



CITY OF EUREKA
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NOTICE OF PUBLIC HEARING
EUREKA CITY PLANNING COMMISSION

NOTICE IS HEREBY GIVEN that the Eureka City Planning Commission will hold a public hearing on Monday, January 29, 2018, at 5:30 p.m., or as soon thereafter as the matter can be heard, in the Council Chamber, Eureka City Hall, 531 “K” Street, Eureka, California, to consider the following application:

Project Title: Sequoia Park Zoo Renovation and Expansion

Project Applicant: City of Eureka

Case Nos.: C-18-0001/ED-17-0015

Location: 3414 W Street

APN: 013-081-001

Zoning and General Plan Designation: P (Public)/PR (Parks and Recreation)

Project Description: The City of Eureka is proposing to adopt a Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program and approve a Use Permit for the renovation and addition of new exhibits within the existing footprint of the Sequoia Park Zoo (approximately 7.5 acres) and expansion the footprint of the Zoo (approximately 1.5 acres) into the adjacent forest of Sequoia Park and the City of Eureka Parks Corporation Yard to accommodate new exhibits.

Website:

http://www.ci.eureka.ca.gov/depts/development_services/cd/public_hearing_notices.asp

All interested persons are invited to comment on the project either in person at the scheduled public hearing, or in writing. Written comments on the project may be submitted at the hearing or prior to the hearing by mailing or delivering them to the Community Development Department, address above. The project file is available for review at the Community Development Division, Third Floor, City Hall. If you have questions regarding the project or this notice, please contact Kristen M. Goetz, Senior Planner, phone: (707) 441-4160; fax: (707) 441-4202; e-mail: kgoetz@ci.eureka.ca.gov



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EUREKA CITY PLANNING COMMISSION

STAFF REPORT

January 29, 2018

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APN: 013-081-001

Zoning and General Plan Designation: P (Public)/PR (Parks and Recreation)

Description: The City of Eureka is proposing to renovate and add new exhibits within the existing footprint of the Sequoia Park Zoo (approximately 7.5 acres) and expand the footprint of the Zoo (approximately 1.5 acres) into the adjacent forest of Sequoia Park and the City of Eureka Parks Corporation Yard to accommodate new exhibits. The renovation and expansion of the Sequoia Park Zoo will significantly enhance the habitat and wildlife conservation components of the zoo and provide innovative, one-of-a-kind educational and interpretive opportunities.

“Parks, zoos, golf courses, playgrounds, and other public recreation facilities” is a conditionally permitted use in the zone district where the project is located. A Use Permit is required for the expansion of the zoo.

Staff Contact Person: Kristen M. Goetz, Senior Planner, City of Eureka, Community Development Department; 531 “K” Street, Eureka, CA 95501-1165; phone: (707) 441-4166, fax: (707) 441-4202, email: kgoetz@ci.eureka.ca.gov

Environmental: Approval of the proposed project is a discretionary action subject to environmental review in accordance with the California Environmental Quality Act (CEQA). A draft Initial Study (IS) and Mitigated Negative Declaration (MND) was prepared and circulated for review as required by CEQA (SCH #2017122051). The IS/MND concludes that with mitigation, no substantial adverse environmental impacts will result from the proposed project.

The City submitted the draft IS/MND to the State Clearinghouse for a 30-day comment period which ended January 17, 2018. A notice of the 30-day local comment period, and a Notice of Intent to Adopt a Negative Declaration were published in the Times-Standard; the local comment period ended January 19, 2018. The City received no comments on the IS/MND.

Prior to approving a project, CEQA requires the Planning Commission consider the proposed MND, together with any comments received during the public review process, and then adopt the MND if the Commission finds, on the basis of the whole record before it, including the Initial Study and any comments received, there is no substantial evidence the project will have a significant effect on the environment and the MND reflects the City's independent judgment and analysis. Based on the Initial Study and the fact no comments were received during the public comment period, Staff has determined this finding can be made.

The California Environmental Quality Act requires the adoption of feasible mitigation measures to reduce the severity and magnitude of potentially significant environmental impacts associated with project development, and Staff recommends adoption of the Mitigation Monitoring and Reporting Program.

Staff Recommendation:

1. Hold a public hearing; and
2. Adopt a Resolution of the Planning Commission approving with conditions the Zoo Renovation and Expansion Use Permit, and adopting the Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program.

Suggested Motion:

I move the Planning Commission adopt a Resolution of the Planning Commission, conditionally approving the Sequoia Park Zoo Renovation and Expansion Use Permit, and adopting the Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program.

Discussion and Analysis:

The Sequoia Park Zoo first opened to the public in 1907, and in the last 110 years the Zoo has grown and adapted to accommodate the changing needs of the community and to comply with ever-changing laws and regulations. The Zoo is the only accredited zoo in the world that is located in a redwood forest, making it a unique California resource. The Zoo is also the oldest zoo in California, and one of the smallest accredited zoos in the country. It also has been a central element in the cultural, educational and recreational growth of Humboldt County, making it a significant local resource.

The project site includes the 7.5-acre Sequoia Park Zoo existing footprint as well as a 1.5 acre expansion into the adjacent 67 acre Sequoia Park forest and the City Eureka Parks Corporation Yard. A corresponding reduction in the size of Sequoia Park will result from the proposed project. All of the proposed work will be done on City-owned property adjacent to the existing Zoo.

As described in the Initial Study, the project consists of several renovations and enhancements within the existing footprint of the Zoo, including: the development of new exhibits and facilities; enhanced animal welfare facilities (larger exhibits, quarantine and treatment areas and expanded animal holding areas); increased visitor amenities including new recreational areas; new food service and retail facilities; and expanded areas for special events and educational activities. The expansion to the west will accommodate the development of the Native Predators exhibits, a redwood canopy walk, trails, and an educational facility.

- Renovation
 - Island Adaptions
 - South Lawn
 - Biodiversity Hotspot of the Andes
 - Asian Forests
 - Entry Pavilion
 - Café
 - New Staff Offices and Meeting Space
 - Relocated Sequoia Park Entry
 - Condor Quarantine
- Expansion
 - New Visitor Serving facilities
 - Native Predators
 - Redwood Canopy Walk
 - Bear Vista Lodge
 - Operations and Maintenance Yard
 - Parking
 - Trail Rehabilitation
 - Native Vegetation Planting and Enhancements

The Zoo is located on approximately five level acres east of, and is generally considered a part of, the ~67-acre Sequoia Park, all within the Eureka City limits. The Sequoia Park is dominated by redwood-forest and includes a duck pond, wetlands, and other natural resource areas unique to the north-coast. The Park offers recreational opportunities for the public that consist of picnicking, hiking, playgrounds, and special event venues. Land uses surrounding the Sequoia Park and Zoo are primarily those associated with the one-family residential zone district, which surrounds the Park and Zoo on three sides (north, south and west). To the east are an elementary school and ball fields, National Guard Armory, and the City's water reservoir. Sequoia Park and Zoo is, for the most part, bordered by Glatt Street to the north, "W" Street to the east, Madrone Street to the south, and "O" Street to the west.

APPLICABLE REGULATIONS:

In order to give the district use regulations flexibility, in certain zoning districts conditional uses may be permitted subject to the granting of a use permit. Because of their unusual characteristics, conditional uses require special consideration so that they are located properly with respect to the objectives of the Zoning Regulations and with respect to their effects on surrounding properties. In order to achieve these purposes, the Planning Commission is empowered to grant an application for a use permit and to impose reasonable conditions provided, pursuant to Eureka Municipal Code Chapter 155, §155.285, the Planning Commission can make the following findings:

- (a) *That the proposed location of the conditional use is in accord with the objectives of this chapter and the purposes of the district in which the site is located;*
- (b) *That the proposed location of the conditional use and the conditions under which it would be operated or maintained will not be detrimental to the public health.*

safety, or welfare or materially injurious to properties or improvements in the vicinity;

- (c) That the proposed conditional use will comply with each of the applicable provisions of this chapter; and
- (d) That the proposed conditional use, if located in the coastal zone, is consistent with the certified Local Coastal Program.

1. Objectives of Chapter 155 and Purposes of District: The Sequoia Park and Zoo, which has existed in this neighborhood since 1907, is zoned Public (P) and has a General Plan designation of Park and Recreation (PR). As discussed below, the Eureka Municipal Code and the adopted General Plan support the development and enhancement of the Zoo. The purpose of the P district is to provide for the orderly establishment of public facilities, expansion of their operations, or changes in the use of lands owned by governmental agencies. The Zoo is unquestionably a public facility, and based on the discussion herein, it is clear that the Zoo is consistent with the purpose of the P zone district.

