

Oak Tree Inventory Report for the Devil's Gate Reservoir

Sediment Removal and Management Project

Pasadena, Los Angeles County, California



Prepared for:

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Public Works
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1.0 INTRODUCTION

On behalf of Los Angeles County Department of Public Works (LACDPW), ECORP Consulting, Inc. (ECORP) conducted an oak tree inventory for the Devil's Gate Reservoir Sediment Removal and Management Project (Project) located in the City of Pasadena (City), Los Angeles County, California. The survey was conducted within the impact areas associated with the initial sediment removal area (ISRA) and access road construction. The surveys were conducted to comply with condition 2.11 of the Streambed Alteration Agreement (SAA) (CDFW 2017) for the Project, which states:

"Within 90 days prior to Project Start the Permittee shall submit to the CDFW a complete inventory of native oak trees, by species and Diameter at Breast Height (DBH) that will be directly removed or have root protective zone impacted (see Condition 2.11a) by the project. The removal of oak trees that are approved by CDFW shall be conducted to be in compliance with other Conditions of this Agreement and any other federal, state, or local laws or ordinances protecting trees. Nothing in this Agreement authorizes Permittee to conduct removals in violation of existing federal, state, or local laws or ordinances protecting trees and shall be responsible for maintaining compliance with federal, state, or local laws or ordinances protecting trees. The Permittee shall replace trees that cannot be directly avoided, deemed to be in fair health, and not designated as seedling or sapling (less than 3" DBH). CDFW shall determine final replacement amounts for native oak trees based on inventory, and it shall be no less than 1:1 by acreage or greater than 1:1 if mitigated by individual tree. CDFW will review the Inventory of Trees and provide written direction on what native oak trees identified within in undeveloped areas subject to Oak Tree Root zone avoidance and monitoring (if any)."

The purpose of this survey was to identify and assess the condition of oak trees within the ISRA and adjacent areas (areas directly and indirectly affected by sediment removal activities) that will be removed or potentially impacted (e.g. within the root protective zone) during the initial sediment removal process. Oak trees located adjacent to the ISRA that can likely be avoided were also identified during the survey. In addition, the survey also included re-evaluating the dripline, canopy, and canopy overlap of oak trees identified during the previous arborist survey conducted by ECORP in 2016 within the Bat and Tree Survey Area associated with the access road impacts (ECORP 2016). The results of the 2016 arborist survey are included as Attachment A to this document. The results of both the 2016 and 2018 surveys will be used to determine the mitigation requirements for direct and indirect impacts to oak trees.

2.0 SITE DESCRIPTION

The Project is located within the City of Pasadena in the upper portion of the Arroyo Seco Watershed and within the City's Hahamongna Watershed Park. Downtown Los Angeles is approximately 14 miles to the south of the Project, the San Gabriel Mountains are located just north of the Project, and the City of La Cañada Flintridge and the unincorporated community of Altadena are located to the west and east, respectively. The Project is located within the "Pasadena, California" 7.5-minute quadrangle (Figure 1. *Project Vicinity*, Figure 2. *Project Location*) (U.S. Geological Survey [USGS], 2015).

The topography in the vicinity of the proposed Project consists of rolling terrain with a decline into the Arroyo Seco basin. The San Gabriel Mountains are located to the north of the proposed Project and are characterized by both the foothills and steep slopes associated with mountainous terrain. The ISRA is composed primarily of black willow thickets (*Salix gooddingii* Woodland Alliance) and mulefat thickets (*Baccharis salicifolia* Shrubland Alliance) towards the southern end and scalebroom scrub (*Lepidospartum squamatum* Shrubland Alliance) towards the northern end. Additionally, some areas towards the southern end of the ISRA were classified as disturbed and/or dominated by weedy species. The access road impact areas are comprised primarily of black willow thickets, coast live oak woodland (*Quercus agrifolia* Woodland Alliance) and disturbed or developed areas. Trees within the black willow thickets portion of the ISRA and access road impact areas included mainly Goodding's black willow (*Salix gooddingii*) red gum (*Eucalyptus camaldulensis*), and blue gum (*Eucalyptus globulus*). Trees within the mulefat thickets portions of the ISRA included primarily Goodding's black willow, Fremont's cottonwood (*Populus fremontii*), red gum, and blue gum present at low cover. Trees present within the scalebroom scrub portions of the ISRA included primarily Goodding's black willow and coast live oak (*Quercus agrifolia*) present at low cover. Trees present within the coast live oak portions of the access road impact areas consisted mostly of coast live oak and shamel ash (*Fraxinus uhdei*). Trees present within the developed portion of the Project Site included ponderosa pine (*Pinus ponderosa*), deodar cedar (*Cedrus deodara*), incense cedar (*Calocedrus decurrens*), and Aleppo pine (*Pinus halepensis*).

