and pervasively sheared mélange (a tectonic mixture of sheared shale and sandstone). Blocks of bedrock were locally exposed on the steeper slopes in the upper portion of the property.

The Santa Clara Formation is mapped in the northern downslope portion of the property, though clear exposures of this material were not observed. Regionally this material is described as a poorly indurated mudstone and siltstone with occasional interbeds of sandstone and conglomerate (Brabb et al., 2000; WCA, 1977).

Soils and Surfical Sediments

Bedrock is mapped as overlain by a large-scale deep-seated active landslide. Earth materials that comprise this feature are derived from the underlying bedrock and in places may include relatively intact blocks of Franciscan rock.

Natural Resource Conservation Service (NRCS) identifies soils as predominantly gravel loam though nearly all of the native soils have been stripped by quarry operations. Locally mantling the majority of the hillside is fill material derived from quarry operations and site reclamation. This material is variable in thickness and consists mainly of poorly sorted angular sand and gravel. Field observations indicate that surfical earth materials are moderately drained with a moderate erosion potential where runoff is concentrated.

Landsliding

Landslides and slope instability are characterized by the movement of soils and surficial deposits, known as colluvium, and bedrock down steep slopes. This movement results from wet weather, adverse structures, seismic shaking and/or improper grading and drainage.

The property is mapped by CSA (2013) as nearly entirely underlain by a 150+ acre large-scale active deep-seated landslide. Field observations identified multiple small debris slides and debris flows. The majority of these are associated with the failure of oversteepened cuts or fills along roads or are small stream bank failures along watercourses.

Regional Faults and Seismicity

The subject property is located within a highly seismically-active region of California. A broad system of inter-related northwest-southeast trending strike-slip faults represents a segment of the boundary between the Pacific and North American crustal plates (Figure 3). For approximately the past 15 million years (mid-Miocene) the Pacific plate has been slipping northwestward with respect to the North American plate (Atwater, 1970; Graham and Dickinson, 1978). The majority of movement has been taken up by the San Andreas Fault itself; however, there are other faults within this broad system that have also experienced movement at one time or another. The property is subject to intense seismic shaking during major earthquakes along nearby fault systems.

San Andreas Fault: The San Andreas Fault is an active, northwest-trending right lateral strike slip fault zone and represents the major seismic hazard in northern California. The main trace of the fault trends northeast-southwest and extends over 700 miles from the Gulf of California through the Coast Range to Point Arena, where the fault extends offshore. The San Andreas Fault was responsible for the 1906 San Francisco earthquake (M_w 7.9) and the 1989 Loma Prieta earthquake (M_w 7.0).

The San Andreas Fault is located about 1.5 miles northwest of the project site. This segment of the fault has been assigned a slip rate that results in a M_w 7.3 earthquake with a recurrence interval of 400 years (WGOCEP, 1996).

Berrocal Fault Zone: The Berrocal Fault Zone, which transects the property, is a Late Quaternary to possibly Holocene active, poorly constrained reverse to oblique slip fault zone located along the base of the eastern flank of the northeastern Santa Cruz Mountains. It is part

of the Southwestern Santa Clara Valley thrust belt that also includes the Sargent, Monte Vista and Shannon Faults (McLaughlin et al., 1996).

Most researchers consider the Santa Clara Valley thrust belt to be potentially active, based upon the geomorphology along the fault zone, as well as loose knit evidence of syntectonic movement during the 1989 Loma Prieta earthquake (Bryant, 2000).

FACTORS AFFECTING TRAIL SUSTAINABILITY

Sustainability can mean different things to different people. In this context the term is used to describe a road or trail that can be maintained for its designated use without off-site impacts and without undue maintenance burdens. Factors influencing road and trail sustainability include 1) trail geometry, design and location, 2) type and extent of use, and 3) maintenance practices. Design and location factors are associated with the layout of the trail and include trail size, gradient, surfacing, orientation, geology and drainage. Use-related factors include type of use, amount of use, and user behavior. Maintenance practices that affect road and trail condition include surface grading, construction and maintenance of drainage structures, and control of use patterns that are impacting the trail.

TRAIL GEOMETRY, DESIGN AND LOCATION RELATED FACTORS

Principal factors that influence trail sustainability from a location and design standpoint include trail geometry (steepness and orientation), drainage provisions, geology and soils, and use. One of the most important considerations for sustainable unpaved roads and trails is maintaining natural drainage patterns to avoid the concentration of runoff, especially down the trail tread, as this leads to erosion and sediment entering streams.

Trail Grade

Numerous studies have documented a strong positive relationship between trail grade and degradation (Best, 2002; Best, 2010; IMBA, 2001; Marion and Olive, 2006; Parker, 2004). The steeper the grade the more likely it is to erode. Most erosion problems tend to occur where the road and trail gradients exceed 15% and it is generally recommended that new trail be constructed with sustained grades less than 15%. Grades steeper than 15% are difficult to adequately drain and as a result, runoff tends to concentrate down the road or trail for long distances. Steep gradient trails also impact recreational access making the trail more difficult to travel and more difficult to use while maintaining control.

Many of the tractor trails on Saratoga Quarry property are quite steep with grades exceeding 15% and up to 35% in some places. Erosion on these trails has been limited, however, probably because the of the rocky substrate that comprises the tread material and because many are now overgrown.

Trail Orientation (Fall-line)

Higher rates of erosion occur on fall-line trails (Best, 2002; Best, 2010; Marion and Olive, 2006). These are routes that drop directly down the hillside. Fall-line trails follow the same path that water flows, thereby focusing water down their length. These trails are difficult, if not impossible, to drain and often experience ongoing erosion.

On steep gradient trails with a fall-line orientation use patterns tend to result in trail widening. This results in greater ground disturbance and higher rates of erosion.

Drainage

One of the most important considerations for sustainable unpaved roads and trails is maintaining natural drainage patterns. Roads and trails should be designed and constructed to minimize disturbance of natural drainage patterns. This avoids the concentration of runoff down the trail tread, which leads to erosion of the tread and sediment entering streams (Best, 2002; Best, 2010; Parker, 2004; PWA, 1994; Webber, 2007). Erosion of the trail tread can result in exposed rocks and plant roots, uneven tread surface and locally muddy conditions. Erosion or instability of the hillslope can also occur where runoff eventually spills over the road embankment.

The most serious problems with drainage tend to occur in areas where the road/trail gradient is steep, typically greater than 15% grade. In these areas constructing effective drainage dips[1], can be difficult and therefore they are often undersized or installed at inadequate intervals. Such drains have a short life expectancy since they tend to break down and/or infill easily with trail use.