Pursuant to Eureka Municipal Code (EMC) § 155.002, the zoning regulations are adopted in accordance with the City Charter to protect the public health, safety, peace, comfort, convenience, prosperity, and general welfare. More specifically, the zoning regulations are adopted in order to achieve the following objectives:

- a. **To provide a precise guide for the physical development of the city in such a manner as to achieve progressively the arrangement of land uses depicted in the general plan adopted by the Council.** *The subject property is designated “Parks and Recreation” under the adopted general plan and as stated above, the zoo use is consistent with the Parks and Recreation designation. Therefore, the existing land use already achieves the arrangement of land uses as depicted in the adopted general plan.*
- b. **To foster a harmonious, convenient, workable relationship among land uses.** *The Zoo has existed in its present location since 1907; much of the residential area surrounding the Zoo was developed after that date. The Zoo, which is located adjacent to the Sequoia Park, is surrounded on three sides by residential uses (north, west, and south), and to the east across “W” Street are other public uses, including a school, ball fields, the National Guard Armory, and the City of Eureka’s one-million gallon water reservoir. The Zoo is in a ‘pocket’ of public uses that support not only the immediate residential neighborhood but also the surrounding community. Staff believes that this relationship between the public uses and the neighborhood and community at large is harmonious, convenient and workable.*
- c. **To promote the stability of existing land uses that conform with the general plan and to protect them from inharmonious influences and harmful intrusions.** *The Zoo has existed for 110 years; this clearly demonstrates that the Zoo is a “stable” land use.*
- d. **To ensure that public and private lands ultimately are used for the purposes which are most appropriate and most beneficial from the standpoint of the city as a whole.** *The Zoo, which serves not only the City*

but also the entire North Coast, is a necessary and appropriate public amenity that provides a vital and extremely beneficial service.

- e. **To prevent excessive population densities and overcrowding of the land with structures.** *It is hoped that development of the proposed project will increase the recreational opportunities for citizens and tourists. It is possible that future residents of the City may choose to reside here, in part, because of the high quality recreational opportunities afforded by the Zoo; thus indirectly increasing population density. However, it is certain that the proposed project will not result in 'excessive population densities.' With regard to overcrowding of the land with structures, the Zoo will consist of approximately nine acres at the completion of the project and compared to the size of the Zoo, there are relatively few existing or proposed structures. Therefore, the project will not overcrowd the land.*
- f. **To promote a safe, effective traffic circulation system.** *Over the years, residents in the vicinity of the Zoo have expressed their concerns regarding existing traffic conditions in the vicinity of the Zoo, particularly in terms of the high volume of cars, excessive speed and the use of shortcut routes through the residential neighborhoods. A traffic impact study was completed on November 28, 2017, by SHN Engineers & Geologists and their partners, Spack Consulting, a firm that specializes in traffic studies. The study was performed to determine the traffic impacts associated with the build out of the proposed expansions on the studied roads and intersections where impact is anticipated. The Dolbeer Street and W Street, Harris Street and the Walnut/Hemlock Street intersections, parking, and traffic generation were analyzed. For the purposes of the study, the expansion was assumed to be built and fully in use by 2020. It should be noted that negligible changes are expected on corridors not analyzed in the study and improvements along those corridors may be needed in the future to accommodate incremental traffic growth from this and other area developments. However, based on the traffic study, the added traffic from the proposed development would not significantly change or impact traffic operations.*
- g. **To foster the provision of adequate off-street parking and off-street truck loading facilities.** *Currently the Zoo has 231 on- and off-street parking spaces available to visitors (not including accessible spaces). The proposed expansion will generate additional parking demand. The Zoo Master Plan includes plans to build additional parking lots: 9 spaces along Glatt Street, an 18-space parking lot off Glatt Street near the Parks Corp Yard, and a 16-space parking lot off W Street at the south end of the zoo. The traffic impact study also included a parking assessment which concluded the project will not result in a significant adverse impact with regard to parking; for a complete discussion, please see the draft Mitigated Negative Declaration and Initial Study that was prepared and circulated in accordance with the California Environmental Quality Act (CEQA).*
- h. **To facilitate the appropriate location of community facilities and institutions.** *The Zoo is a community facility that is centrally located to the community it serves (including those living within City limits as well as those living within the unincorporated area of Humboldt County).*

- i. **To promote commercial and industrial activities in order to strengthen the city's tax base.** *The Zoo is not a commercial or industrial activity.*
- j. **To protect and enhance real property values.** *The proposed project, which will improve, enhance and expand the Zoo facilities, will not adversely affect real property values for residential property in the vicinity of the Zoo.*
- k. **To safeguard and enhance the appearance of the city.** *The proposed project will preserve and upgrade the Zoo for future generations, and it will enhance the appearance of the Zoo and expand the experiences of persons enjoying the Zoo, which will be a benefit to the Zoo, the community and the City.*

Based on the discussion above, Staff believes that the proposed project is in accord with the objectives of the Eureka Municipal Code and the purpose of the Public zone district, as well as being consistent with the adopted general plan.

2. Public health, safety, or welfare: Staff prepared and circulated in accordance with the California Environmental Quality Act (CEQA) a draft Mitigated Negative Declaration and Initial Study. These CEQA documents analyze, among other environmental impacts, the projects effect on the public health, safety, and welfare; and they conclude that the proposed project as mitigated will not result in any adverse effects. The mitigation measures described in the initial study have been added as conditions of approval. Therefore, Staff believes that the proposed project will not be detrimental to the public health, safety or welfare, or be materially injurious to properties or improvements in the vicinity of the zoo.

3. Use complies with applicable provisions: As discussed above, the project complies with the objectives and purposes of the Eureka Municipal Code. The 'P' zoning district specifically gives the Planning Commission the authority to establish limits to the height, bulk, and coverage as a condition of a use permit in order to ensure compatibility with adjoining uses. By taking action to approve the project as submitted, the Planning Commission will be simultaneously establishing the limits to the height, bulk, and coverage and determining that the proposed project is compatible with the adjoining uses.

4. Use is consistent with Local Coastal Program: The project site is not located in the coastal zone.

Staff Recommendation:

1. Hold a public hearing; and
2. Adopt a Resolution of the Planning Commission approving with conditions the Zoo Renovation and Expansion Use Permit, and adopting the Mitigated Negative Declaration and the Mitigation Monitoring and Reporting Program.

Suggested Motion:

I move the Planning Commission adopt a Resolution of the Planning Commission, conditionally approving the Zoo Renovation and Expansion Project Use Permit, and adopting the Mitigated Negative Declaration and the Mitigation Monitoring and Reporting Program.

Attachments:

- Attachment 1 Planning Commission Resolution 2018-____
- Attachment 2 Draft Initial Study/MND
- Attachment 3 Mitigation Monitoring and Reporting Program

RESOLUTION NO. 2018-

**A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF EUREKA
CONDITIONALLY APPROVING THE SEQUOIA PARK ZOO RENOVATION AND
EXPANSION USE PERMIT AND ADOPTING THE MITIGATED NEGATIVE
DECLARATION AND MITIGATION MONITORING AND REPORTING PROGRAM**

WHEREAS, Sequoia Park Zoo first opened to the public in 1907, and in the last 110 years the Zoo has grown and adapted to accommodate the changing needs of the community and to comply with ever-changing laws and regulations; and

WHEREAS, the Zoo is the only accredited zoo in the world that is located in a redwood forest; and

WHEREAS, the Zoo is the oldest zoo in California, and one of the smallest accredited zoos in the country; and

WHEREAS, the zoo is and has been a central element in the cultural, educational and recreational growth of Humboldt County; and

WHEREAS, the City of Eureka proposes to renovate and add new exhibits within the existing footprint of the Sequoia Park Zoo (approximately 7.5 acres) and expand the footprint of the Zoo (approximately 1.5 acres) into the adjacent forest of the approximately 67 acre Sequoia Park and the City of Eureka Parks Corporation Yard to accommodate new exhibits; and

WHEREAS, the project will significantly enhance the habitat and wildlife conservation components of the zoo and provide innovative, one-of-a-kind educational and interpretive opportunities; and

WHEREAS, parks and zoos are a conditionally permitted use in the zone district where the project is located and a use permit is required.