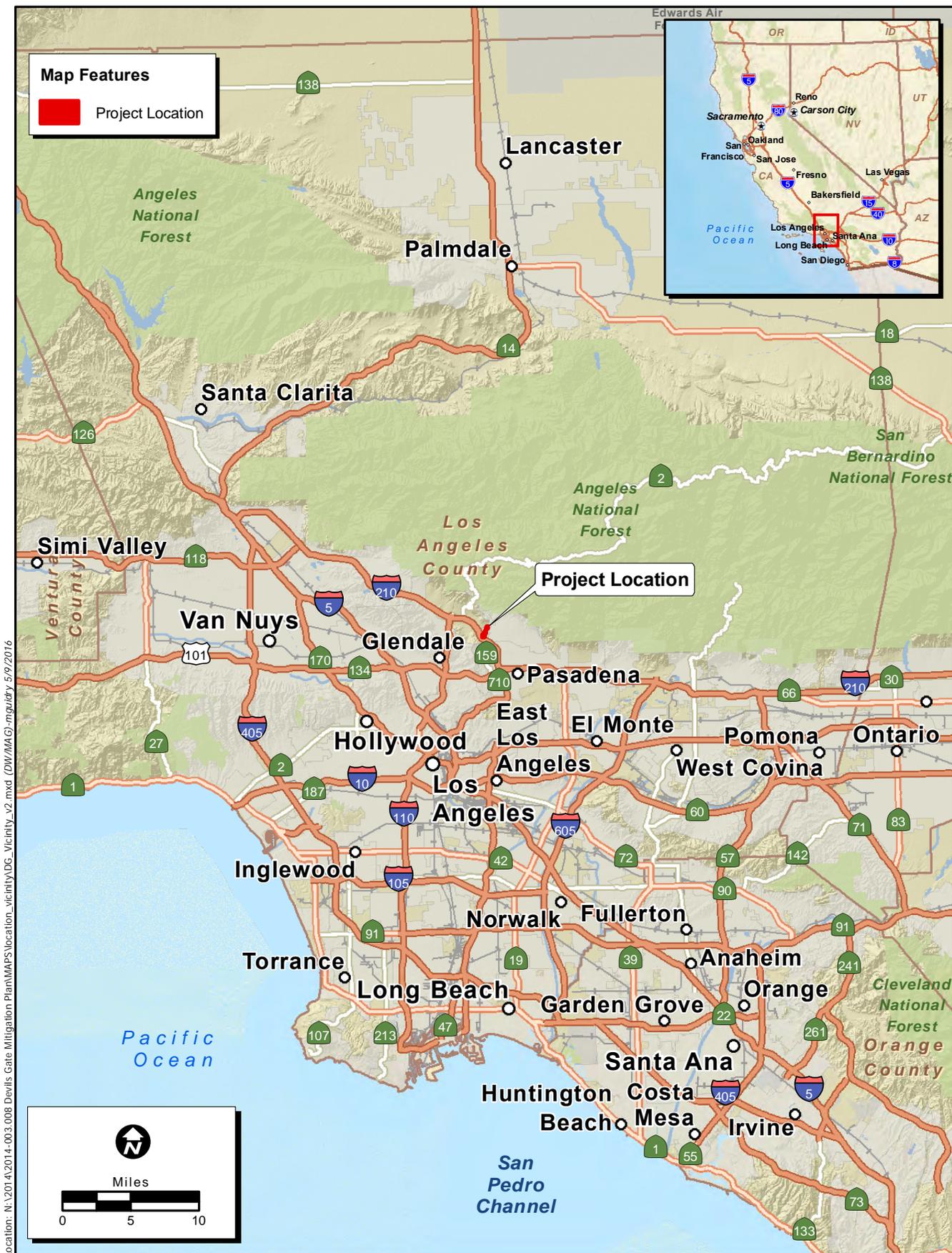


Figure 1. Project Vicinity

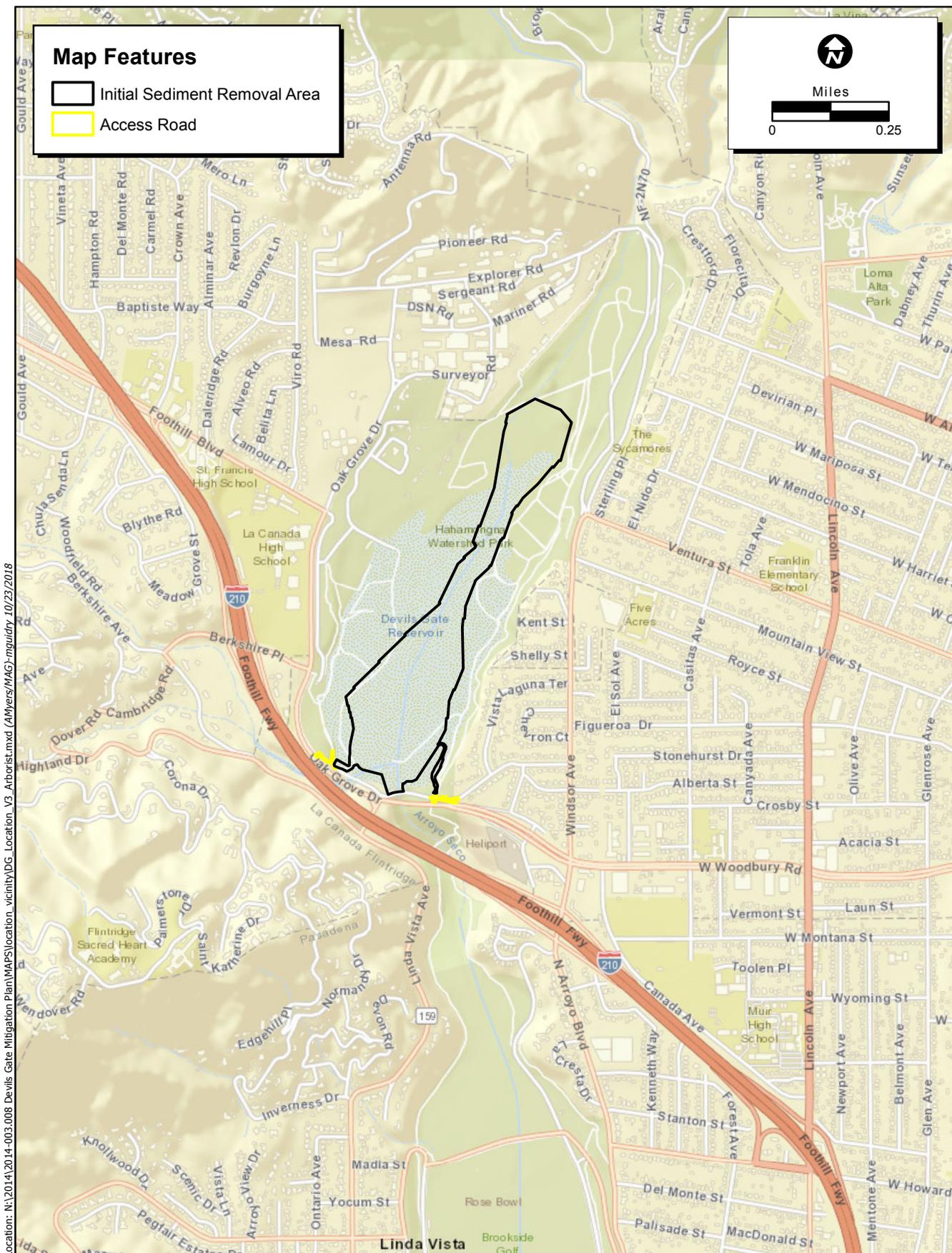


Figure 2. Project Location

3.0 METHODS

The field survey was conducted by Ms. Carley Lancaster, an ECORP arborist (ISA Certification #WE-11837A), and Ms. Taylor Dee, an ECORP biologist, on October 2 through 5, 2018. During the field survey, the area identified by LACDPW as the ISRA (Figure 2) and a 50-foot buffer were walked and a sub-meter accuracy iSxblue Global Positioning System unit was used in conjunction with ESRI's Collector Application to collect location and survey data. In addition, the impact areas associated with the access roads were walked to re-evaluate oak trees identified during the 2016 survey.

Data collected for all oak trees within the ISRA or 50-foot buffer included tree tag number, species, diameter at breast height (DBH), dripline radius, structure, height, condition, and transplantability. In addition, a photograph was taken of each oak tree identified during the 2018 survey. Suitability for transplantation was determined based on the following criteria: size, health, nearby obstructions, and slope. Because the mitigation requirement is to replace oak trees by acreage, the arborist measured the canopy area of each oak tree that intersected (was rooted within) the ISRA and estimated the canopy overlap for trees that were not rooted within the ISRA. Canopies of oak trees associated with the access road impact areas that were inventoried in 2016 were re-evaluated to reflect the current condition and canopy cover of the trees. The canopy overlap was then calculated into impact acreages to aid in determining mitigation requirements for both the ISRA and access road impacts. Please note that the survey results are intended for general project planning purposes only; therefore, these results should not be considered a detailed tree analysis (i.e., results do not include hazard assessment, tree health diagnosis, preservation/removal recommendations, or pruning advisement).

During the field survey, ECORP's arborist and biologist also identified oak trees within the 50-foot buffer of the ISRA that can likely be avoided during Project activities. For these trees, ECORP's arborist determined an appropriate root protective zone (RPZ) based on the criteria described in Section 22.46.210 of the Los Angeles County Code of Ordinances (LAC 2018).

The following terms define the data that was collected:

Diameter at Breast Height (DBH): Trunk diameter at 4.5 feet above grade. Occasional deviations from this height were required for trees with branching at this level or with unusual structural configurations (e.g., horizontal trunks). On multi-trunked trees (trees with multiple vertical trunks in contact at or near ground level), the report lists total aggregate diameter along with the total number of trunks that were measured.

Dripline Radius: Imaginary line defined by the branch spread (ie. canopy) of a single tree or group of trees

Condition: An estimate of the tree's overall health. This includes evaluation of foliage, evidence of wound healing, evidence of fungal attack, density of insect galls, and the amount and condition of attached deadwood. Rated on a three-point scale (poor, fair, good), with a rating like "fair-good" representing conditions in-between the upper and lower parameters.

Maximum Dripline Radius: The maximum distance from the trunk to the edge of the canopy.

Structure: An estimate of the tree’s structural soundness, based on obvious external evidence. This evaluates the potential for structural failure of one or more major branches or trunks, the environment and condition of the root crown, symmetry of the canopy, and any noticeable effects of crowding caused by adjacent trees. Rated on a three-point scale (poor, fair, good), with a rating like “fair-good” representing conditions in-between the upper and lower parameters.

In addition, where appropriate, notes were also taken regarding any unusual features (e.g., large trunk cavities, obvious damage or disease, girdling by barbed wire, etc.).

Suitability for Transplantation: Whether an oak tree is suitable for transplant. A tree was determined to not be suitable for transplanting if it had one or more of the following: a) large size – the tree was determined to be too large to be successfully transplanted; b) health – the health of the tree was determined to be too poor to survive transplantation; c) obstructions – transplantation of the tree would result in damage to nearby infrastructure or existing features such as power lines; and d) slope – the tree was located on a steep slope, indicating a root structure not suitable for transplantation to a level surface.

Root Protective Zone: The area 15 feet from the trunk(s) of an oak tree or the area at least five feet outside the dripline (whichever is greater) is considered the Root Protective Zone (RPZ). Per the SAA, the root protective zone was determined by a Certified Arborist.

4.0 RESULTS

During the survey conducted in 2018, a total of 22 coast live oak trees were inventoried within the ISRA or 50-foot buffer (Table 1. *Oak Tree Inventory Data (October 2-5, 2018)*; Figure 3. *Coast Live Oak Protective Zones*). Based on the survey results, a total of 14 trees were found to be rooted within or have canopy overlap within the impact area associated with the ISRA. Based on the current extent of the ISRA, only 5 of these trees will need to be completely removed during the initial sediment removal, including the trees numbered as 4 through 8 (indicated with shading in Table 1). The other 8 trees were not rooted within the ISRA nor did they have canopy overlap within the ISRA. These trees can likely be avoided during construction activities and may require a RPZ based on location relative to the ISRA. None of the 22 trees were determined to be suitable for transplantation due to large size, health, obstructions, or slope. Photographs of all 22 coast live oak trees inventoried in 2018 are provided in Attachment B.

Table 1. Oak Tree Inventory Data (October 2-5, 2018)

Tree Tag Number	DBH (inches)	Height (feet)	Multi-trunked (#)	Max Dripline radius (feet)	Oak Impact	Structure	Health	Transplantable
1	36	36	3	44	No	Poor	Fair	No
2	45	35	4	27	Yes	Fair	Fair	No
3	8	20	1	13	Yes	Good	Good	No
4	13	20	2	17	Yes	Fair	Good	No

Tree Tag Number	DBH (inches)	Height (feet)	Multi-trunked (#)	Max Dripline radius (feet)	Oak Impact	Structure	Health	Transplantable
5	18	30	3	20	Yes	Fair	Good	No
6	73	40	5	33	Yes	Fair	Fair	No
7	17	40	1	23	Yes	Fair	Fair	No
8	7	20	1	6	Yes	Good	Good	No
78	70	35	4	31	No	Fair	Fair	No
79	35	35	1	29	No	Fair	Fair	No
80	11	20	1	18	No	Fair	Fair	No
81	54	25	7	15	No	Fair	Good	No
82	13	20	1	18	No	Fair	Poor	No
83	13	20	1	16	Yes	Poor	Fair	No
84	4	10	1	4	Yes	Good	Fair	No
85	6	10	2	9	Yes	Fair	Fair	No
86	5	12	1	7	Yes	Fair	Good	No
87	5	11	1	6	Yes	Fair	Fair	No
88	6	11	2	5	Yes	Fair	Good	No
89	9	15	2	19	No	Poor	Fair	No
N/A 1	3	7	1	6.5	No	Fair	Fair	No
N/A 2	5	11	4	5	Yes	Fair	Fair	No

*Shading indicates trees that will be completely removed.