Most of the roads and tractor trails on the property were drained by inslope pitch to infrequently spaced cross drains. As a result, runoff was allowed to concentrate for long distances. This does not appear to have resulted in much erosion of the road bed in most instances, but did cause the formation of several larger gullies where runoff was eventually discharged off of the road. Some of this erosion may have occurred shortly after the quarry was closed and prior to the site becoming revegetated. Nonetheless, if roads and trails are to be reopened for trail use it is essential that adequate drainage provisions are incorporated into the design. Where possible these drainage structures should be built to require minimum maintenance.

Stream Crossings

There are a number of steam crossings on the property. The majority of these crossings are culverts that are functioning adequately and are not a significant constraint for future use. The

[1] Drainage Dip: A short dip constructed in the road or trail that forces water off the tread and prevents runoff from concentrating. Drainage dips include rolling dips, reverse grade dips, and as a last option, water bars. Frequent dips are essential elements for sustainable trail design.

most significant issue is found at C19 where a deep ravine has eroded through an old tractor road. Where major washouts occur, extensive reconstruction is usually required which in some cases is cost prohibitive for trail use.

USE RELATED FACTORS

For well-designed and constructed trails, post-construction trail impacts would be minimal in the absence of use. This is the case even on some poorly-designed trails that are not heavily used and are largely covered by vegetation that limits the direct impact of rainfall and runoff. As previously mentioned many of the abandoned roads on the property have inadequate drainage provisions by today's standards but do not show excessive erosion due to the fact the roads are unused and overgrown.

Use Intensity

Most forms of trail degradation on otherwise well-designed trails are related to use intensity, with higher use typically resulting in greater ground disturbance. Leung and Marion (1996) found the majority of post construction changes occur with initial or low levels of use, with changes diminishing, on a per-capita basis, with increasing use. Subsequent degradation on established trails is mostly a function of site durability and other use-related factors such as type of use and use behavior.

Type of Use

Type of use has also been shown to be a determinant of the type and extent of trail impacts (Marion and Olive, 2006; Marion and Wimpey, 2007; Wilson and Seney, 1994). Roads with sustained vehicle use have been shown to have greater degradation than trails where vehicles are not used. Other erosion problems associated with use include hikers and mountain bikes cutting corners and switchbacks resulting in steep, fall-line segments without drainage structures and equestrian use which can damage the trail tread due to the weight and frequency of use. Because the quarry is not currently being used, this Assessment does not attempt to characterize or differentiate the potential impacts stemming from different types of trail uses.

MAINTENANCE FACTORS

Ideally trails are located and designed to be very low maintenance, but the existing roads and trails were not designed with this in mind. It is likely that the existing steep gradient roads and trails will be utilized in the final park plan. Maintaining drainage structures will be critical, especially prior to the rainy season, in order to prevent damage to the trail tread. Trail upgrades and design specifications will need to include recommendations for maintenance based on planed use, park resources, accessibility, etc.

RESULTS

A reconnaissance level inventory was undertaken on most of the major roads and tractor trails on the property. The purpose of the inventory was to characterize existing conditions and their suitability for recreational trail use. The inventory focused on the principal roads and trails on the property that are most likely to be included in a trail network.

CURRENT TRAIL SYSTEM

The inventory found a high density of roads and tractor trails on the property that were constructed for quarry operations and subsequent reclamation efforts. This includes 0.8 miles of roads that are currently drivable and well over 3 miles of abandoned and overgrown roads and tractor trails. For the purpose of this study roads are classified as listed in Table 1 below.

TABLE 1:
ROAD AND TRAIL CLASSIFICATION

ROADS	DESCRIPTION
Principal road	Gravel road
Secondary road	Unsurfaced dirt single lane road
Abandoned road	Unused road; typically overgrown.
Tractor road	Unsurfaced steep road constructed for tractor use (>30% grade)
Abandoned tractor road	Unused tractor road; typically overgrown.
Trail	Single track trail

INVENTORY RESULTS

The condition of trails in the park is varied. Most of the roads are in good condition whereas the tractor trails tend to be poor due to their steep grade. Trail grade will be a limiting factor in the future management of the park and will have a direct impact on the type of future use the park can receive.

The condition and constraints of the pertinent trails in the park are summarized in Table 2 below. A detailed description of the roads in found in Appendix 1.

TABLE 2: SUMMARY OF ROADS

ROAD ID	LENGTH (ft)	TYPE	GRADE	DESCRIPTION	CONSTRAINTS FOR TRAIL USE	SUITABILITY FOR TRAIL USE
1A	420	Principal Road	3%	Main gravel road accessing bottom of property off Congress Springs Road	• None	Good
1B	600	Principal Road	17%	Main gravel road climbing at moderately steep grade from valley bottom to Pad P5. Tread in good shape. Possible plugged storm drain (C2) at bottom of reach. C3 culvert (30") at top of reach may drain pond. 5 gal buckets incorporated in fill.	• Drainage	Good
1C	1700	Principal Road	5% – 20%	Main gravel road contours across hillside at moderate grade to west end of property. Road provides access to pond. Last 250 feet is steep. 30 lf of outer road edge at risk of being undercut at N3. Drainage needs improvement.	• Drainage • Steep 20% grade • Undercut road at N3	Good
1D	200	Principal Road	20%	Short moderately steep gravel road making loop.	• Steep grade	Good
1E	250	Secondary Road	10%	Lightly rocked gentle gradient road making loop adjacent to pond	• Adjacent to pond	Good
2	750	Secondary Road	5% - 12%	Lightly rocked moderate gradient road accessed off Congress Springs Road from eastern gate. Tread is worn but stable. C3 rusted culvert (36") at stream crossing needs to be replaced. Possible perched fill on outer road edge.	• Rusted 36" culvert • Possible perched fill • Drainage	Good
3	250	Principal Road	16+%	Paved road accessing picnic area. Plugged storm drain at bottom of reach. Past fill failure at N18 reconstructed with low criblog retaining wall.	• Stability of crib wall at N5 unknown	Good
4	350	Secondary Road	15%	Secondary road at 15% grade accessing several graded pads used to stockpile old construction material, culverts, and other debris. 30" functional culvert (C5) at old stream crossing. Drainage will need to be upgraded.	• Drainage	Good
4A	330	Abandoned Tractor Road	30%	Old overgrown tractor road at steep 30+% grade accessing adjacent parcel.	• Steep 30% grade • Overgrown	Poor
5	1750	Abandoned Road	5% to 18%	Old overgrown road switch backing up hillside to an old pond and concrete water tank at N6. Tread is intact. Drainage is fair to poor due to lack of cross drains (dips) but this has not caused problems. Two culverted watercourse crossings: C7 is a 48" functional culvert. C8 is a 30" functional put partially plugged culvert. Small sinkhole in road prism at N5 will need to be repaired	• Steep 18% grade • Overgrown	Good
6	225	Tractor Road	30%	Steep fall-line tractor road dropping down from Road 1 to west end of picnic area. Tread is in good condition. Recently installed wood steps at N7. C9 ditch relief culvert (24") is bypassed. Road accesses Adit A1	• Steep 30% grade • Fall-line orientation • Culvert bypassed • Stairs	Fair