NOW THEREFORE, BE IT RESOLVED by the Planning Commission of the City of Eureka, that the project, is *approved with conditions*, and the decision to *approve with conditions* the subject application was made after careful, reasoned and equitable consideration of the evidence in the record, including, but not limited to: written and oral testimony submitted at the public hearing; the staff report; site investigation(s); agency comments; project file; and, the evidence submitted with the permit application. The findings of fact listed below “bridge the analytical gap” between the raw evidence in the record and the Planning Commission’s decision.

1. Approval of the proposed project is a discretionary action subject to environmental review in accordance with the California Environmental Quality Act (CEQA). A draft Initial Study (IS) and Mitigated Negative Declaration (MND) was prepared and circulated for review as required by CEQA (SCH #2017122051). The IS/MND concludes that with mitigation, no substantial adverse environmental impacts will result from the proposed project.

2. The draft IS/MND was submitted to the State Clearinghouse for a 30-day comment period which ended January 17, 2018.

3. A notice of the 30-day local comment period, and a Notice of Intent to Adopt a Negative Declaration were published in the Times-Standard; the local comment period ended January 19, 2018. The City received no comments on the IS/MND.

4. The mitigation measures identified in the draft Mitigated Negative Declaration and initial study have been incorporated into the project approval as conditions of approval

5. As evidenced by the findings of the circulated environmental documents, the project as conditioned will not result in any adverse environmental impacts, including impacts resulting from an increase in traffic or on-street parking demand.

6. The Sequoia Park Zoo, which has existed in this neighborhood since 1907, is zoned Public (P) and has a General Plan designation of Park and Recreation (PR) and the Eureka Municipal Code and the adopted General Plan support the renovation and expansion of the Sequoia Park Zoo.

7. The project will develop new exhibits and facilities; enhance animal welfare facilities (larger exhibits, quarantine and treatment areas and expand animal holding areas); increase visitor amenities including new recreational areas; new food service and retail facilities; and expand areas for special events and educational activities. The expansion to the west will accommodate the development of the Native Predators exhibits, a redwood canopy walk, trails, and an educational facility.

8. The long-standing relationship between the Zoo, the immediate neighborhood and the surrounding community will not be adversely affected by the proposed project.

9. The conditional use permit will facilitate the development of a wide range of improvements, upgrades, and enhancements to the Zoo.

10. The design, bulk and dimensions of the various individual projects authorized under this conditional use permit are complimentary to the Zoo and will be an asset to the community.

11. The zoo, which serves not only the city but also the entire north coast, is a necessary and appropriate public amenity that provides a vital and extremely beneficial service.

12. The proposed project will preserve and upgrade the zoo for future generations, and it will enhance the appearance of the zoo and the experience of persons enjoying the zoo, which will be a benefit to the zoo, the community and the City.

13. The proposed Sequoia Park Zoo Renovation and Expansion is in accord with the objectives of the zoning code, and the purposes and intent of the zone districts in which the project is located, as well as being consistent with the adopted general plan.

14. No potential impacts were identified by any agency so the project will not impact the public health, safety, or welfare.

15. The Planning Commission has considered the proposed Mitigated Negative Declaration (MND), and finds, on the basis of the whole record before it, including the Initial Study, that there is no substantial evidence that the project will have a significant effect on the environment and that the MND reflects the City's independent judgment and analysis.

16. The Planning Commission hereby adopts the Mitigation Monitoring and Reporting Program required by the California Environmental Quality Act to reduce the severity and magnitude of potentially significant environmental impacts associated with project development.

FURTHER approval of the Use Permit is conditioned on the following terms and requirements. The violation of any term or requirement of this conditional approval may result in the revocation of the permit.

1. The applicant and contractor shall at all times comply with the adopted Mitigation Monitoring and Reporting Program.

PASSED, APPROVED AND ADOPTED by the Planning Commission of the City of Eureka in the County of Humboldt, State of California, on the 29th day of January, 2018, by the following vote:

AYES: COMMISSIONER
NOES: COMMISSIONER
ABSENT: COMMISSIONER
ABSTAIN: COMMISSIONER

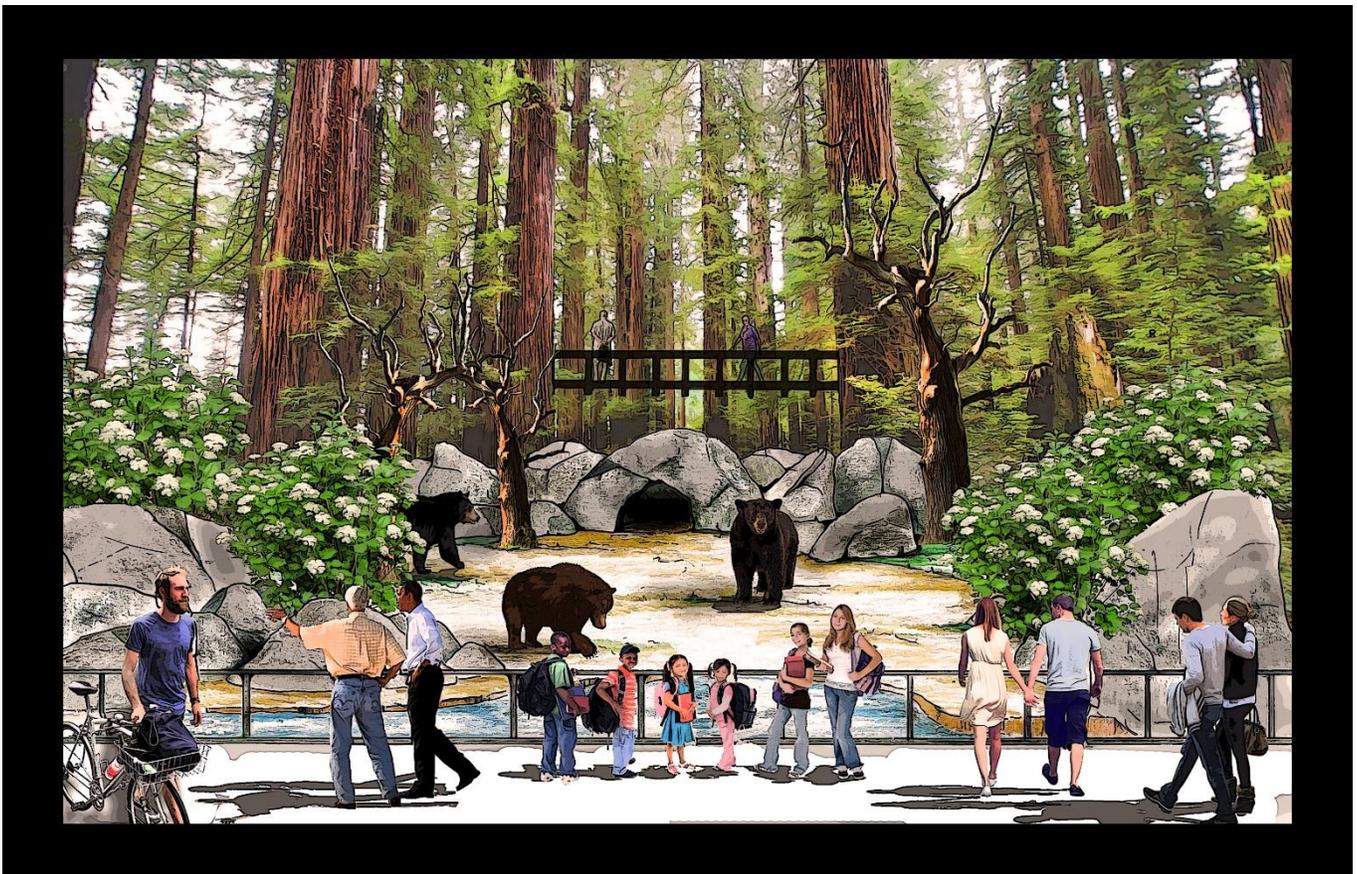
Jeff Ragan, Chair, Planning Commission

Attest:

Pamela J. Powell, City Clerk

City of Eureka

Initial Study and Mitigated Negative Declaration



Sequoia Park Zoo Expansion and Renovation

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CEQA

INITIAL STUDY and PROPOSED MITIGATED NEGATIVE DECLARATION

CITY OF EUREKA

PROJECT TITLE: Sequoia Park Zoo Renovation and Expansion

PROJECT APPLICANT: City of Eureka

CASE NO: ED-17-0015

PROJECT LOCATION: Southeastern Eureka between S and W Streets; between Glatt Street and Madrone Avenue. APN: 013-081-001.