During the survey conducted in 2016, a total of 54 coast live oak trees were inventoried within the Bat and Tree Survey Area associated with the access road impacts (Table 2. *Oak Tree Survey Data (June 6, 2016)*; Figure 3. *Coast Live Oak Protective Zones*). Based on the extent of the access road impact areas during the 2018 survey, 25 of the oak trees inventoried in 2016 were found to be rooted within or have canopy overlap within the impact areas and 10 of these trees will need to be completely removed including the trees numbered as 23 through 31 and 66 (indicated with shading in Table 2). The other 15 trees may be partially impacted by construction activities. Of the 54 trees, 3 trees are suitable for transplantation but only 1 of these (Tree Number 31) is within the impact area. The remaining 51 trees were determined not to be suitable candidates for transplantation due to large size, health, obstructions, or slope. Photographs of all 54 coast live oak trees inventoried during the 2016 survey are provided in Attachment A.

Table 2. Oak Tree Survey Data (June 6, 2016)

Tree Tag Number	DBH (inches)	Height (feet)	Multi-trunked (#)	Max Dripline radius (feet)	Oak Impact	Structure	Health	Transplantable
21 ¹	19	20	2	14	Yes	Good	Fair	No
22 ¹	38	20	5	18	Yes	Fair	Fair	No
23	14.5	12	3	12	Yes	Poor	Fair	No
24	13	18	1	18	Yes	Fair	Fair	No
25	21	27	1	23	Yes	Good	Poor	No
26 ¹	13.5	18	1	15	Yes	Good	Fair	No
27 ¹	5.5	14	2	10	Yes	Good	Fair	No
28 ¹	6.5	10	4	8	Yes	Good	Good	No

Tree Tag Number	DBH (inches)	Height (feet)	Multi-trunked (#)	Max Dripline radius (feet)	Oak Impact	Structure	Health	Transplantable
29 ¹	20	23	1	23	Yes	Fair	Poor	No
30 ¹	10	18	2	8.5	Yes	Fair	Good	No
31	3.5	10	3	7	Yes	Fair	Good	Yes
32 ¹	25	20	2	20	Yes	Fair	Fair	No
33	32	23	1	22	Yes	Good	Fair	No
34	68	25	6	18	Yes	Poor	Fair	No
35	22.5	20	4	19	Yes	Fair	Fair	No
36 ¹	40	23	3	23	Yes	Poor	Fair	No
37 ¹	14	23	1	10	Yes	Fair	Fair	No
38	10.5	15	1	12	Yes	Fair	Fair	No
39	32	16	3	15	No	Poor	Fair	No
40	48	25	3	20	No	Fair	Fair	No
41	10	14	2	27	No	Poor	Poor	No
42	53	20	3	22	No	Fair	Fair	No
43	10.5	14	1	15	No	Fair	Fair	No
44	58.5	25	5	16	No	Fair	Poor	No
45	19.5	15	3	12	No	Fair	Fair	No
46	18.5	17	3	12	Yes	Fair	Fair	No
47	30	30	1	18	Yes	Fair	Poor	No
48 ¹	41	20	3	25	Yes	Fair	Fair	No
49	38.5	22	3	18	Yes	Poor	Fair	No
50	7.5	12	1	10	No	Fair	Poor	No
51	12.5	15	1	12	No	Fair	Poor	No
52	24	25	1	21	Yes	Fair	Fair	No
53	23.5	15	1	17	No	Fair	Poor	No
54	42.5	28	2	20	No	Poor	Fair	No
55	32	23	1	28	No	Fair	Fair	No
56	22	25	2	18	No	Fair	Fair	No
57	34.5	35	1	26	No	Fair	Fair	No
58	35	30	1	24	No	Fair	Fair	No
59	31	27	1	18	No	Fair	Fair	No
60	17	15	1	15	No	Fair	Fair	No
61	11	15	1	13	No	Good	Fair	No
62	30	28	1	21	No	Fair	Poor	No
63 ¹	44.5	35	1	45	No	Poor	Fair	No
64	29.5	30	3	18	No	Fair	Fair	No
65	5.5	15	1	6	No	Fair	Good	No
66	8	20	1	12	Yes	Fair	Good	No
68	7.5	18	2	6	No	Fair	Fair	No
69	11	26	1	12	No	Good	Fair	Yes
70 ¹	18	28	1	24	No	Fair	Fair	No
71 ¹	11.5	30	1	17	No	Fair	Fair	No
72	12	27	1	15	Yes	Fair	Fair	No
73	13	20	2	14	No	Fair	Fair	No
76	9	14	4	7	No	Good	Good	Yes

Tree Tag Number	DBH (inches)	Height (feet)	Multi-trunked (#)	Max Dripline radius (feet)	Oak Impact	Structure	Health	Transplantable
77	11.5	30	1	19	No	Fair	Fair	No

*Shading indicates trees that will be completely removed.

¹ Updated during 2018 survey to reflect current conditions.

Because the mitigation requirement is to replace oak trees by acreage, ECORP’s arborist and biologist determined the canopy area of each oak tree rooted within the ISRA and the area of canopy overlap for oak trees rooted outside of the ISRA. In addition, ECORP’s arborist and biologist re-evaluated the canopy area of oak trees inventoried in 2016 that were rooted within the access road impact areas and re-evaluated the area of canopy overlap for oak trees inventoried in 2016 that were rooted outside of the access road impact areas. A total of 0.330 acres of oak canopy was mapped for trees rooted within the ISRA and/or access road impact areas and a total of 0.069 acres of canopy overlap was mapped within the ISRA and/or access road impact areas.



Figure 3.
Coast Live Oak Protective
Zones

Map Features

- Initial Sediment Removal
- Access Road Impact Area
- Coast Live Oak Trunk (tree ID)
- Coast Live Oak Dripline
- Impacted Coast Live Oak
- Removed Coast Live Oak
- Coast Live Oak Protective Zone

Location: N:\2014\2014-003.008 Devils Gate Mitigation Plan\Map\Stuss_survey_and_mapping\arboris\Tree_locations\2\VG_CLO_ProtectedZone_V2.mxd (MAG) - mguidry 11/9/2018

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community





Figure 3.
Coast Live Oak Protective Zones

Map Features

- Initial Sediment Removal
- Access Road Impact Area
- Coast Live Oak Trunk (tree ID)
- Coast Live Oak Dripline
- Impacted Coast Live Oak
- Removed Coast Live Oak
- Coast Live Oak Protective Zone

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community



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5.0 CONCLUSIONS

Thirty-nine (39) coast live oak trees were located within areas that may be impacted by initial sediment removal activities and/or access roads construction activities. Fifteen (15) of these trees will likely need to be completely removed based on direct impacts from the construction and only 1 of these was deemed suitable for transplantation. The other 24 coast live oak trees within the impact area may be partially impacted by construction activities.

A total of 0.399 acres of impacts to oak trees, which includes the direct removal and impacts within the RPZ of oak trees that won't be completely removed, will occur as a result of the initial sediment removal and construction of the access roads; however, it may be possible to minimize these impacts if avoidance is feasible for certain oak trees.

The actual extent of the impacts to the oak trees cannot be determined until the boundaries of the impact areas are flagged in the field and it is determined if modifications to the boundaries can be accommodated. After the boundaries are flagged, a Certified Arborist will conduct an evaluation of the potential impacts to the oak trees and provide recommendations for minimizing impacts, if possible. The final number of oak trees and associated canopy acreage affected by the construction will be determined following the completion of the vegetation removal in the ISRA and along the access roads. Oak trees that can be avoided during construction will be monitored during both the construction phase and during the maintenance and monitoring period.

REFERENCES

[CDFW] California Department of Fish and Wildlife. 2017. Final Lake or Streambed Alteration Agreement, Notification No. 1600-2015-0263- R5, Devil's Gate Dam Sediment Removal and Management Project.

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Lilly, S. J. (2010). *Arborists' Certification Study Guide*. Champaign, IL: International Society of Arboriculture.

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https://www.municode.com/library/ca/los_angeles_county/codes/code_of_ordinances?nodeId=TIT22PLZO_DIV1PLZO_CH22.46SPPL_PT4UNSTSPPL_22.46.2100OATRRE.
Accessed: October 9, 2018.