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ROAD ID	LENGTH (ft)	TYPE	GRADE	DESCRIPTION	CONSTRAINTS FOR TRAIL USE	SUITABILITY FOR TRAIL USE
6A	120	Tractor Road	25%	Short connector road bypassing steps at N7. Lower 40 feet of road is locally wet with 25% grade. Located adjacent to Adit A2.	• Step 25% grade • Locally wet	Good to Fair
7	750	Abandoned Road	10%	Abandoned road contouring across hillside connecting eastern end of pond to the picnic area. Tread is in good condition but over grown. Wet ford crossing at C10.	• Overgrown • Wet ford crossing	Good
8A	240	Abandoned Tractor Road	18%	Short tractor road climbing up valley bottom at 18% grade to watercourse crossing. Tread in good condition. Three culverts: C12 functional ditch relief culvert (24") with little flow; C13 partially plugged ditch relief culvert (24"); C14 functional culvert (24") at stream crossing.	• Partially overgrown	Good
8B	890	Abandoned Tractor Road	15% - 35%	Steep 15% to 35% gradient abandoned tractor road climbing across steep quarry wall to reach ridgetop. Large outside berm. Tread is intact. Poor drainage resulting in gully at switchback N8. Road narrowed in a few locations from raveling of cutbank. Not feasible to reroute to have lower grade.	• Steep 25+% grade • Large outside berm • Steep side slopes • Poor drainage • Overgrown	Fair to Poor
8C	430	Abandoned Tractor Road	15% - 25%	Fall-line trail extending up ridgeline at 15% to 25% grade. May be possible to reroute to have lower grade and avoid fall-line orientation.	• Steep 15% grade • Fall-line orientation • Overgorwn	Fair to Poor
9A	780	Abandoned Tractor Road	20% - 35%	Steep 20% to 35% gradient tractor road routed across steep rocky quarry wall. Large outside berm. Majority of tread is intact. Poor drainage resulting in entrenched roadbed near N9 and deep gully at N10. This gully narrows the road to less than 3 feet. Not possible to reroute to avoid steep grade.	• Steep 25+% grade • Large outside berm • Steep side slopes • Poor drainage • Gully encroaches into road prism • Overgrown	Fair to Poor
9B	960	Abandoned Tractor Road	15%	Moderate gradient tractor road contours across hillside. Majority of the tread is intact. At N13 an old gully narrows road to about 7 feet. Two wet ford watercourse crossings at C15 and C16. Both crossings will need to be upgraded for trail use.	• Overgrown • Poor drainage • Two wet ford crossings	Good to fair
10	650	Abandoned Tractor Road	5% – 18%	Narrow abandoned tractor road contours across steep rocky hillside at 5% to 18% grade. The road has been narrowed at several locations from cutbank instability depositing debris onto the road surface (N15) and from gully erosion from road drainage (N16). In addition and most significantly, a 60+ foot section of road has completely washed out at a narrow incised ravine (C17) and is no longer passable. It is unknown if the trail can be reconstructed past this site.	• Cutbank instability • Washed out stream crossing	Poor
11	625	Abandoned Tractor Road	5% to 14%	Old overgrown tractor road contours across moderate gradient slopes above the south side of the pond. There are two wet ford crossings at C18 and C19.	• None	Good

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APPENDIX 1: ROAD INVENTORY

ROAD 1

Road 1 is the principal road accessing the lower and midslope portions of the property. The road extends 3100+ feet from the gate on Congress Springs Road up the hillside and past the small pond before ending at a small graded pad (P11) near the main old quarry. The road is broken up into 5 reaches, including two small loop roads.

Reach 1A (STN 0 - 420)

Reach 1A is a 420-foot-long, 40-foot-wide gentle gravel road forming a broad graded pad (P1) at the main entrance to the property off Congress Springs Road. The tread has been recently rerocked and is in good condition (Photo 1). There are no signs of erosion or drainage problems. There are two or three storm drain inlets located near the old concrete building that should be checked to see if they are functional.

C1 - culvert: On the downslope side of the road is the outlet of an 18" CMP. The inlet to this pipe was not found. The pipe may be draining a concrete water tank or possibly culverts coming off of the upslope picnic area. Drainage from the concrete water tank and picnic area should be checked.

N1: Stairs: A short set of degraded stairs lead down to a junction box.

Condition and constraints: Overall Reach 1A is in good condition with no significant constraints for future use.

Photo 1: Reach 1A showing good surface condition. Old gravel loading structure in the background

Reach 1B (STN 420 - 1020)

Reach 1B is a 600-foot-long segment of moderately steep, high-use gravel road climbing from the valley bottom to Pad P5 (Photo 3). The road is about 14+ feet wide and climbs at a moderately steep 17% grade (Photo 2). There is one culvert at C3 that appears to drain the nearby pond. Old debris is found locally along the fill embankment below the road at N2.

Photo 2: Grade of 17%. Road tread in good condition.

Photo 3: Large graded pad at P5.

The road tread is gravel that appears recent and in good condition, though slightly worn from use.

The steep 17% grade makes it difficult to drain the road and as a result runoff is conveyed down the road to the inlet of a storm drain (C2) near the bottom of the reach (Photo 4). The inlet to the storm drain appears partially plugged. Though drainage is only fair, there is no evidence of significant erosion of the road surface.

Photo 4: Inlet to storm drain at C2 appears partially plugged.

Photo 5: Outlet to 30-inch diameter CMP.

<u>N2: 5-gallon metal buckets in fill embankment</u>: About halfway up the road are several 5-gallon metal buckets of unknown origin located on the loose fill embankment below a wide segment of road. The fill embankment toes out into an ephemeral watercourse that drains from a 30”

culvert a short distance upslope. The source of the buckets and whether they pose any environmental impact are unknown.