ZONING & GENERAL PLAN LAND USE DESIGNATION: Zoning: Public (P). General Plan Land Use Designation: Park and Recreation (PR).

PROJECT OVERVIEW: As designated in the 2016 Sequoia Park Zoo Master Plan, the City of Eureka proposes to renovate and add new exhibits within the existing footprint of the Zoo and expand the footprint of the Zoo to accommodate new exhibits. The expansion and renovation of the Sequoia Park Zoo will significantly enhance the habitat and wildlife conservation components of the zoo and provide innovative, one-of-a-kind, educational and interpretive opportunities. The following areas will be renovated: Island Adaptions, South Lawn, Biodiversity Hotspot of the Andes, Asian Forests, Entry Pavilion, Café, New Staff Offices and Meeting Space, Relocated Sequoia Park Entry, Condor Quarantine, Trail Enhancements, and Native Vegetation Planting and Enhancements. Expansion out of the Zoo footprint will include: New Visitor Serving facilities, Native Predators Exhibit, Redwood Canopy Walk, Bear Vista Lodge, Operations and Maintenance Yard, and Parking.

PROJECT PURPOSE: The purpose of the proposed project is to renovate and expand the Sequoia Park Zoo and achieve the following objectives:

- Promote wildlife conservation.
- Promote habitat conservation.
- Create more intimate connections between people and animals/habitats.
- Create new exhibit areas at the Zoo based on conservation “hotspots” around the world.
- Serve as a regional attraction in Eureka that encourages an appreciation of the environment by providing opportunities for nature study, including up-close views of wildlife and their habitats with interpretive opportunities.

STUDY AREA AND SUPPORTING STUDIES: Figure 1 – Project Master Plan and Figure 2 – Project Area Map show the project study area (Appendix A). The project includes the renovation of the existing Zoo footprint (approximately 7.5 acres) and an expansion of approximately 1.5 acres into the adjacent forest, Sequoia Park. The study area identified for this project encompasses the existing Zoo footprint, the proposed expansion area, the redwood canopies of the forest adjacent to the Zoo and the streets

surrounding the Zoo so that all potential impacts were measured. The location of project elements were selected with the goal of minimizing impacts, while still achieving the project objectives. The project area is within the United States Geological Survey Eureka quadrangle in Township 5 north, Range 1 west, Section 35.

The project area drains to unnamed perennial tributaries and eventually to Martin Slough, which is a tributary to Elk River and eventually to Humboldt Bay. The project has been designed to prevent any impacts to surface waters in the project area.

The following third-party analyses and studies have been conducted to support the project: a biological survey, a spotted owl survey, an arborist assessment, a cultural resources survey report, and a traffic study. Field data collection occurred within the project study area, while record searches and other special studies may include information outside of the identified study area to ensure the full scope of the project is analyzed.

PROJECT DESCRIPTION:

The Sequoia Park Zoo Renovation and Expansion Project consists of several renovations and enhancements within the existing footprint of the zoo, including: the development of new exhibits and facilities within the current footprint of the zoo; enhanced animal welfare facilities (larger exhibits, quarantine and treatment areas and expanded animal holding areas); increased visitor amenities including new recreational areas; new food service and retail facilities; expanded areas for special events and educational activities. In addition to the renovations within the existing footprint of the zoo, the project also consists of an expansion to the west of the current zoo to accommodate the development of the Native Predators exhibits, a redwood canopy walk, trails, and an educational facility. The specific project elements are described in more detail below:

The project description includes the following sub-sections:

- Renovation
 - Island Adaptions
 - South Lawn
 - Biodiversity Hotspot of the Andes
 - Asian Forests
 - Entry Pavilion
 - Café
 - New Staff Offices and Meeting Space
 - Relocated Sequoia Park Entry
 - Condor Quarantine
- Expansion
 - New Visitor Serving facilities
 - Native Predators
 - Redwood Canopy Walk
 - Bear Vista Lodge
 - Operations and Maintenance Yard
 - Parking
 - Trail Rehabilitation
 - Native Vegetation Planting and Enhancements
- Staging and Construction
- Operations and Maintenance

- Approvals Required
- Environmental Factors Assessment

Renovation

The interior existing footprint of the zoo is proposed to be renovated. All of the following work will be done within the existing footprint of the Zoo. Reference Figure 1 – Project Master Plan.

- *Island Adaptions:* Currently home to gibbons and spider monkeys, this exhibit will be renovated to provide a significantly more spacious home for some existing inhabitants, as well as large exhibits for animals that will be new to the Zoo. The total size of this exhibit area will range from 3,500 s.f to 8,000 s.f. and will be developed within the existing Zoo footprint on the northeast corner of the Zoo, just south of the Sequoia Park Garden. This zone brings together tree-dwelling species, Tree Kangaroo, Lemur and Gibbons, from three different island habitats - Papua New Guinea, Madagascar and the Asian archipelago. These charismatic animals will share the story of how life evolves in unique ways on islands, and how their specific adaptations make them so well suited to their island homes.
- *South Lawn:* This open lawn space will be developed within the existing Zoo footprint and will be between 4,000 and 7,000 s.f. to serve visitors and to host special events. The lawn will become the main Zoo event location. This location will also include a Nature Playspace for visitors to explore.
- *Biodiversity Hotspot of the Andes:* This new exhibit will provide homes for existing Zoo animals as well as several new species. A significant portion of this exhibit already exists, yet will be expanded to increase animal welfare. Approximately 20,000+ s.f. of new exhibit area will be created and will enable visitors to interface with animals from this critical biodiversity hotspot. The animals in this area are largely threatened or endangered animals. Adjacent to this exhibit is the Hilfiker Aviary. This will be expanded to feature a Cotton-top tamarin habitat adjacent to the existing structure.
- *Asian Forests:* This zone enhances and expands the existing red panda exhibit within the zoo footprint, to include other elusive forest-dwelling species - the binturong and the clouded leopard. Each of these animals will make good use of the shady forest edges and vertical, wooded exhibit spaces located northwesterly of the Barnyard.
- *Entry Pavilion:* The Entry Pavilion will be renovated to provide a smoothly functioning visitor entrance and exit by:
 - Construction of two symmetrical ramps whose flow can be altered in response to visitor capacity (special events, etc.) and to improve ADA access for visitors with disabilities.
 - Elimination of an existing ticket kiosk and addition of new ticketing windows on each side of the entry that can be opened and closed to accommodate changing capacity, creating better security, operational efficiency and a more welcoming experience and street view.
 - Installation of transparent wind baffles to provide a sheltered outdoor gathering area for school groups and tours.

- *Café and Retail Store:* The existing Café and retail store will be reconfigured to provide more spacious and comfortable indoor/outdoor seating that overlooks the North lawn and the Island Adaptations exhibits. An outdoor café terrace along W Street will cater to cafe patrons not visiting the Zoo, and allow curbside pick-up. Retail floor space will be doubled.
- *New Staff Offices and Meeting Space:* On the second level of the existing entry Pavilion, much-needed staff offices, an elevator and meeting space will be created by enclosing the entrance atrium and reconfiguring space and access.
- *Relocated Sequoia Park Entry:* The entry to Sequoia Park will be moved south 20-25 feet to accommodate additional off-street parking and to improve safety and pedestrian circulation.
- *Condor Quarantine:* An off-view permanent facility will house up to 4 critically-endangered California condors at a time that are in need of short-term veterinary rehabilitation treatment. This facility will support the Yurok Tribe's condor reintroduction program in Northern California.

Expansion

The footprint of the Zoo is proposed to be expanded westerly into the adjacent Sequoia Park and the City of Eureka Parks Corporation Yard (Figure 1 – Project Master Plan). All of the following work will be done on City owned property adjacent to the existing Zoo. This expansion will require grade preparation, limited grading and excavation and construction of a small amount (<.25 acre) of new impervious surface area for new facilities and exhibits. The designs have been created to minimize potential impacts to existing natural areas, including mature redwood forest, coastal brambles and other environmentally sensitive areas.

New electrical service, stormwater and drainage facilities, and sewer and water service will be developed to serve this expansion. Construction techniques such as directional drilling will be used to minimize any impact to existing naturalistic areas as needed. Lastly, limited removal of hazard trees (spruce, fir and redwood) may be required to ensure visitor, staff and animal safety. These activities will occur during the construction timeline. All trees will be utilized on site (within Sequoia Park or the zoo) or will be felled and left in a condition that will create enrichment opportunities for exhibit animals (tall snags, denning or nesting areas).