ATTACHMENT A

2016 Arborist Survey Report

**Arborist Survey Report
Access Road Construction Area
for the Devil's Gate Reservoir
Sediment Removal and Management Project
Pasadena, Los Angeles County, California**



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Attachment A – Oak Tree Photographs

1.0 INTRODUCTION

On behalf of Los Angeles County Department of Public Works (LACDPW), ECORP Consulting, Inc. (ECORP) conducted an arborist survey for the Devil's Gate Reservoir Sediment Removal and Management Project (Project) within the Bat and Tree Survey Area, located in the City of Pasadena (City), Los Angeles County, California. The surveys were conducted to comply with Mitigation Measure BIO-7 (MM-BIO-7) of the Final Environmental Impact Report (FEIR; Chambers Group 2014) for the Project, which states:

"Within 90 days prior to ground-disturbing activities, a qualified biologist shall conduct a tree survey within the project footprint, to identify trees that will be removed or potentially affected by the Proposed Project and trees that can be avoided. Los Angeles County Flood Control District (LACFCD) will replace trees that cannot be avoided. The replacement is expected to be up to 1:1 by acreage. The biological monitor shall implement measures to protect the root zone of oak trees that may be impacted immediately adjacent to the project site and along access roads."

The purpose of this survey was to identify and assess the condition of trees within the access roads and adjacent areas (areas directly and indirectly affected by the actual construction of the access roads into and out of the reservoir) that may require removal. In addition, the purpose also included determining which trees would be indirectly affected by the construction (e.g. impacts within the dripline). The results of the survey will be used to determine the mitigation requirements for direct and indirect impacts to oak trees.

2.0 SITE DESCRIPTION

The Project is located within the City of Pasadena in the upper portion of the Arroyo Seco Watershed and within the City's Hahamongna Watershed Park. Downtown Los Angeles is approximately 14 miles to the south of the Project, the San Gabriel Mountains are located just north of the Project, and the City of La Cañada Flintridge and the unincorporated community of Altadena are located to the west and east, respectively. The Bat and Tree Survey Area is located within the "Pasadena, California" 7.5-minute quadrangle (Figure 1. *Project Vicinity*, Figure 2. *Project Location*) (U.S. Geological Survey [USGS], 2015). The approximate center of the site is located at 34° 11' 10.08" North and 118° 10' 31.48" West.

The topography in the vicinity of the proposed Project consists of rolling terrain with a decline into the Arroyo Seco basin. The San Gabriel Mountains are located to the north of the proposed Project and are characterized by both the foothills and steep slopes associated with mountainous terrain. The Bat and Tree Survey Area is composed primarily of riparian woodland and oak woodland vegetation with developed areas interspersed. Trees within the riparian woodland portion of the Bat and Tree Survey Area include mainly Goodding's black willow (*Salix gooddingii*), coast live oak (*Quercus agrifolia*), and eucalyptus (*Eucalyptus camaldulensis*).

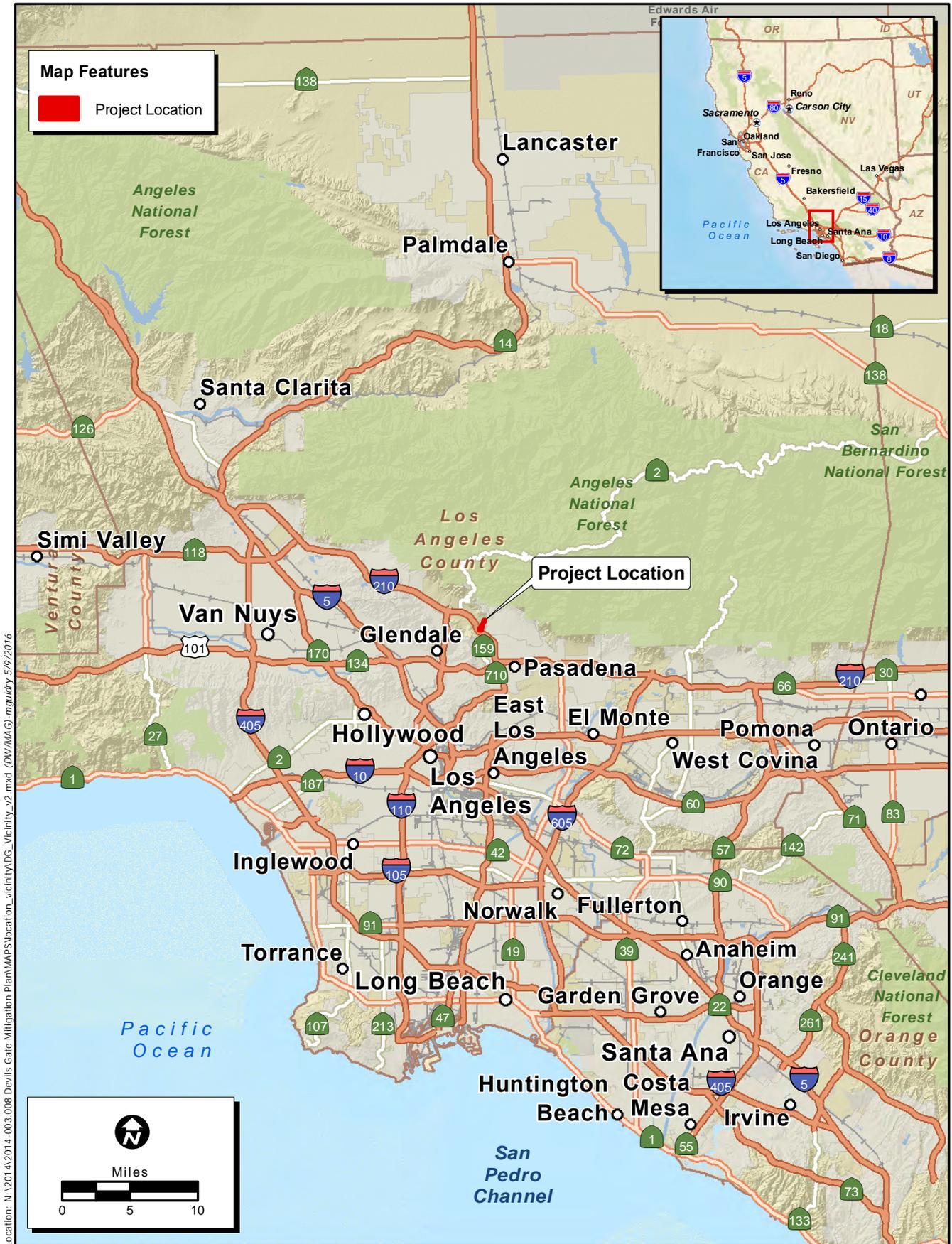
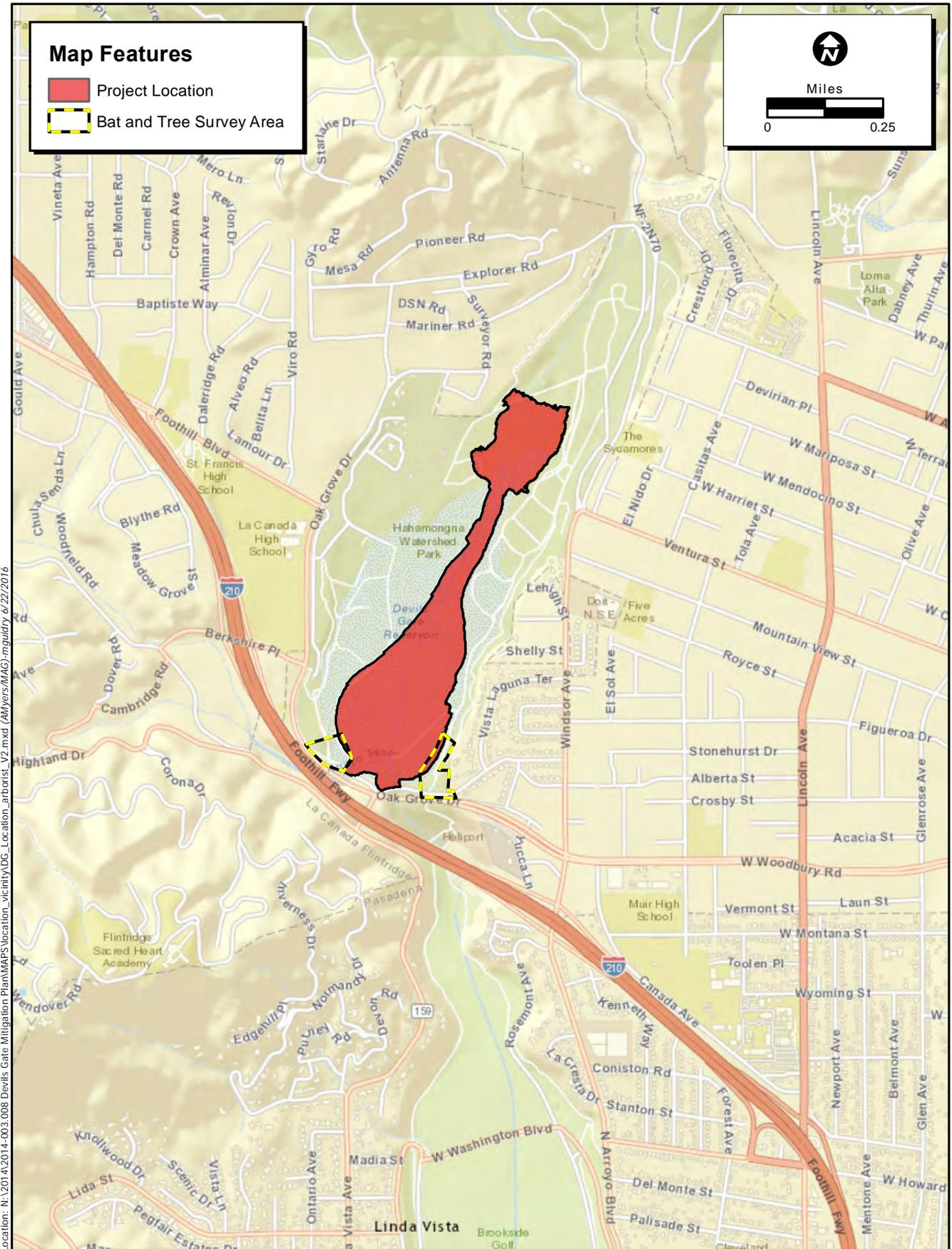


Figure 1. Project Vicinity



Location: N:\2014\2014-003_008 Devils Gate Mitigation Plan\MAPS\location_vicinity\DG_Location_arborist_V2.mxd (AMyers\MAG-nguidry_6/22/2016)

Figure 2. Project Location

Trees within the oak woodland portion of the Bat and Tree Survey Area included primarily coast live oak and Bailey acacia (*Acacia baileyana*). Trees within the developed portion of the Project Site included ponderosa pine (*Pinus ponderosa*), deodar cedar (*Cedrus deodara*), incense cedar (*Calocedrus decurrens*), and Aleppo pine (*Pinus halepensis*).