C2: 30" culvert: At the top of the reach is the outlet to a 30" diameter CMP that appears to extend to the pond (Photo 5). The culvert outlet appears in good condition. Presently there is no flow through the pipe suggesting the culvert inlet is blocked. The culvert inlet was not located. The pipe discharges into a dry ephemeral watercourse. The condition of the culvert and its association with the pond requires further review.

Condition and constraints: Overall the road is in good to fair condition with no significant constraints. As previously mentioned, the steep 17% grade could impact drainage. Drainage will need to be upgraded by maintaining the inboard ditch and cleaning the storm drain inlet at the bottom of the reach. Depending on use the road surface may need to be periodically resurfaced. The fill embankment located at the wide segment of road appears loose and is probably prone to failure but presently does not impact the gravel segment of road.

The 5 gallon buckets should be assessed to determine if they present an environmental hazard.

The 30" diameter culvert presently does not appear to impact the road. The culvert inlet should be identified and assessed to see if it is functioning as designed.

Reach 1C (STN 1020 - 2800)

Reach 1C is a more than 1700-foot-long lightly rocked midslope road that contours across the hillside before ending at a graded pad (P11). The road provides the principal access to the midslope portion of the property including a small pond (Photo 6). There are two adjacent short road segments that form two separate loops in the road.

Photo 6: Photo of western portion of Reach 1C.

Photo 7: Minor rilling on steeper 20% road segment.

The majority of the road has a grade less than 15% with a couple of steeper segments. The last 250 feet of road climb at a steep 20+% grade (Photo 7).

The tread is lightly rocked though locally worn from use. A 40-foot segment of roadway at N3 has been undercut by stream bank erosion at the western end of the reach. Minor rilling is evident on the steeper road segments where the road grade exceeds 15%.

Drainage is fair with most of the road insloped. The most significant drainage issues are along the western portion of road where runoff is collected along 600 lf of road and discharges into the western end of the pond. This runoff has resulted in some shallow rilling of the road surface, especially on the steeper road grades. Road drainage in this area will need to be upgraded by reshaping the road and installing additional cross drains.

N3: Undercut roadway: At the western end of the road segment, approximately 30 lf of roadway have been undercut by stream bank erosion, narrowing the road to about 13 feet. The road at this location appears to have been constructed on a partial bench with fill pushed to the outer edge of the roadway. This fill toes out into a small ephemeral watercourse where some of the material has eroded out from stream bank erosion. Adjacent to the failure is a 30" ditch relief culvert draining a small 1/10 acre graded pad. It is unknown if this culvert played any role in the failure. The outer road edge is currently oversteepened at greater than 80% slope and may be unstable. Continued stream bank erosion is expected which could further undermine the road. For long-term stability the outer road edge will need to be reconstructed or the road moved inboard slightly. Moving the road inboard will be the most cost-effective solution.

Condition and constraints: Overall the road is in fair to good condition and suitable for continued road use with upgrades. The principal constraints are the locally steep road grade and undercutting of the road at N3.

Road drainage will need to be upgraded by reshaping the road and installing additional cross drains. The steep 20% grade at the western end of the road will have a higher potential for erosion and therefore require periodic maintenance. At N3 there are 30 lf of road at risk for being undercut by stream bank erosion. In the long term this section of the road will need to be stabilized or rerouted.

Reach 1D

Reach 1D is a 200-foot segment of rocked road making the first loop with Road 1C. The road is lightly rocked at up to 20% grade. The steeper road segment appears rilled possibly from drainage coming off of Road 4 (Photo 8).

Condition and constraints: Overall the road is in fair to good condition and suitable for continued use with upgrades. The steep 20% grade has a higher potential for erosion and therefore may require periodic maintenance. Drainage coming off of Road 4 will need to be upgraded if this segment is to be reopened.

Photo 8: Steep rilled segment of Reach 1D.

Photo 9: Well-vegetated edge of Reach 1E adjacent to pond.

Reach 1E

Reach 1E is a 250-foot segment of unsurfaced road extending along the north side of the pond and making a second loop with Road 1C. Road fill appears to toe out into the pond but appears well vegetated (Photo 9). The road tread is lightly rocked and in good shape. No significant erosion observed.

Condition and constraints: Due to its close proximity to the pond, erosion of the road surface will discharge fine sediment into the pond. If this is a significant issue then the road should be rocked if use is to continue or increase.

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ROAD 2

Road 2 is a 750-foot-long segment of lightly rocked road extending from the eastern most gate off Congress Springs Road and providing a secondary access to the property. The first 350 feet of road extending from the gate are at 12 % grade (Photo 10); the remaining 400 are at less than 5% grade.

At the western end of the road before its intersection with the main gravel road is a broad graded pad (Photo 11). This pad appears to have been used to stockpile spoils which partially block the road and form a large outside berm to the road.

The road is lightly rocked and in fair condition, being somewhat rutted from use. Drainage is fair. There are no cross drains in place, though little significant erosion was observed. There is one culverted stream crossing at C4.

Photo 10: Lowered rutted segment of Road 2

Photo 11: Upper wide portion of Road 2. Large berm visible on left

Photo 12: Inlet to rusted 36” culvert

<u>C4: 36” culvert</u>: This is a 36” x 30” diameter CMP draining a small intermittent to perennial stream near its confluence with Saratoga Creek (Photo 13). The culvert is rusted with pin holes

observed in the culvert bottom. There is some sediment backed up behind the culvert inlet suggesting the pipe may be undersized. This culvert will need to be replaced.

Condition and constraints: Overall the road is in fair condition and suitable for continued use with upgrades. The road surface should be regraded and rocked to remove ruts and improve drainage. The large berms found along outer road edge should be removed. For long term stability, the rusted 36” CMP should be replaced.

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ROAD 3

Road 3 is a 250-foot-long paved road accessing picnic grounds. The road is moderately steep at 16%-plus grade (Photo 13). Road is paved with the tread in good condition and drained by inslope to partially plugged storm drain inlet that will need to be cleaned. There are two old road failures at N17 and N18.

Photo 13: Photo of Road 3

Photo 14: Cutbank failure at N17 above Road 3

Photo 15: Crib wall at fill failure N18 on Road 3

<u>N17: Old cutbank failure</u>: This is an old 20-foot-wide cutbank/fillslope failure above the road. Slide appears to have been partially stabilized with an unengineered "chain-link fence" retaining wall (Photo 14).