- *New Visitor Serving facilities:*
 - *Perimeter footpath:* A new 600-foot AC footpath will be developed along the western perimeter of the expanded zoo footprint. This will enable the public to continue to transit the zoo perimeter on foot or bicycle, to access Sequoia Park, and to connect Glatt Street to the North with the Sequoia Park playground. This pathway will require grading, compaction and some engineered fill to ensure adequate grade preparation for long-term viability of the surface.
- *Native Predators:* This zone expands on the theme, started with Watershed Heroes, by highlighting the North Coast's native predators, large and small, and the important roles they play in our ecosystem. These exhibits will be constructed of high-tension steel mesh, structural posts and columns supported by concrete footings and fencing. In this zone, visitors encounter animals

in habitats designed to provide maximum flexibility and mobility while engaging in natural behaviors:

- Cougars can explore their spacious forest habitat, or stalk their way above the visitor trail through mesh tubes, affording several elevated vantage points that cougars prefer to survey their territory;
- Black bears and coyotes will be placed in a common exhibit area with a complex 1-acre forest glen for their enrichment. These exhibits will have a stream and pond, ridges, downed trees, digging sites and retreat areas;
- Fishers, bobcats and ringtails will rotate through three interconnected habitats, which provide the animals new sensory and behavioral experiences every day. The animals will be kept in separate habitats to ensure their wellbeing, yet they will be shifted daily into new exhibit areas.

Visitors will walk through these habitats on a boardwalk-style path on their way to the nearby Canopy Walk.

- *The Redwood Canopy Walk:* The Redwood Canopy Walk is an integral component of the Sequoia Park Zoo's Master Plan. The exhibit provides self-guided, educational tours of the redwood canopy as well as elevated views down into the animal enclosures. The City and Zoo Foundation consulted with a number of certified arborists, canopy biologists, canopy walk and adventure park developers, engineers, designers, and builders during the development of this Project, and in both the evaluation of the potential impacts, and the design of mitigation measures. A day-long design charrette was conducted to evaluate the conceptual design. World-renowned canopy biologist from the California Academy of Sciences, Dr. Meg Lowman, Ph.D., consulted during the conceptual design process to determine a feasible way to construct this project without affecting the short or long-term health of the redwood trees. Letters from two additional Canopy experts that attended a day long workshop on site are appended to this document (Appendix C): internationally renowned arborist Scott Baker, and canopy walk expert Robbie Oates.

- *Root Cellar and Departure Deck*

Canopy Walk tours start in a subterranean room, under a large redwood stump with interpretive signage and roots dangling from the roof (the Root Cellar). Visitors will then proceed to the Canopy Walk Departure Deck via a net, climbing-tube, or stairs; ADA accessibility will be provided by either an elevator or ramp. The Canopy Walk Departure Deck is an elevated platform (approximately 25' above the ground) adjacent to and east of the Bear Vista Lodge. From there, visitors can follow a cable-suspended walkway, a one-way loop, that takes them out further and higher (approximately 75' above the ground) into the canopy and or can walk along a wider section that overlooks the western edge of the Zoo and forest edge. These canopy walkways will provide different levels of challenge for visitors but similar educational and experiential opportunities. The Site Master Plan shows the planned route and placement of these elements. Some of these elements may shift during the final design process. Additional details are provided below about each element of the walkways. The Canopy Walk area will not be an adventure park and will not include a zip line.

- *ADA Accessible Canopy Experience*

The ADA segment of the Redwood Canopy Walk will branch off the Departure Deck and traverse 20-25 feet above fairly level ground around the southern edge of the Native Predators Exhibit. Approximately 200 linear feet of rigid walkways and three viewing platforms will be supported on a series of free-standing, steel or fiberglass reinforced polymer (FRP) pipes/posts with concrete foundations embedded into the forest floor. The walkways, railings, and containment netting will be designed to meet the California Building Code and ADA requirements. The pipe supports will be strategically placed to minimize root damage and to thread a path between the trees. The walkways will be a minimum of 7'-6" wide to accommodate two-way, wheelchair traffic. All segments of this walkway will have wooden hand railings, net walls, and a non-slip, structural walking surface.

- *Cable-Suspended Walkways*

The secondary loop of the Redwood Canopy Walk will depart from one arm of the ADA accessible walkway. The one-way walkway will include approximately 500 linear feet of two to three-foot wide, cable-suspended, walkways with spans ranging between 40' and 110' leading to tree-encircling platforms located up to 75' above the forest floor. Platforms will have interpretive signage and displays to educate visitors about the redwood forest and ecosystem. The walkways and platforms will be attached to and hang from the trees using state-of-the-art hardware evaluated by a structural engineer. The attachment hardware and loads will be designed to minimize the potential impacts to the trees. Guy wires may be required to transfer the walkway loads to the ground and balance the horizontal loads on the trees. A Burma Bridge Arm will attach a section of the cable-suspended bridge to the Departure Deck area as an alternate route of travel.

- *Canopy Exploration Zone*

One or more of the trees may be rigged to allow limited access up into the higher reaches of the canopy for scientific or educational purposes. The rigging would include additional tree attachment hardware and possibly steps and platforms. Access would require climbing gear (ropes and harnesses) and special permission from the Zoo. The upper reaches of the canopy would not be open to the general public.

- *Tree Attachments*

The cable-suspended walkways and platforms will be attached to the trees with tree attachment bolts (TABs) or through bolts. The TAB is a long, metal screw with a portion of the shaft or shank that is significantly larger in diameter than the threaded portion. The screw end has coarse threads designed to bite into wood. The other end is threaded to accept a nut. A special two-stage bit is used to drill a pilot hole into the heartwood for the screw and to countersink a larger diameter hole for the shank. When the TAB is installed, the shank completely fills the countersunk hole and the exterior surface of the shank is flush with the cambium layer of the tree. The rest of the shank with the nutted end protrudes out from the bark. The length of the larger diameter segment is sized to carry to shear loads. The cambium grows over the face of the shank and seals the hole. The length of the remainder of the shank is sized to allow the tree to continue to grow without impacting the attached structure. Other fasteners and hardware are attached to the shaft and held in place at the nutted end. Multiple TABs are often used to provide multiple attachment points for platforms or walkways and to spread the load out over the bole of

the tree. TABs can be used to suspend loads from above or support loads from below.

- *Bear Vista Lodge:* Located near the Canopy Walk, the Bear Vista Lodge, a two story 1,500 to 5000 s.f. “lodge” facility will provide interpretive experiences for the bear/coyote exhibits as well as host modest sized educational classes and special events.
- *Operations and Maintenance Yard:* New offices and service facilities for animal care staff, parking and storage areas will be located in the existing Parks Corporation yard. This area will be shared by the Parks and Zoo Divisions of the Parks & Recreation Department. This location will become the primary delivery location for zoo vendors. Relocation of the service facilities will effectively eliminate service truck and parking disruptions at the main visitor entrance on W Street, which will enhance visitor safety.
- *Parking:* Additional parking will be added for staff and visitors. Approximately 10 additional staff parking spaces will be constructed in the existing Parks’ corporation yard on the northwest side of the zoo. Approximately 20 additional visitor parking stalls will be constructed through the re-alignment and widening of the entrance to Sequoia Park. Also, a 19-space visitor parking area will be created by changing parallel parking to perpendicular parking along the south side of Glatt Street from the intersection with W Street to just east of the Parks’ corporation yard entrance.
- *Trail Rehabilitation:* Existing trails will be rehabilitated, and some will be realigned. Targeted trails include the Zoo parameter trail and trail segments under the Canopy Walk. Primitive trails will be eliminated and planted to decrease erosion and runoff and to improve habitat and water quality.
- *Native Vegetation Planting and Enhancements:* Nonnative vegetation will be removed in areas near exhibits or the Canopy Walk, English Ivy will be specifically targeted around sensitive species of habitats. Native vegetation planting will occur in Zoo expansion areas and areas below or within view of the Canopy Walk.

Staging and Construction

It is anticipated that this project will begin construction in the summer of 2018 or 2019 and be completed within a five-year period, pending funding. All construction phases that require grading will be completed within the RWQCB “dry seasons” (April 15th to October 15th). Demolition of existing structures on impervious foundations and construction of new structures on impervious surfaces will occur throughout the year.