3.0 METHODS

ECORP arborist Krissy Walker-Berry (ISA Certification #WE-11308A) and ECORP biologist Lauren Dorough conducted the field survey on June 6, 2016. During the field survey, the area identified by LACDPW as the Bat and Tree Survey Area (see Figure 2) was walked and a sub-meter accuracy Trimble GeoXT Global Positioning System unit was used to collect location and survey data.

Data collected for all oak trees included tree tag number, species, diameter at breast height (DBH), dripline radius, structure, height, condition, and transplantability. In addition, a photograph was taken of each oak tree. Transplantability was determined based on the following criteria: size, health, nearby obstructions, and slope. Because the mitigation requirement is to replace trees by acreage, the arborist measured the canopy area of each oak tree that intersected (was rooted within) the access road impact area, which is a portion of the Bat and Tree Survey Area, and estimated the canopy overlap with trees that were not within the access road impact area. The canopy overlap was then calculated into impact acreages to aid in determining mitigation requirements. Please note that the survey results are intended for general project planning purposes only; therefore these results should not be considered a detailed tree analysis (i.e., results do not include hazard assessment, tree health diagnosis, preservation/removal recommendations, or pruning advisement).

For all remaining trees (non-oak trees), the species and location was identified and marked on a map by the arborist and the canopy area was determined by analyzing digital aerial photographs using image analysis software (e.g. Feature Analysis program, ArcGIS).

The following terms define the data that was collected:

Diameter at Breast Height (DBH): Trunk diameter at 4.5 feet above grade. Occasional deviations from this height were required for trees with branching at this level or with unusual structural configurations (e.g., horizontal trunks). On multi-trunked trees (trees with multiple vertical trunks in contact at or near ground level) the report lists total aggregate diameter along with the total number of trunks that were measured.

Dripline Radius: The maximum distance from trunk to the edge of the canopy.

Condition: An estimate of the tree's overall health. This includes evaluation of foliage, evidence of wound healing, evidence of fungal attack, density of insect galls, and the amount and condition of attached deadwood. Rated on a three-point scale (poor, fair, good), with a rating like "fair-good" representing conditions in-between the upper and lower parameters.

Structure: An estimate of the tree's structural soundness, based on obvious external evidence. This evaluates the potential for structural failure of one or more major branches or trunks, the

environment and condition of the root crown, symmetry of the canopy, and any noticeable effects of crowding caused by adjacent trees. Rated on a three-point scale (poor, fair, good), with a rating like “fair-good” representing conditions in-between the upper and lower parameters.

In addition, where appropriate, notes were also taken regarding any unusual features (e.g., large trunk cavities, obvious damage or disease, girdling by barbed wire, etc.).

Transplantability: Whether an oak tree is suitable for transplant. A tree was determined to not be suitable for transplanting if it had one or more of the following: a) large size – the tree was determined to be too large to be successfully transplanted; b) health – the health of the tree was determined to be too poor to survive transplantation; c) obstructions – transplantation of the tree would result in damage to nearby infrastructure or existing features such as power lines; and d) slope – the tree was located on a steep slope, indicating a root structure not suitable for transplantation to a level surface.

Protected Zone: The area 15 feet from the trunk(s) of an oak tree or the area at least five feet outside the dripline (whichever is greater) is considered the Protected Zone.

4.0 RESULTS

A total of 54 coast live oak trees were inventoried within the Bat and Tree Survey Area (Table 1. *Oak Tree Survey Data (June 6, 2016)*; Figure 3. *Coast Live Oak Protected Zones*). Twenty (20) trees are within the impact area but only 11 of these trees will need to be completely removed to accommodate the access road, including the trees numbered as 23 through 31, 37, and 66 (indicated with shading in Table 1). The other 9 trees may be partially impacted by construction activities. Of the 54 trees, 3 trees are suitable for transplantation but only 1 of these (Tree Number 31) is within the impact area. The remaining 51 trees were determined not to be suitable candidates for transplantation due to large size, health, obstructions, or slope. Photographs of all 54 coast live oak trees are provided in Attachment A.

Table 1. Oak Tree Survey Data (June 6, 2016)

Tree Tag Number	DBH (inches)	Height (feet)	Multi-trunked (#)	Dripline radius (feet)	Oak Impact	Structure	Health	Transplantable
21	19	20	2	14	No	Good	Fair	No
22	38	20	5	18	Yes	Fair	Fair	No
23	14.5	12	3	12	Yes	Poor	Fair	No*
24	13	18	1	18	Yes	Fair	Fair	No
25	21	27	1	23	Yes	Good	Poor	No
26	13.5	18	1	15	Yes	Good	Fair	No
27	5.5	14	2	10	Yes	Good	Fair	No
28	6.5	10	4	8	Yes	Good	Good	No
29	20	23	1	23	Yes	Fair	Poor	No
30	10	18	2	8.5	Yes	Fair	Good	No
31	3.5	10	3	7	Yes	Fair	Good	Yes
32	25	20	2	20	Yes	Fair	Fair	No

Tree Tag Number	DBH (inches)	Height (feet)	Multi-trunked (#)	Dripline radius (feet)	Oak Impact	Structure	Health	Transplantable
33	32	23	1	22	Yes	Good	Fair	No
34	68	25	6	18	Yes	Poor	Fair	No
35	22.5	20	4	19	Yes	Fair	Fair	No
36	40	23	3	18	Yes	Poor	Fair	No
37	14	23	1	10	Yes	Fair	Fair	No
38	10.5	15	1	12	No	Fair	Fair	No
39	32	16	3	15	No	Poor	Fair	No
40	48	25	3	20	No	Fair	Fair	No
41	10	14	2	27	No	Poor	Poor	No
42	53	20	3	22	No	Fair	Fair	No
43	10.5	14	1	15	No	Fair	Fair	No
44	58.5	25	5	16	No	Fair	Poor	No
45	19.5	15	3	12	No	Fair	Fair	No
46	18.5	17	3	12	No	Fair	Fair	No
47	30	30	1	18	No	Fair	Poor	No
48	41	20	3	20	No	Fair	Fair	No
49	38.5	22	3	18	No	Poor	Fair	No
50	7.5	12	1	10	No	Fair	Poor	No
51	12.5	15	1	12	No	Fair	Poor	No
52	24	25	1	21	No	Fair	Fair	No
53	23.5	15	1	17	No	Fair	Poor	No
54	42.5	28	2	20	No	Poor	Fair	No
55	32	23	1	28	No	Fair	Fair	No
56	22	25	2	18	No	Fair	Fair	No
57	34.5	35	1	26	No	Fair	Fair	No
58	35	30	1	24	No	Fair	Fair	No
59	31	27	1	18	No	Fair	Fair	No
60	17	15	1	15	No	Fair	Fair	No
61	11	15	1	13	No	Good	Fair	No
62	30	28	1	21	No	Fair	Poor	No
63	44.5	35	1	30	Yes	Poor	Fair	No
64	29.5	30	3	18	No	Fair	Fair	No
65	5.5	15	1	6	No	Fair	Good	No
66	8	20	1	12	Yes	Fair	Good	No
68	7.5	18	2	6	No	Fair	Fair	No
69	11	26	1	12	No	Good	Fair	Yes
70	18	28	1	16	No	Fair	Fair	No
71	11.5	30	1	10	Yes	Fair	Fair	No
72	12	27	1	15	Yes	Fair	Fair	No
73	13	20	2	14	No	Fair	Fair	No
76	9	14	4	7	No	Good	Good	Yes
77	11.5	30	1	19	No	Fair	Fair	No

*Shading indicates trees that will be completely removed.