<u>N18: Old fill failure</u>: This 35-foot-wide old shallow fillslope failure extends to the outer road edge (Photo 15). Slopes below the road are steep at greater than 65%. A couple of stacked crib logs have been placed at the top edge of the slide scarp to stabilize the outer edge of the road. These logs are slightly degraded and their long-term stability is uncertain. A 2" water line crosses the slide scarp. Unknown if the water line is functional.

Condition and constraints: Road is suitable for continued use. Long-term stability of the old fill failure is unknown. Inlet to the storm drain will need to be cleaned.

ROAD 4

Road 4 is a 350-foot-long, infrequently-used, unsurfaced and grassed-over road accessing two graded pads (P6 and P7). These pads are stockpiled with old construction material, culverts, pipes, and other debris (Photos 17 and 18). There is one culverted watercourse crossing at C4 and a small diameter ditch relief culvert at C5. Several oild drums are found at the end of the road (Photo 19)

The road is routed up a graded bench at 15% grade. Much of the tread is grassed over with the lower (northern) portion indistinct (Photo 15). There is no evidence of any drainage dips installed. There is little evidence of erosion, mainly because the road is grassed over.

Photo 15: Looking up overgrown road 4

Photo 16: Inlet to culvert C5

<u>C5: 30” Culvert</u>: 30” x 20’ CMP draining small ephemeral watercourse with very little flow (Photo 16). Culvert is intact without problems.

<u>C6: 12” Ditch relief culvert</u>: 12” x 20’ ditch relief culvert crossing the entrance of pad P6. Culvert is partially plugged with sediment. Presently the pipe does not appear to receive much flow. Inlet to the culvert is partially brushed over.

Condition and constraints: Overall the road is in good to fair condition and is suitable for future use with drainage upgrades. Culvert inlets should be cleared. If the road is reopened then drainage on the lower road segment will need to be improved to avoid draining onto Road 1D.

Photo 17: Debris on lower pad

Photo 18: End of road 4

Photo 19: Oil drums on Road 4

Reach 4A

This is a ~330-foot-long old overgrown tractor road extending from Pad 7 at the end of Road 4 to an adjoining property.

The road is visible in the 1956 aerial photographs but is overgrown in subsequent photos. The tread is identifiable in the LiDAR imagery at roughly 12 feet wide with greater than 30% grade. A field review of this road was not made.

Condition and constraints: The trail is in poor condition and generally not suitable for future use due to its steep 30% grade**.**

ROAD 5

This is a 1750-foot-long 15- to 20-foot-wide overgrown road switchbacking up a hillside to an old pond and concrete water tank. The road ends at a large graded pad (P12) at the edge of a deeply incised ravine/watercourse at C6. Crossing this ravine would provide part of what would likely be a popular loop trail, but access may be difficult due to being deeply incised.

The lower 400 feet of road climbs at a 15% to 18% grade (Photos 20 and 21); thereafter the grade drops to a more favorable grade of less than 5% (Photo 25).

The tread is lightly rocked and generally in good condition, though lower portion is slightly rutted. Although drainage is fair to poor due to lack of any cross drains (e.g. dips), there has been only limited erosion due to the rocked and overgrown nature of the road bed.

Photo 20: Lower portion of Road 5

Photo 21: Middle portion of Road 5

There are two functional watercourse crossings along the alignment (C7 and C8). A short retaining wall supports a 45-foot-long segment of road cut at N4. At N5 there is a small sinkhole in the road bed.

<u>C7: 48” culvert</u>: 48” x 40’ long CMP with concrete sack headwall at an incised ephemeral watercourse (Photo 22). Culvert appears functional and without problems.

<u>N4: Retaining Wall?</u>: At this location the road cut appears to be supported by a 45-foot-long, 8-foot-high concrete retaining wall (Photo 23). The wall appears somewhat degraded.

<u>N5: Sinkhole</u>: 1-foot-diameter by 2-foot-deep sinkhole caused by soil piping has developed in the middle of the old road (Photo 24). Continued erosion is likely. The loose soils around the sinkhole will need to be removed and recompacted.

<u>C8: 30” culvert</u>: 30” x 30’ long CMP located on an ephemeral watercourse at the outlet of a small pond (Photo 26). Culvert appears functional though the inlet is overgrown. The pipe does not appear to receive much flow. Adjacent to the culvert is a concrete water tank.

N6: Concrete water tank: This is a 40-foot-long by ~22-foot-wide concrete water tank/reservoir located on the outer road edge (Photo 27. The water tank appears dry.

Condition and constraints: Overall the road is in good to fair condition and suitable for continued use with upgrades. The principal constraint is the moderately steep 18% grade in the initial section of road. For future use, road drainage will need to be upgraded by installing drainage dips. The sinkhole at N5 will need to be excavated and reconstructed.

Photo 22: Inlet to culvert C7

Photo 23: Possible old concrete retaining wall at N4

Photo 24: Small sinkhole at N5

Photo 25: Upper portion of Road 4

Photo 26: Inlet to culvert C8. Concrete water tank to left.

Photo 27: Concrete water tank N6

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ROAD 6

Road 6 is a 225-foot-long, steep-gradient fall-line tractor road dropping from Road 1 down to the west end of the picnic area (Photo 28). The road also accesses several small graded pads (P13, P14 and P16) and the entrance to adit A1 (Photo 29). A set of wood steps (N7) has recently been constructed on the lower 40 feet of the trail.

The trail is steep at a 25% grade with a short 35% gradient segment at the wood steps. The tread lightly rocked, partially grassed over, and overall in good condition.

The trail is drained by an inslope pitch that was designed to discharge into a 24-inch-diameter ditch relief culvert at C9. The ditch appears to have infilled with sediment and flow currently bypasses the culvert.

C9: 24" culvert: 24" x 40' long CMP draining inboard ditch (Photo 30). The ditch is infilled and flow bypasses the culvert.

N7: Wood Steps: This is a series of recently installed wood steps constructed from railroad ties and anchored into the slope with rebar (Photo 31.

Photo 28: Looking up Road 6

Photo 29: Entrance to Adit A1

Photo 30: Culvert C9 on Road 6

Photo 31: Recently built steps at the bottom of Road 6

Condition and constraints: Overall the trail is in good to fair condition and suitable for continued use with upgrades. The principal constraints are the steep 25% fall-line grade and the steps. Rerouting the trail to have a lower grade would be preferential, though may not be feasible due to topographic constraints in the area.