Construction will primarily include animal exhibit construction, canopy walk installation, building construction, parking lot construction and some demolition activities for existing AC pathway.

Animal exhibit construction both in the existing zoo footprint and in the expanded area may include the following activities:

- *Hazard Tree Removal-*International Society of Arborists (ISA) certified arborists have been consulted to make a preliminary assessment of potential hazard trees within the project area.
- *Clearing and Grubbing -* To clear vegetation and topsoil from the proposed constructed area where engineered sub-grades are required. These areas include the perimeter trail, new interior walkways

and building foundations in several key locations; restrooms, bear lodge, animal holding buildings and in the expanded parking areas in the corporation yard and in the entrance to Sequoia Park.

- *Excavation and Grade Preparation*– At areas that will have new exhibit features such as fence and animal containment, concrete footings, ponds and water features, new play areas including the South Lawn area, and in areas for new restrooms, bear lodge, animal holding buildings and in parking areas.
- *Concrete and Asphaltic Concrete Sub-Grade Compaction*-Areas that will have concrete footings or foundations shall be compacted using vibratory compactors, to ensure adequate structural integrity. Concrete shall be poured into forms built to design specifications with either steel mesh or rebar. Staging building materials such as re-bar and forming materials (lumber, wire, etc.) will be placed in close proximity to the area that will be constructed. Concrete trucks will be staged out of the footprint of the zoo and will either deliver concrete through sluice or through concrete pumps. A concrete wash out station will be developed that will be utilized throughout the project. These areas will include the perimeter trail, building foundations, containment and visitor fencing, restroom facilities and pond and water feature areas within exhibits.
- *Construction Laydown Areas*-Construction vehicles and material deliveries and supplies will be staged in a construction laydown yard that will be temporary. Portable toilets and job trailers will also be staged in this location.
- *Fencing and Structural Columns*-shall be driven columns or helical coil anchors and will be installed through mechanical means. All fencing, animal containment and ground based anchors for the Departure Deck shall be installed using these techniques.
- *Tree Attachments*-Shall be installed by contractors who will climb the trees and set up anchors that will be strung together with steel cables and pulled tight.
- *Planting and restoration activities*-shall be implemented within each exhibit area, in the trail restoration area and in the watershed restoration zone under the canopy walk area following construction.
- *Interpretive Installations*-Fabricated panels with interpretive signage will be produced off-site and shall be installed by hand crews with small power tools.

Equipment required for construction of these new exhibits may include:

- Tracked Excavator
- Bulldozer
- 10 yd. end dump truck
- Pick-up trucks
- Excavator
- Track mounted pile driver
- Concrete truck
- 10 yd. end dump
- Skid steer
- Delivery vehicles
- Small pickups
- Pavers

Construction activities will be limited to the hours of 7:00 AM to 7:00 PM on weekdays and 8:00 AM to 6:00 PM on Saturdays, Sundays, and Holidays, except in emergencies or with prior approval from the City of Eureka.

It is not anticipated that any temporary utility extensions, such as electric power or water, will be required

for construction.

Operations and Maintenance

The majority of the Zoo will continue to be operated by City of Eureka Parks and Recreation staff as a facility with indoor and outdoor settings where animals are cared for and kept for public display. It will host conservation lectures, after-school programs, summer camps and elementary school classes for wildlife and habitat conservation curriculum. The Sequoia Park Zoo Foundation will continue to operate the gift shop and café.

Maintenance will be performed primarily by City of Eureka Parks and Recreation staff. Maintenance will be supplemented by the City of Eureka Public Works staff and local contractors.

Approvals Required

- Regional Water Quality Control Board - SWPPP
- City of Eureka Conditional Use Permit
- City of Eureka Grading Permit
- City of Eureka Building Permit

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

- | | | |
|---|--|--|
| <input type="checkbox"/> Aesthetics | <input type="checkbox"/> Agricultural Resources | <input type="checkbox"/> Air Quality |
| <input type="checkbox"/> Biological Resources | <input type="checkbox"/> Cultural Resources | <input type="checkbox"/> Geology/Soils |
| <input type="checkbox"/> Green House Gas Emissions | <input type="checkbox"/> Hazards/Hazardous Materials | <input type="checkbox"/> Hydrology/Water Quality |
| <input type="checkbox"/> Land Use/Planning | <input type="checkbox"/> Mineral Resources | <input type="checkbox"/> Noise |
| <input type="checkbox"/> Population/Housing | <input type="checkbox"/> Public Services | <input type="checkbox"/> Recreation |
| <input type="checkbox"/> Transportation/Traffic | <input type="checkbox"/> Tribal Cultural Resources | <input type="checkbox"/> Utilities/Service Systems |
| <input type="checkbox"/> Mandatory Findings of Significance | | |

DETERMINATION:

On the basis of this initial evaluation:

- I find that the proposed project **could not** have a significant effect on the environment, and a **NEGATIVE DECLARATION** will be prepared.
- I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A **MITIGATED NEGATIVE DECLARATION** will be prepared.
- I find that the proposed project **may** have a significant effect on the environment, and an **ENVIRONMENTAL IMPACT REPORT** is required.
- I find that the proposed project **may** have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An **ENVIRONMENTAL IMPACT REPORT** is required, but it must analyze only those effects that remain to be addressed.
- I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier **EIR** or **NEGATIVE DECLARATION** pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier **EIR** or **NEGATIVE DECLARATION**, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Robert Holmlund, AICP
Development Services Director, City of Eureka

Date

Summary of Potential Project Impacts: Below is a table that summarizes the impact potential for each category of impacts discussed and analyzed in this Initial Study.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
I. Aesthetics		✓		
II. Agricultural & Forestry Resources				✓
III. Air Quality			✓	
IV. Biological Resources		✓		
V. Cultural Resources		✓		
VI. Geology & Soils		✓		
VII. Greenhouse Gas Emissions			✓	
VIII. Hazards & Hazardous Materials			✓	
IX. Hydrology and Water Quality		✓		
X. Land Use and Planning				✓
XI. Mineral Resources			✓	
XII. Noise		✓		
XIII. Population & Housing				✓
XIV. Public Services			✓	
XV. Recreation		✓		
XVI. Transportation & Traffic			✓	
XVII. Tribal Cultural Resources		✓		
XVIII. Utilities & Service Systems			✓	
XIX. Mandatory Findings of Significance		✓		

Recommended Mitigation Measures: Below is a list of mitigation measures that are identified in the following checklist and would be recommended as conditions of project approval.

I. Aesthetics

Mitigation Measure I-1: Canopy Walk Aesthetics. The surface of canopy walk pipes/posts shall be camouflaged with texture and color to match the forest surroundings, and artificial branches may be attached. The structural elements of the walkways (such as cables, fasteners, and planking) shall be painted to reduce their reflective qualities and to blend with the forest colors. If guy-wires are required to balance the horizontal loads from the cable-suspended walkways, the wires shall be minimized in length, hidden from view, and camouflaged, to the extent possible.

Mitigation Measure I-2: Light. All new sources of light, including outside night lighting associated with construction, shall be designed to protect wildlife and nighttime views, including views of the night sky. This design goal shall be satisfied using a variety of means, including but not limited to fixture types, cut off angles, shields, lamp arm extensions, and pole heights. Specific designs shall include directing light downward, away from adjoining properties, avoiding brightly illuminated vertical surfaces, such as walls and lamp poles where feasible, and directing lighting away from ESHA. The Recommended Practices (RPs) of the Illuminating Engineering Society of North America (IES) shall be utilized for lighting levels

and quality of light.

II. Agricultural and Forestry Resources

None.

III. Air Quality

None.

IV. Biological Resources

Mitigation Measure IV-1: Amphibian Survey. If possible, restoration activities shall take place between July 15 and October 31, to minimize potential impacts to amphibian species noted in Section IV-a. If work must be completed during that time, a qualified biologist shall conduct surveys of all disturbance areas within the 50 feet of wetlands to verify absence of sensitive amphibian species. Surveys shall be conducted not more than two weeks prior to start of vegetation removal. If sensitive amphibian species are found during the survey, an appropriate buffer area shall be established until the dates of seasonal avoidance are reached (July 15 to October 31).