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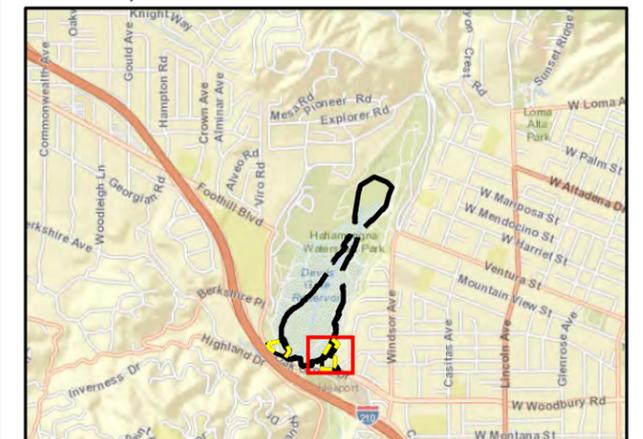


Figure 3A.
Coast Live Oak Protected Zones

Map Features

- Initial Project Footprint¹
- Annual Maintenance Footprint¹
- Bat and Tree Survey Area¹
- Access Road Impact Area¹
- Access Roads¹
- Coast Live Oak Trunk (tree ID)
- Coast Live Oak Dripline
- Impacted Coast Live Oak
- Coast Live Oak Protected Zone

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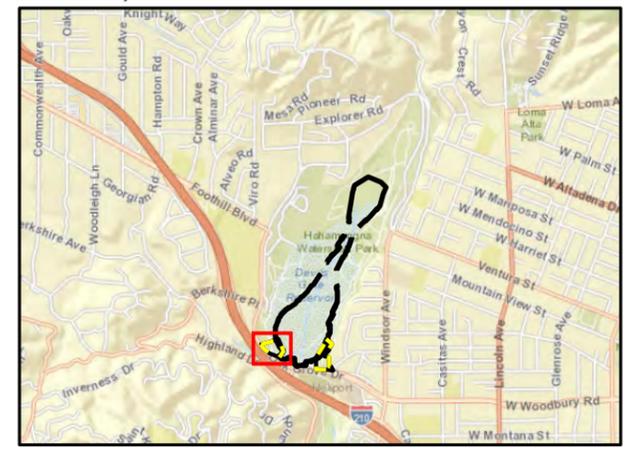


Figure 3B.
Coast Live Oak Protected Zones

Map Features

- Initial Project Footprint ¹
- Annual Maintenance Footprint ¹
- Bat and Tree Survey Area ¹
- Access Road Impact Area ¹
- Access Roads ¹
- Coast Live Oak Trunk (tree ID)
- Coast Live Oak Dripline
- Impacted Coast Live Oak
- Coast Live Oak Protected Zone

Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



An additional 14 non-oak tree species were inventoried within the Bat and Tree Survey Area and 9 are within the impact area. The non-oak tree species include 3 native species: Goodding's black willow, big-leaf maple, and ponderosa pine. However, based on the natural distribution and range of these species, only the black willow and big-leaf maple would be expected to naturally occur in the area. The ponderosa pine was most likely planted as an ornamental. Six (6) non-native species, including Chinese elm, Shamel ash, European olive, Bailey acacia, eucalyptus, and deodar cedar were also found in the Bat and Tree Survey Area. A total of 0.40 acre of native tree canopy cover was located within the proposed access road impact areas. The native tree canopy cover within the impact area is composed of 0.14 acre of coast live oak, 0.22 acre of Goodding's black willow, less than 0.01 acre of big-leaf maple, and 0.02 acre of ponderosa pine. Approximately 0.15 acre of non-native tree canopy cover is located within the proposed access road impact areas (Table 2. *Tree Canopy Cover Impacts Survey Data (June 6, 2016)*; Figure 4. *Tree Canopy Cover within the Project Impact Area*).

Table 2. Tree Canopy Cover Impacts Survey Data (June 6, 2016)

Common Name	Scientific Name	Impact Area Canopy Overlap (square feet)
Native Tree Species		
Big-leaf maple	<i>Acer macrophyllum</i>	138
Boxelder	<i>Acer negundo</i>	-
Incense cedar	<i>Calocedrus decurrens</i>	-
Ponderosa pine	<i>Pinus ponderosa</i>	1,009
Western sycamore	<i>Platanus racemosa</i>	-
Coast Live Oak	<i>Quercus agrifolia</i>	6,460
Goodding's black willow	<i>Salix gooddingii</i>	9,752
Total:		17,359 (0.40 acre)
Non-Native Tree Species		
Bailey acacia	<i>Acacia baileyana</i>	4,046
Tree of heaven	<i>Ailanthus altissima</i>	-
Deodar cedar	<i>Cedrus deodara</i>	178
Eucalyptus	<i>Eucalyptus camaldulensis</i>	1,907
Shamel Ash	<i>Fraxinus udhei</i>	78
European olive	<i>Olea europaea</i>	109
Aleppo pine	<i>Pinus halepensis</i>	-
Chinese elm	<i>Ulmus parvifolia</i>	264
Total:		6,582 (0.15 acre)

5.0 CONCLUSIONS

Twenty (20) coast live oak trees were located within areas that may be impacted by the access roads construction activities. Eleven (11) of these trees will likely need to be completely removed based on direct impacts from the construction and only 1 of these was deemed suitable for transplantation. The other 9 coast live oak trees within the impact area may be partially impacted by construction activities. However, the extent of the impacts to the 9 oak trees cannot be determined until the boundaries of the impact area are flagged in the field. After the boundaries are flagged, a Certified Arborist should conduct an evaluation of the potential impacts to the 9 oak trees and provide recommendations for minimizing impacts, if

possible. The final numbers of oak trees affected by the construction will be determined following the completion of the construction of the access roads.

A total of 0.40 acre of impacts to native trees, which includes the direct removal of native trees and impacts within the dripline of native trees that won't be completely removed, will occur as a result of the construction of the access roads. However, 0.02 acre of the native tree canopy cover is comprised of ponderosa pine, which is not native to the region. By removing the ponderosa pine tree canopy from the total native tree canopy cover, the resulting total impact to native tree canopy cover is approximately 0.38 acre. The total impact to the oak tree canopy cover is approximately 0.14 acre. Approximately 0.15 acre of impacts will occur to non-native tree species as a result of the construction of the access roads. However, the removal of non-native trees is not considered an impact that will be subject to mitigation.

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Figure 4A.
Tree Canopy Cover Within
the Project Impact Area

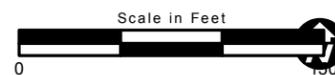
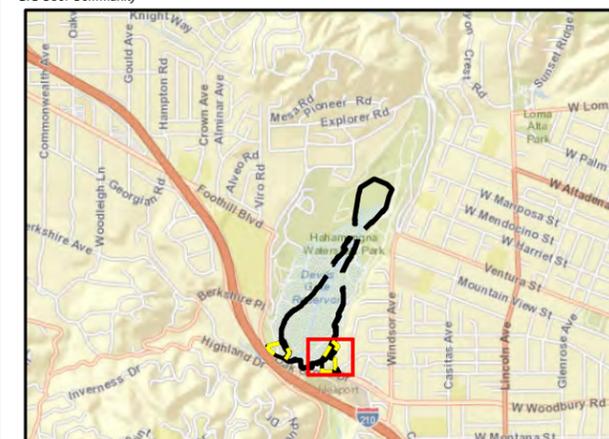
Map Features

- Annual Maintenance Footprint¹
- Initial Project Footprint¹
- Bat and Tree Survey Area¹
- Access Road Impact Area¹
- Access Road¹

Tree Survey Results

- | Native | | Non-Native | |
|-------------------------|-------------|-------------|--------------|
| Coast Live Oak | Aleppo Pine | Chinese Elm | Deodar Cedar |
| Goodding's Black Willow | Eucalyptus | Shamel Ash | |
| Incense Cedar | | | |
| Ponderosa Pine | | | |