Fall-line trails are inherently difficult to drain and require a higher level of maintenance to ensure drainage structures are functioning. Presently the trail is not adequately drained, with runoff bypassing the culvert. This problem can easily be remedied by reshaping the road and cleaning the culvert inlet at C9.

The wood steps are functional but would preclude bicycle and equestrian access. Because the steps do not incorporate a side rail they may be prone to shifting over time. The steps can be bypassed by following a gentle gradient tractor trail at 6A.

Reach 6A

Reach 6A is a 120-foot-long tractor road providing an alternative way to connect the top of the stairs on Trail 6 to the Picnic area (Photos 32 and 33). The trail also accesses the western end of Road 7, one of the mine adits at A2 (Photo 34) and a small pad at P17. There is a small diameter plugged culvert (C11) near the entrance of the adit A2

The trail grade is 10% with a short 25% section at the north end. The tread is unsurfaced and grassed over. The lower portion of the trail may be seasonally wet due to runoff coming out of adit A1 and flowing down to the site.

Photo 32: Lower portion of Road 6A

Photo 33: Western end of Road 6A

Photo 34: Entrance to Adit A2

Condition and constraints: Overall the trail is in fair condition with the principal issue being the steep grade and wet ground near the end. It should be feasible to regrade the lower portion of the trail and apply base rock to remedy this problem. This alignment would provide a lower grade alternative to using the stairs at Road 6.

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ROAD 7

Road 7 is a wide 750-foot-long abandoned and overgrown road contouring across the hillside to connect the western end of the picnic area to the west side of the pond. The road is heavily vegetated with brush and grass.

There is a wet ford crossing at C10 where the road crosses a small perennial watercourse draining out of adit A1. A large graded pad is found at P15 (Photo 36) with small a degraded trail with wood steps descending to the picnic area. A second pad or wide section of road is found at P18.

The tread is in good condition with few signs of erosion. The grade is gentle, generally at less than 10%.

C10: Wet Ford Crossing: This is a wet ford crossing located where the old road crosses runoff draining out of the adit at A1. Flow is poorly confined resulting in a roughly 20- to 30-foot-long segment of wet road (Photo 35). It should be feasible to upgrade this crossing by installing a culvert, rock ford, or puncheon.

Condition and constraints: Overall the road is in good condition except for being overgrown. The road could easily be reopened for permanent use by clearing brush and installing drainage dips. Crossing C10 would need to be upgraded by installing a culvert, rock ford, or puncheon.

Photo 35: Wet ford crossing at C10

Photo 36: Wide bench on Road 7

ROAD 8

Road 8 is a 1550-foot-long overgrown tractor road climbing at a steep 30% grade from the end of Road 1 to the ridge top. Use of this road will be essential to establish an upslope loop trail. However, feasibility of this route for trail use is constrained by steep grade, steep side slopes and difficult drainage. The road has been divided into three reaches: 8A, 8B and 8C.

Reach 8A (STN 0 – 240)

The first 250 feet of road climb up the valley bottom from the end of Road 1 to a small ephemeral watercourse at C14 (Photo 37). The road grade is moderately steep at 15% to 18%. The tread appears rocked with minimal past erosion. There are three culverts along this section of road: C12, C13 and C14. Overall this segment of trail is in good condition, though drainage should be improved by installing a couple of drainage dips.

C12: 24" Culvert: 24" x 40' ditch relief CMP draining inboard edge of Pad P11 (Photo 38). The pipe discharged on the slide area N3 which is undercutting part of Road 1. The culvert presently receives very little flow and is probably not a significant factor in the stability at N3.

C13: 24" Culvert: 24" x 40' culvert draining an upslope gully. The culvert is functional though the inlet is about half plugged with sediment. Upslope of the culvert is a very large and deep gully (N10) that initiates at Road 9A. This gully formed within graded fill material from the reclamation and appears to have been a result of concentrated road runoff coming off of road 9A. Most of the erosion appears old with scarps distinct but weathered. It is quite possible that most of the erosion occurred shortly after the site was regraded and prior to the slope revegetating. Regardless, the gully serves to illustrate the potential for significant erosion to occur when runoff is concentrated. For future use the culvert inlet should be cleaned and drainage on the upper road upgraded if reopened.

C14: 24" Culvert: 24" x 40' culvert at small ephemeral watercourse with little flow (Photo 39). Inlet is partially blocked by a couple of rocks, and the outlet by a wood rat nest. Otherwise the crossing is functional.

Condition and constraints: Overall this segment of trail is in good condition though drainage should be improved by installing a couple of drainage dips.

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Photo 37: Inlet to culvert C12

Photo 38: Partially blocked inlet to culvert C14

Photo 39: Looking down Road 8A

Reach 8B (STN 240 – 1130)

This 890 foot long segment of tractor road climbs from the valley bottom at C14 to the ridge top (Photos 40 and 41). The majority of the alignment is located on steep 60% to 90%-plus gradient rocky slopes along the western edge of the old quarry. The road crosses a small pad at P19 and makes a tight switchback at N8.

The road is steep with over half of the alignment with a grade of 15% to 35%. The road appears to have been constructed on cut and fill resulting in a steep, high and rocky cutbank. Portions of the cut have failed, depositing debris on the road tread and narrowing it slightly (Photos 42). The road tread is generally in good shape though heavily vegetated with brush. A large 2-plus-foot-high berm is found along the outer road edge where the road crosses the steepest slopes. This berm was probably built to act as a barrier from the steep slope below.

This segment of road is poorly drained with an insloped pitch that collects water for 600+ feet of roadway. Runoff is discharged off the road at switchback N8 where it has eroded a deep gully on the hillslope below. Most of the erosion appears old and probably occurred when the road was unvegetated and there was a higher rate of runoff. Reopening the road for trail use could

result in renewed erosion unless additional cross drains are installed to prevent excess runoff from concentrating.

Condition and constraints: Road is poorly suited for trail use with the principal constraints being the steep 15% to 35% road grade, steep side slopes, and poor drainage conditions.

Over half of the grade is steeper than 15%, which is the maximum sustained grade generally recommended for trail use. Numerous studies have documented a strong positive relationship between trail grade and degradation (Best, 2002; Best, 2010; IMBA, 2001; Marion and Olive, 2006; Parker, 2004). The steeper the grade the more likely the trail is to erode. Most erosion problems tend to occur where road and trail gradients exceed 15%. Grades steeper than 15% are difficult to adequately drain and as a result runoff tends to concentrate down the road or trail for long distances. Steep gradient trails also impact recreational access making the trail more difficult to travel and more difficult to use while maintaining control. This could be an issue if mountain bikers and hikers are to share the alignment.