Mitigation Measure IV-2: Special Status Plant Avoidance. Areas of special-status plants shall be noted and marked by a qualified professional to ensure they are not trampled during construction. If any portion of the community is harmed, it shall be restored to a level sufficient to ensure no net loss of the target species five years after the completion of construction. If translocation and/or re-planting or re-seeding into appropriate habitat in the immediate project area is required for conservation, it shall be done by hand, by a qualified Biologist. Additionally, English Ivy shall be removed around sensitive-species to assist in improving those communities.

Mitigation Measure IV-3: Snag Habitat. Although no nesting birds were observed in the study area, and a minimal number of trees are slated for removal, the potential to impact special status bird species does exist. To minimize that potential future impact, the lowest 20-25 feet of trees slated for removal shall be retained to create snag habitat. If the lower 20-25 feet is still deemed a hazard to humans or animals, the entire tree shall be removed.

Mitigation Measure IV-4: Pre-Construction Nesting Surveys. If possible, vegetation clearing activities shall take place between August 16 and March 13, outside of the active nesting season for migratory bird species (i.e., March 15 to August 1). If work must be completed during the nesting season, a qualified biologist shall conduct preconstruction surveys of all ground disturbance areas and all trees adjacent to the Canopy Walk to verify absence of nesting migratory birds in the project area prior to vegetation removal and/or the start of construction. These surveys shall be conducted not more than two weeks prior to start of vegetation removal or any construction activities. If nesting migratory birds are found during the preconstruction surveys, an appropriate buffer area shall be established until the young birds have fledged. Buffers shall be 250-feet for raptors, 100-feet for threatened and endangered species, 50-feet for other special-status bird species; however, buffers may be modified after consultation with, and agreement by CDFW. If state listed California Endangered Species Act (CESA), federally listed Endangered Species Act (ESA), or raptors are found outside of but near the construction area, appropriate buffers shall be implemented. If non-listed state CESA, and/or non-listed federal ESA, including state species of special concern, are found near, but outside of the construction area, no buffers will be implemented.

Mitigation Measure IV-5: Coastal Bramble Replacement. Coastal Brambles removed by the Zoo expansion project shall be replaced 1:1. Where primitive trails are eliminated, *Rubus* species shall be

transplanted from the expansion area to those areas. Areas shall be monitored for 5 years to ensure vegetation survival and success of coastal bramble habitat creation, and trail removal revegetation. If the transplanted *Rubus* species does not survive, they shall be replaced with the same species.

Mitigation Measure IV-6: Large Root Avoidance. The foundations for the pipe supports for the ADA segment of the Canopy Walk shall be strategically located to minimize placement within the dripline and to avoid damage to the structural roots. Poles placement at a distance 3 times the trunk diameter away from the base of old growth trees shall be prioritized. If large structural roots are encountered, an attempt shall be made to realign or relocate the hole to avoid the root.

Mitigation Measure IV-7 – Tree Stability. To mitigate the potential impact of the horizontal loads, the suspended walkways shall be designed to be as light as possible. To reduce the horizontal loads, the walkways shall be as short and as narrow (2' to 3'-wide) as possible and the route shall be a one-way loop to minimize the number of people on the walkway at any one time. The trees shall be evaluated by engineers and arborists pre-construction to determine if the imposed loads will trigger a significant response. If deemed necessary by the arborists and/or engineers, guy wires shall be used to balance the horizontal loads. If guy wires are required, they shall be attached to the walkways and affixed to the ground with helical anchors. The suspended cables and guy wires shall have slack and shall not rigidly restrain the trees.

Mitigation Measure IV-8 – Bark Erosion. Netting or a rigid barrier shall be installed around the inner ring of the Canopy Walk platforms to prevent damage but still allow the public to see the trunk.

Mitigation Measure IV-9: Redwood Forest Alliance.

- a. A maximum number of trees shall be retained within the Zoo expansion area.
- b. Trails shall be realigned/relocated further from the base of old growth trees, where possible.
- c. Primitive (undesignated) trails shall be eliminated through native planting and mulching.
- d. Split rail fences and informative signs shall be installed to deter additional primitive trail creation and use.
- e. Invasive species shall be removed in areas near the Canopy Walk.
- f. English Ivy shall be removed from redwoods.
- g. Native redwood forest plants shall be planted to increase habitat and scenic resources.

V. Cultural Resources

Mitigation Measure V-1: Resource Discovery. If potential archaeological or paleontological resources are encountered during project subsurface construction activities or geotechnical testing, all work within 50 feet of the find shall be stopped, and a qualified archaeologist funded by the City of Eureka and approved by the City of Eureka shall be contacted to evaluate the find, determine its significance, and identify any required mitigation. The applicant shall be responsible for implementing the mitigation prior to construction activities being re-started at the discovery site.

Mitigation Measure V-2: Human Remains. In accordance with California Health and Safety Code Section 7050.5 and California Public Resources Code Sections 5097.94 and 5097.98, if human remains are uncovered during project construction activities, work within 50 feet of the remains shall be suspended immediately, and the City of Eureka Development Services Department (DSD) and Humboldt County Coroner shall be immediately notified. If the remains are determined by the Coroner to be Native American in origin, the Native American Heritage Commission (NAHC) shall be notified within 24 hours, and the guidelines of the NAHC shall be adhered to in the treatment and disposition of the remains.

VI. Geology and Soils

Mitigation Measure VI-1: Geotechnical Study. A California registered Geotechnical Engineer shall conduct a design-level geotechnical study for the project. The geotechnical study shall evaluate seismic hazards and provide recommendations to mitigate the effect of strong ground shaking; any unstable, liquefiable, or expansive soils; or settlement in adherence with current California Building Code (CBC) standards for earthquake resistant construction. The seismic criteria shall take into account the active faults in the Eureka area and beyond, and ground motions and shaking related to the faults shall be accounted. The study shall provide recommendations on grading, drainage, paving, and foundation design.

The project shall be designed and constructed in conformance with the specific recommendations contained in the design-level geotechnical study, including recommendations for grading, ground improvement, and foundation support. The recommendations made in the geotechnical study shall be incorporated into the final plans and specifications and implemented during construction. Professional inspection of foundation and excavation, earthwork and other geotechnical aspects of site development shall be performed during construction in accordance with the current version of the CBC.

VII. Greenhouse Gas Emissions

None.

VIII. Hazards and Hazardous Materials

None.

IX. Hydrology and Water Quality

Mitigation Measure IX-1: SWPPP. A SWPPP, to be implemented during construction, shall be submitted to the City of Eureka Public Works Stormwater Division and subject to approval by the NCRWQCB, and City of Eureka Building, Planning, Engineering, and Public Works Departments.

Mitigation Measure IX-2: Stormwater Detention. All post-construction stormwater shall be detained on site through capture and low impact development design.

X. Land Use and Planning

None.

XI. Mineral Resources

None.

XII. Noise

Mitigation Measure XII-1: Construction Hours. Construction activities shall be limited to the hours of 7:00 AM to 7:00 PM on weekdays and 8:00 AM to 6:00 PM on Saturdays, Sundays, and Holidays, except in emergencies.

XIII. Population and Housing

None.

XIV. Public Services

None.

XV. Recreation

See Biological Resources and Hydrology Mitigation Measures.

XVI. Transportation and Traffic

None.

XVII. Tribal Cultural Resources

Same as V-1 and V-2 Mitigation Measures.

XVIII. Utilities and Service Systems

None.

XIX. Mandatory Findings of Significance

None.

CHECKLIST AND EVALUATION OF ENVIRONMENTAL IMPACTS:

An explanation for all checklist responses is included, and all answers take into account the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts. The explanation of each issue identifies (a) the significance criteria or threshold, if any, used to evaluate each question; and (b) the mitigation measure identified, if any, to reduce the impact to less than significant. In the checklist below the following definitions are used:

“Potentially Significant Impact” means there is substantial evidence that an effect may be significant.

“Less than Significant with Mitigation Incorporated” means the incorporation of one or more mitigation measures can reduce the effect from potentially significant to a less than significant level.

“Less Than Significant Impact” means that the effect is less than significant and no mitigation is necessary to reduce the impact to a lesser level.

“No Impact” means that the effect does not apply to the proposed project, or clearly will not impact nor be impacted by the project.