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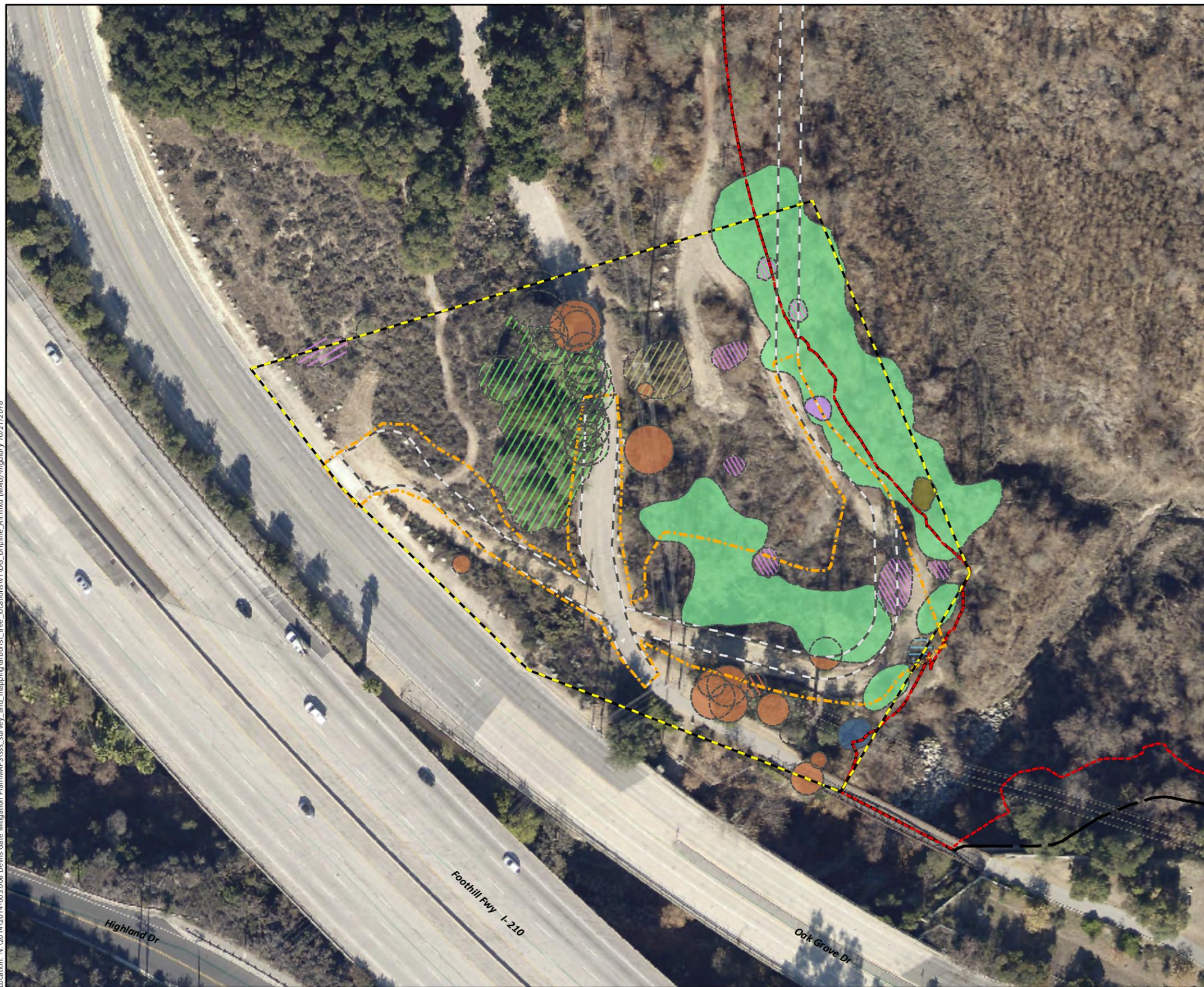


Figure 4B.
Tree Canopy Cover Within
the Project Impact Area

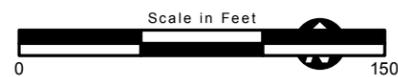
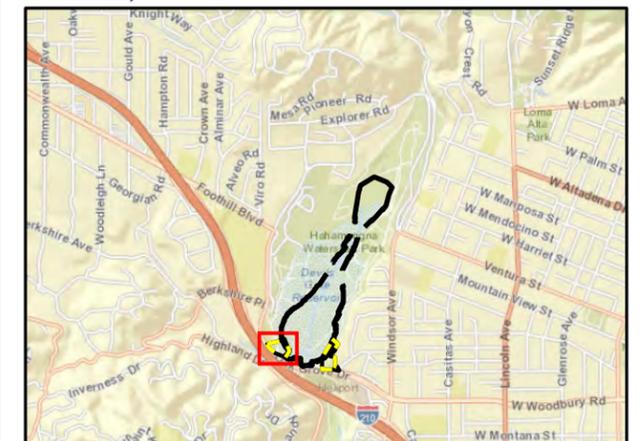
Map Features

- Annual Maintenance Footprint¹
- Initial Project Footprint¹
- Bat and Tree Survey Area¹
- Access Road Impact Area¹
- Access Road¹

Tree Survey Results

- | Native | | Non-Native | |
|-------------------------|------------------|----------------|------------|
| Big Leaf Maple | Bailey Acacia | Chinese Elm | Eucalyptus |
| Boxelder | Coast Live Oak | European Olive | Shamel Ash |
| Goodding's Black Willow | Western Sycamore | Tree of Heaven | |

Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



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ATTACHMENT A

Oak Tree Photographs



Photo 1. Tree Number 21



Photo 2. Tree Number 22



Photo 3. Tree Number 23

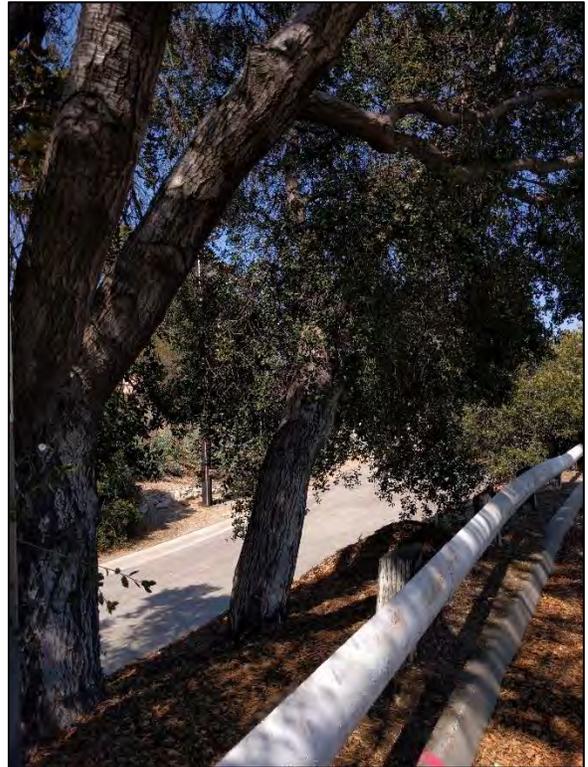


Photo 4. Tree Number 24



Photo 5. Tree Number 25



Photo 6. Tree Number 26



Photo 7. Tree Number 27



Photo 8. Tree Number 28

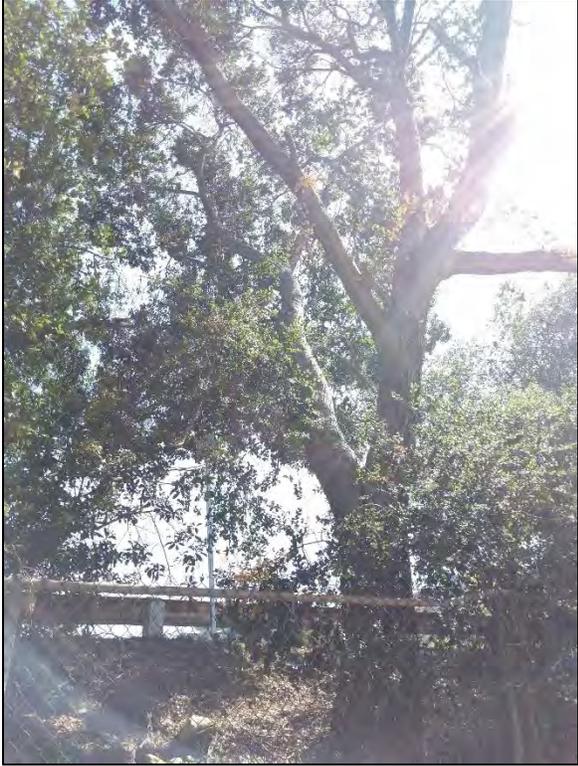


Photo 9. Tree Number 29

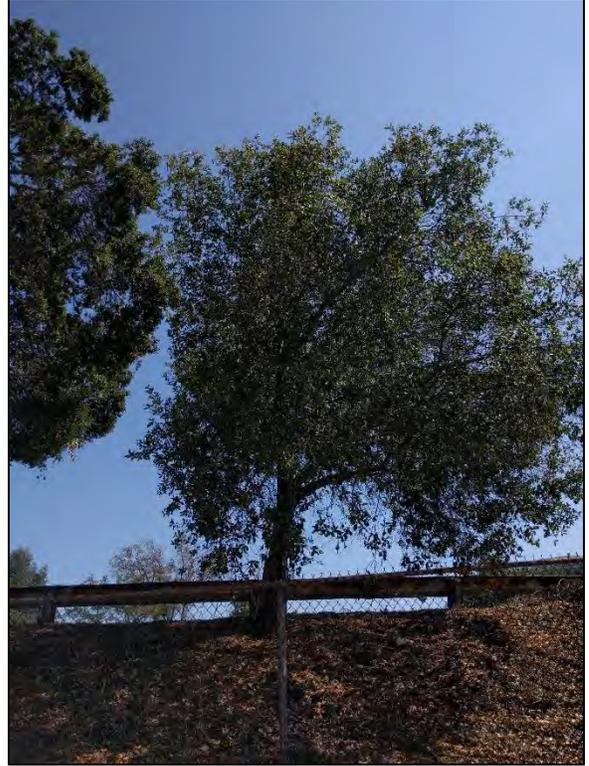


Photo 10. Tree Number 30



Photo 11. Tree Number 31



Photo 7. Tree Number 27



Photo 8. Tree Number 28

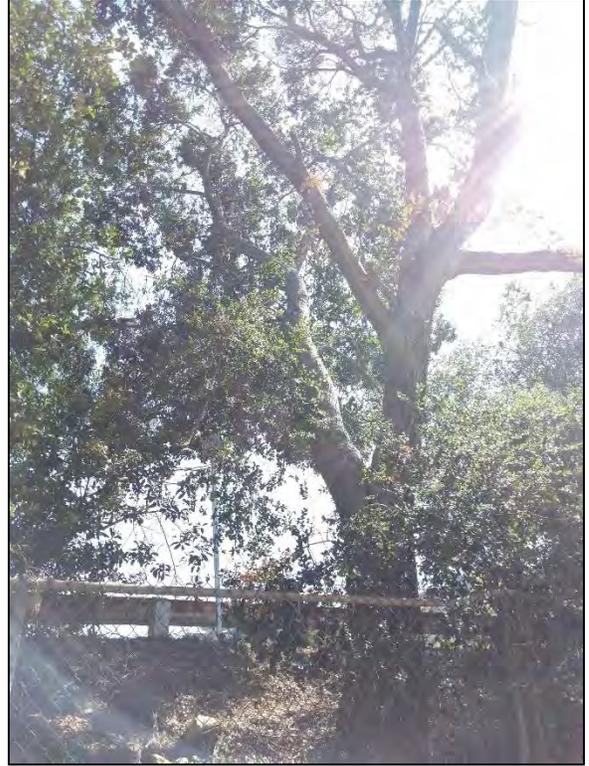


Photo 9. Tree Number 29



Photo 10. Tree Number 30



Photo 11. Tree Number 31



Photo 12. Tree Number 32



Photo 13. Tree Number 33



Photo 14. Tree Number 34



Photo 15. Tree Number 35



Photo 16. Tree Number 36



Photo 17. Tree Number 37



Photo 18. Tree Number 38



Photo 19. Tree Number 39

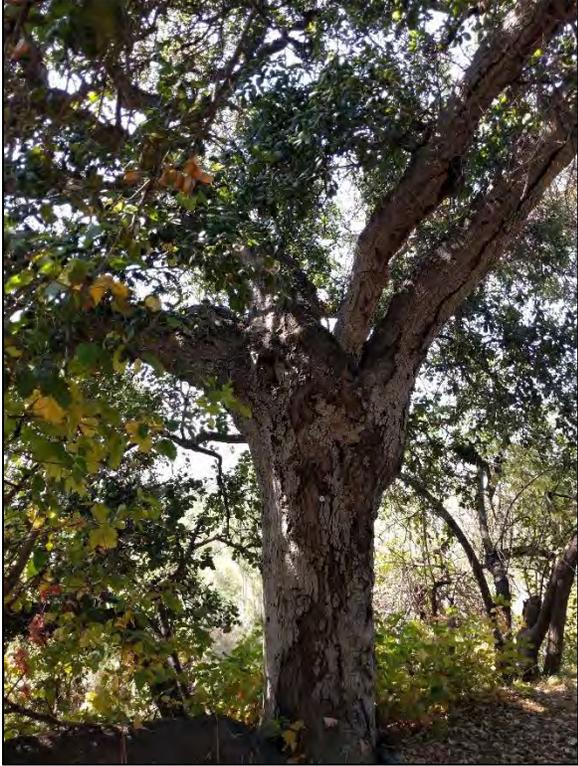


Photo 20. Tree Number 40



Photo 21. Tree Number 41



Photo 22. Tree Number 42

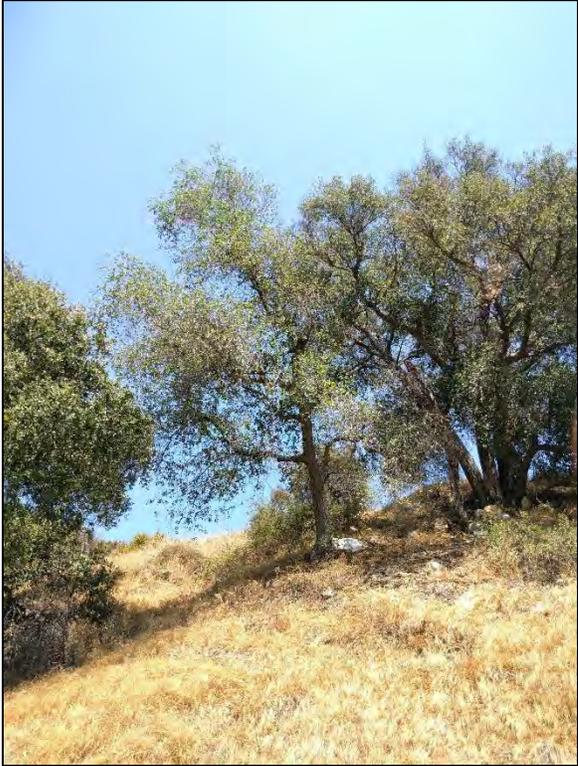


Photo 23. Tree Number 43

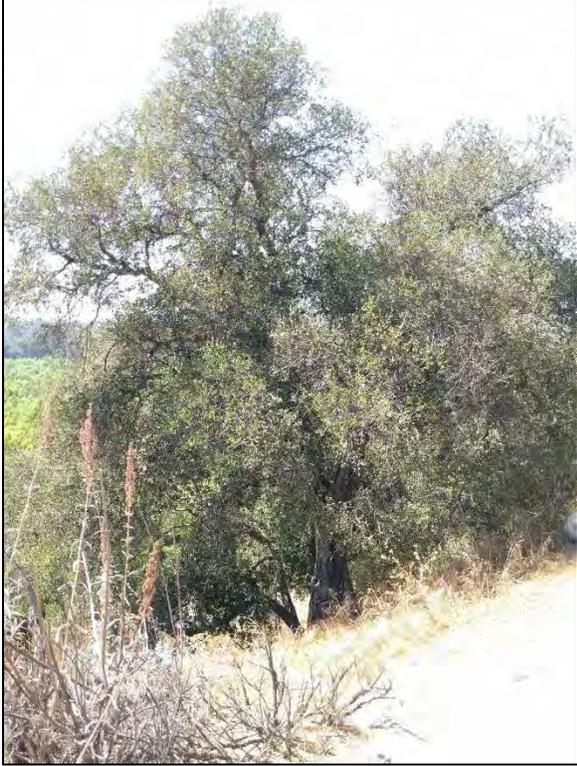


Photo 24. Tree Number 44



Photo 25. Tree Number 45



Photo 26. Tree Number 46



Photo 27. Tree Number 47



Photo 28. Tree Number 48



Photo 29. Tree Number 49



Photo 30. Tree Number 50



Photo 31. Tree Number 51



Photo 32. Tree Number 52



Photo 33. Tree Number 53



Photo 34. Tree Number 54



Photo 35. Tree Number 55



Photo 36. Tree Number 56



Photo 37. Tree Number 57



Photo 38. Tree Number 58



Photo 39. Tree Number 59



Photo 40. Tree Number 60



Photo 41. Tree Number 61



Photo 42. Tree Number 62



Photo 43. Tree Number 63



Photo 44. Tree Number 64



Photo 45. Tree Number 65



Photo 46. Tree Number 66

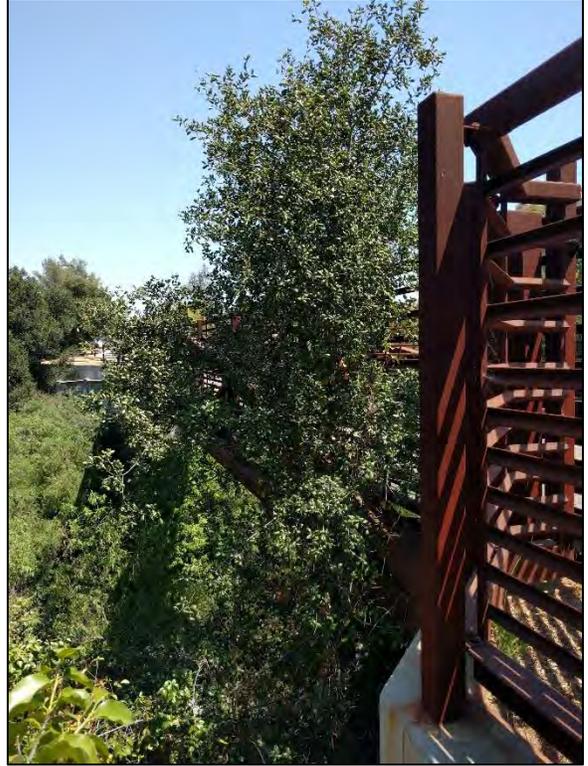


Photo 47. Tree Number 68



Photo 48. Tree Number 69



Photo 49. Tree Number 70



Photo 50. Tree Number 71



Photo 51. Tree Number 72



Photo 52. Tree Number 73



Photo 53. Tree Number 76



Photo 54. Tree Number 77

ATTACHMENT B

Oak Tree Photographs from the 2018 Survey



Photo 1. Tree Number 1



Photo 2. Tree Number 2



Photo 3. Tree Number 3



Photo 4. Tree Number 4



Photo 5. Tree Number 5



Photo 6. Tree Number 6



Photo 7. Tree Number 7



Photo 8. Tree Number 8



Photo 9. Tree Number 78



Photo 10. Tree Number 79



Photo 11. Tree Number 80



Photo 12. Tree Number 81



Photo 13. Tree Number 82



Photo 14. Tree Number 83



Photo 15. Tree Number 84



Photo 16. Tree Number 85



Photo 17. Tree Number 86



Photo 18. Tree Number 87



Photo 19. Tree Number 88



Photo 20. Tree Number 89



Photo 21. Tree Number NA-1



Photo 22. Tree Number NA-2