The road can be opened for trail use with the understanding that the steep grade will require a high level of maintenance to ensure that drainage dips are functional and to repair degraded segments. It may be possible to reduce the erosion potential narrowing the trail to a 4- to 5-foot width to reduce the amount of ground where runoff can occur. This may be accomplished by pulling back some of the perched fill along the outer edge of road and compacting the material along the inboard edge. Rerouting the trail to have a lower gradient is also a possibility but likely difficult due to the steep surrounding slopes.

Photo 40: Lower portion of Road 8B

Photo 41: Middle portion of Road 8B before it becomes heavily vegetated.

Photo 41: Cutbank instability on Road 8B

Reach 8C (STN 1130 – 1550)

The last 430 feet of road climbs the fall-line of the ridge at a 15% to 25% grade (Photo 42 and 43). The tread is in good condition but at risk for erosion due to steep grade and fall-line orientation. If opened for trail use, drainage dips will need to be installed to control drainage or preferably the trail rerouted to avoid a fall-line orientation.

Condition and constraints: Road is poorly suited for trail use with the principal constraints being the steep 15% to 25% road grade and fall-line orientation.

Higher rates of erosion also occur on fall-line trails (Best, 2002; Best, 2010; Marion and Olive, 2006). They are routes that drop directly down the hillside. Fall-line trails follow the same path that water flows, thereby focusing water down their length. These trails are difficult, if not impossible, to drain, and often experience ongoing erosion.

It may be possible to reroute this trail to have a lower grade and to avoid a fall-line orientation.

Photo 42: Steep fall line segment on Road 8C

Photo 43: Old water truck at end of Road 8C

ROAD 9

Road 9 is a 1720 foot long locally very steep tractor road that connects the ridge near the end of Road 8 to the valley bottom at Road 5. The western portion of this road would be required to be reopened for any upslope loop trail. The road is divided into two reaches 9A and 9B.

Reach 9A (STN 0 – 780)

Reach 9A is a steep gradient tractor road that begins at the ridgetop at the end of Road 8 and extends 780 feet across steep rocky face of the old quarry wall to a deep gully at N10.

The road was constructed across steep 60% to 90+% gradient slopes resulting in a steep and high rocky cut. Portions of the cut have failed or raveled depositing debris on the back edge of the road tread and narrowing the road slightly.

The road grade is very steep with over half of the alignment with a grade between 20% and 35%. Future trail use is constrained by this steep grade which will make it difficult to drain and may hinder access. In general, to be sustainable, trails should have a sustained grade of less than 15%.

The road is poorly drained with an inslope pitch and a large 2 to 3 foot high outside berm along the majority of the alignment. Road runoff is concentrated along the entire reach causing the roadbed to become entrenched near N9 and resulting in a larger and deep gully at N10 where flow eventually discharges off of the road. This gully has encroached most of the way though the road prism narrowing the road to less than 3 feet. Most of the erosion appears old and probably occurred when the road was unvegetated and there was a higher rate of runoff. Reopening the road for trail use could result in renewed erosion unless additional cross drains are installed to prevent excess runoff from concentrating.

<u>N9: Outside road berm:</u> 2 to 3 foot high berm along outer edge of road that concentrated runoff. Road bed has become entrenched.

<u>N10: Gully:</u> 20 foot wide 8 foot deep gully encroaches most of the way into the road prism. A three foot wide trail leads around the head of the gully. The gully is the result of poor road drainage. Erosion has diminished as the site revegetated but the potential for renewed erosion exists if the road is to be reopened for trail use. Some road reconstruction will be required to reopen the trail past the gully.

Condition and constraints: Road is in poor condition and generally poorly suited for trail use. The principal constraints are the steep 15% to 35% road grade, steep side slopes, large outside berm, N10 gully and poor drainage.

Over half of the trail has a gradient greater than 20% which is too steep to be sustainable without a high level of maintenance. It may be possible to reduce the erosion potential narrowing the trail to a 4 to 5 foot width to reduce the amount of ground where runoff can occur. Rerouting the trail to have a lower grade is not feasible due to very steep sideslopes.

Road drainage will need to be improved if the trail is to be reopened. This will require removing the large outside berm and installing frequent drainage dips. Repair to the gully at N10 will also be required.

Reach 9B (STN 780 – 1720)

Reach 9B is a 960 foot long old tractor road that contours across the hillside at generally less than 15% grade. The tread is intact and generally in good condition. Drainage is fair and will need to be upgraded if the road is to be reopened. A cutbank failure partially blocking the road is found at N11. A large outside berm and entrenched road prism are at N12. A small gully has encroached partway into the road prism at N13. There are two earth ford watercourse crossings at C15 and C16.

N11: Cutbank failure: Small cutbank failure has deposited a small amount of rocky debris onto the road surface, narrowing the road slightly.

N12: Berm: 2 to 3 foot high berm along outer road edge. Will need to be regraded if road is to be opened for trail use.

N13: Gully: 20-foot wide gully narrows the old road to about 7 feet. Gully is attributed to poor road drainage in past. There appears to be enough of a bench remaining that the trail can be routed around the head of the gully without much problem.

C15: Wet ford crossing: Wet ford crossing where road crosses a small perennial stream and wet area. Stream flow appears to be diverted down the road. Road bed is intact but muddy. It should be feasible to upgrade this crossing by correcting the diversion and installing a culvert, rock ford, or puncheon.

C16: Wet ford crossing: Second wet ford where road crosses a small perennial stream. It should be feasible to upgrade this crossing by correcting the diversion and installing a culvert, rock ford, or puncheon.

Condition and constraints: Road is in fair to poor condition but can be converted to trail use with upgrades. The alignment will need to be regraded and frequent drainage dips installed. The two watercourse crossings will need to be upgraded by installing rock ford, wood puncheon, or culvert.

ROAD 10

Narrow abandoned tractor road extending 650 feet east from Road 9 to a washed out watercourse crossing at C17 before reaching the end of Road 4. The road was constructed at 10 foot width across steep 75+% gradient slopes resulting in steep rocky and unstable cuts. The grade is moderate at 5% to 18%.

The road has been narrowed at several locations from cutbank instability depositing debris onto the road surface (N15) and from gully erosion from road drainage (N16). In addition and most significantly, a 60+ foot section of road has completely washed out at a narrow incised ravine (C17) and is no longer passable. If these issues can be resolved then the road could provide part of a major loop trail when connected to Roads 5 and 9.

N15: Cutbank instability: Raveling of the steep rocky cutbank has deposited talus and rocky debris onto the road surface and in some places narrows the road to less than 3 feet. A multi-use trail can be established by ramping over the failed debris.

N16: Gully: At this location a small gully has eroded into the outer road edge narrowing the road to less than 9 feet. The erosion is mostly likely associated with road drainage. Most of the erosion appears old and probably occurred shortly after the road was abandoned.

C17: Washed out stream crossing: At this location the old tractor road appears to have crossed an ephemeral watercourse before reaching a large graded pad at the end of Road 5. Following the reclamation of the property this watercourse appears to have deeply incised forming a narrow ravine that washed out the crossing. At the crossing this ravine is 20 feet wide and 10 feet deep with steep channel banks. On the right (east) side of the ravine an additional 40+ feet of roadway appears to have failed and down dropped probably from slope instability. This failure occurred at a seep which may have contributed to the failure.

It is unknown if the trail can be reconstructed past this site. Reconstruction is constrained by the steep slopes and unstable nature of the underlying earth materials. Spanning the ravine with a bridge is probably not feasible due to the unstable ground. Likely the best alternative would be to reconstruct the crossing at a narrow width on engineered fill. Additional geologic and geotechnical work will be required to further evaluate the feasibility of reopening this site for trail access.

Condition and constraints: Road is in poor condition. The most significant constraint is at Crossing C16 where a 60 foot long segment of roadway has eroded out and failed. It is unknown if the trail can be reconstructed past this site. Additional geologic and geotechnical work will be required to further evaluate the feasibility of reopening this site for trail access.

ROAD 11

625 foot long abandoned road or tractor trail contouring across moderate gradient slopes above the south side of the pond. The road connects Road 5 with Road 1. The tread appears intact but overgrown with brush. Grade is gentle to moderate at mostly less than 10%. Old rilling of the road surface is found on the eastern portion of the roadway. There are two wet ford crossings at C18 and C19.

C18: Wet ford crossing: Wet ford crossing where road crosses a small perennial stream and wet area. It should be feasible to upgrade this crossing by correcting the diversion and installing a culvert, rock ford, or puncheon.

C19: Wet ford crossing: Second wet ford where road crosses a small perennial stream. It should be feasible to upgrade this crossing by correcting the diversion and installing a culvert, rock ford, or puncheon.

Condition and constraints: Overall the road is suitable for continued road use with upgrades.

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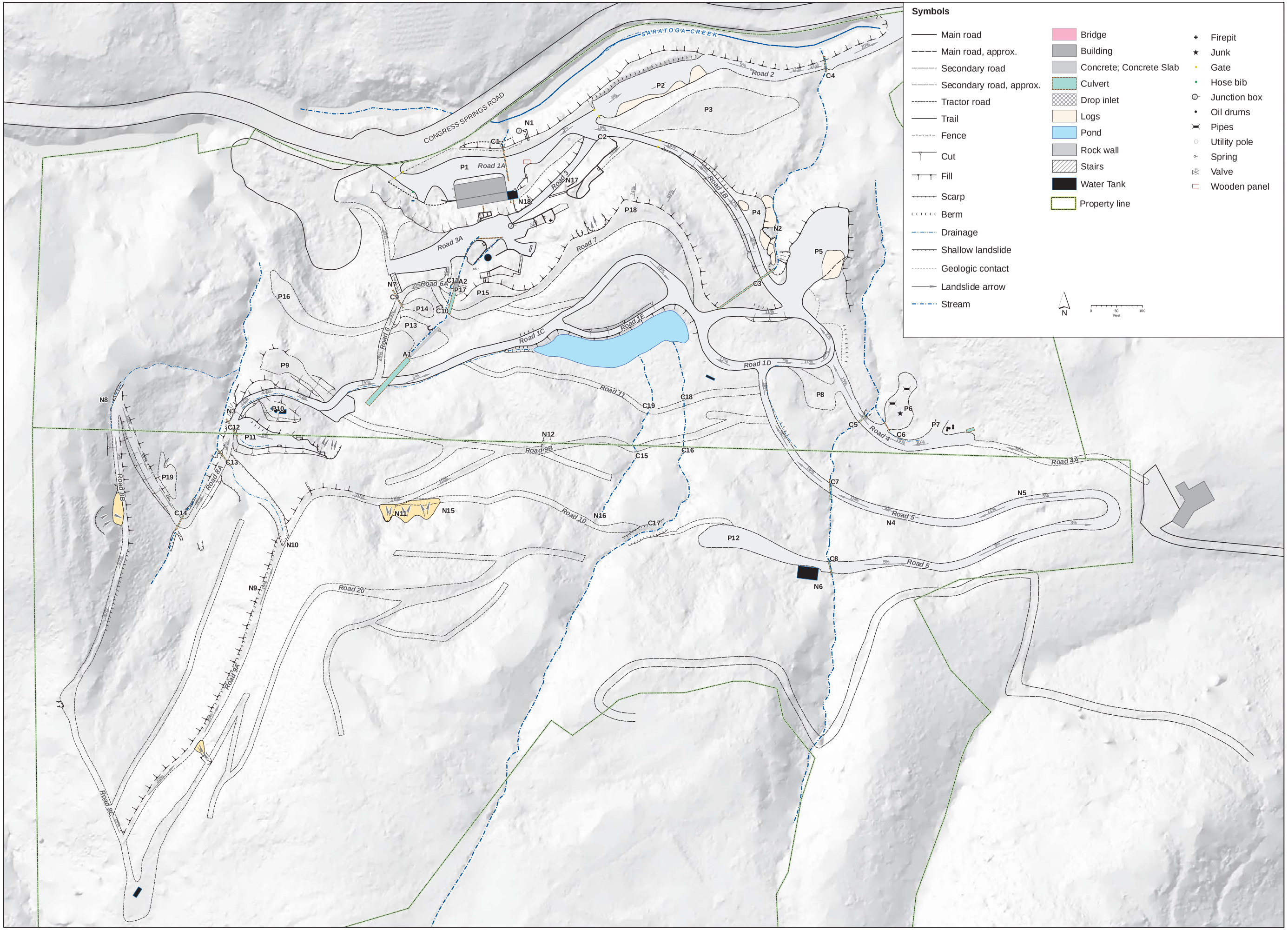

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PROJECT

SARATOGA QUARRY PARK PROJECT

Saratoga, CA

PREPARED FOR

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SHEET TITLE

SITE MAP

Date	Description	Rev
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