I. AESTHETICS. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?			✓	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?				✓
c) Substantially degrade the existing visual character or quality of the site and its surroundings?		✓		
d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?		✓		
<p><u>THRESHOLDS OF SIGNIFICANCE:</u> This Initial Study considers whether the proposed project may have any significant effects on visual aesthetics because of: (a) the short-term or long-term presence of project-related equipment or structures; (b) project-related changes in the visual character of the project area that may be perceived by residents or visitors as a detraction from the visual character of the project area; (c) permanent changes in physical features that would result in the effective elimination of key elements of the visual character of the project area near a State scenic highway; or (d) the presence of short-term, long-term, or continuous bright light, such as from welding or nighttime construction, that would detract from a project area that is otherwise generally dark at night or that is subject to artificial light.</p>				
<p><u>DISCUSSION:</u> The primary scenic resource is the forest that the Zoo is built within, and the area outside of the current footprint where expansion will happen. The expanded footprint of the Zoo will be for the purposes of education about the forest and the species who depend on it, exploration of the forest from the root zones all the way into the canopy, and to provide exhibit space for native predators who are orphaned and injured wild animals; animals who reside in forests similar to the redwood dominant mixed stand that encircles the project area.</p>				
<p>I a) The scenic resources would be minimally altered, yet also enhanced, as visitors to the new exhibit areas will have expanded scenic vistas into the canopy of the forest and from the canopy down into the gulches that surround the project area. This scenic view, at a height of 75’ above the forest floor will give visitors a fully immersive experience into a redwood forest. Therefore, the impact is less than significant.</p>				
<p>I b) This project is not visible, or adjacent to, any scenic highway or thoroughfare. No impact will occur.</p>				
<p>I c) Implementation of the project would not block or alter any of the existing views noted previously and will have minimal impact to existing vistas. There will be visual change due to the placement of canopy walk attachments that make the site accessible at the canopy walk level. Yet, the project will result in newly restored forest floor areas and re-alignment and removal of illegal trails that have degraded both scenic and natural resources. Lastly, enhancement of scenic vistas into the forest is a hallmark of this project as visitors will have new vistas at a height of 75-feet to see deeper into the forest at multiple levels.</p>				
<p>Certain elements of the Redwood Canopy Walk may have an aesthetic impact on park visitors utilizing the adjacent areas of Sequoia Park. The ADA accessible segment of the canopy walk will be</p>				

supported by pipes/posts between 20' and 30'-tall. The cable-suspended walkways, platforms, and guy wires will also add unnatural elements to the redwood forest that will be viewed from below, by visitors to Sequoia Park. Materials will be chosen for strength, durability, light-weight, and aesthetics. All hardware will be galvanized, stainless steel, or ceramic coated. Wood products will be used for the ADA accessible segment and portions of the cable-suspended bridges. Cable suspended walkways will be composed of wood framing, steel nets, and fiberglass or wood walkways. In order to minimize the scenic impact to Park visitors, multiple camouflaging techniques will be used (**Mitigation Measure I-1: Canopy Walk Aesthetics**). Similar camouflaging techniques are commonly used to disguise cell towers. This will reduce the impact to existing visual character or quality of the site to a less than significant level.

I d) No additional sources of glare or artificial lighting that may contribute a new source of substantial glare are planned within the forest that surrounds the expanded footprint of the zoo project area. There will be limited lighting for safety purposes and for animal holding and treatment facilities, which will be only available to park personnel and for special event participants, as the zoo and park both close at dusk. Light will be downcast and designed to protect wildlife and nighttime views, including views of the night sky (**Mitigation Measure I-2: Light**). Therefore, the impact will be less than significant.

FINDINGS: Based on the discussion above, the project will not result in significant adverse aesthetic impacts that could not be reduced to a less-than-significant level with incorporation of mitigation. While there will be less than significant aesthetic impacts, the project is expected to improve aesthetics and visitor access to scenic vistas in the project area.

MITIGATION MEASURES:

Mitigation Measure I-1: Canopy Walk Aesthetics. The surface of canopy walk pipes/posts shall be camouflaged with texture and color to match the forest surroundings, and artificial branches may be attached. The structural elements of the walkways (such as cables, fasteners, and planking) shall be painted to reduce their reflective qualities and to blend with the forest colors. If guy-wires are required to balance the horizontal loads from the cable-suspended walkways, the wires shall be minimized in length, hidden from view, and camouflaged, to the extent possible.

Mitigation Measure I-2: Light. All new sources of light, including outside night lighting associated with construction, shall be designed to protect wildlife and nighttime views, including views of the night sky. This design goal shall be satisfied using a variety of means, including but not limited to fixture types, cut off angles, shields, lamp arm extensions, and pole heights. Specific designs shall include directing light downward, away from adjoining properties, avoiding brightly illuminated vertical surfaces, such as walls and lamp poles where feasible, and directing lighting away from ESHA. The Recommended Practices (RPs) of the Illuminating Engineering Society of North America (IES) shall be utilized for lighting levels and quality of light.

II. AGRICULTURE RESOURCES. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				✓
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				✓
c) Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?				✓
d) Result in the loss of forest land or conversion of forest land to non-forest use?				✓
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?				✓

THRESHOLDS OF SIGNIFICANCE: This Initial Study considers to what degree the proposed project would: (a) change the availability or use of agriculturally important land areas designated under one or more of the programs above; (b) cause or promote changes in land use regulation that would adversely affect agricultural activities in lands zoned for those uses, particularly lands designated as Agriculture Exclusive or under Williamson Act contracts; (c) change the availability or use of agriculturally important land areas for agricultural purposes; (d) convert forest land to non-forest use; or (e) involve other changes which could convert farmland to non-agricultural use or convert forest land to non-forest use.

DISCUSSION:

II a, b, c, e) The project area has no Important Farmlands as mapped by the Farmland Mapping and Monitoring Program of the California Department of Conservation. There is no land in agricultural production, land zoned for agricultural use, land designated (General Plan Land Use) for agriculture use, or land under Williamson Act contract within the project area or in the vicinity. No impact has been identified

II d) Some portions of the project are partially located in forested park lands that are operated as a City Park. The lands in question are not zoned for timber production or habitat protection; the lands are zoned “Public” and intended to be used for park and recreation purposes. The project will not result in the substantial loss or conversion of the forested park lands beyond any threshold of significance. The forested lands that will be affected are within an established City park and zoo, and will continue to serve as a public park and zoo upon completion of the project; therefore, no conversion or loss of forest lands will occur.

The project does include the removal of a limited number (5-25) of trees in order to increase safety for park visitors and exhibit animals. Grand firs (*Abies grandis*) infected with *Armellaria ostoyae* represent the majority of the trees slated for removal. *Armillaria ostoyae* has killed several grand firs within the project area, and caused several others to decline which will end in eventual

mortality. Trees that pose a safety risk, as determined by a professional arborist, will be removed. If possible, the lowest 20-15 feet of some trees will be retained to create snag habitat and to ensure that the forest soils left intact (see Biological section and Mitigation Measure IV-2 – Snag Habitat for more information).

FINDINGS: The project would have no impact on farm land, agricultural lands, or forest land and no mitigation is required.

III. AIR QUALITY. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?			✓	
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?			✓	
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?			✓	
d) Expose sensitive receptors to substantial pollutant concentrations?			✓	
e) Create objectionable odors affecting a substantial number of people?			✓	

THRESHOLDS OF SIGNIFICANCE: This Initial Study considers to what degree the proposed project would (a) directly interfere with the attainment of long-term air quality objectives identified by the North Coast Unified Air Quality Management District (NCUAQMD); (b) contribute pollutants that would violate an existing air quality standard, or contribute to a non-attainment of air quality objectives in the project’s air basin; (c) produce pollutants that would contribute as part of a cumulative effect to non-attainment for any priority pollutant; (d) produce pollutant loading near identified sensitive receptors that would cause locally significant air quality impacts; or (e) release odors that would affect a number of receptors.

DISCUSSION:

III a, b) The project site is located within the North Coast Air Basin (NCAB), which is under the jurisdiction of the North Coast Unified Air Quality Management District (NCUAQMD). The NCAB is comprised of three air districts, the NCUAQMD, the Mendocino County AQMD, and the Northern Sonoma County Air Pollution Control District (APCD). The North Coast AQMD includes Del Norte, Humboldt, and Trinity Counties; the Mendocino County AQMD consists of Mendocino County; and the Northern Sonoma County APCD comprises the northern portion of Sonoma County. The NCAB currently meets all federal air quality standards; however, the entire air basin is currently designated as non-attainment for the state 24-hour and annual average particulate matter smaller than 10 microns in size (PM10) standards. The air basin is designated as unclassified for the state annual PM2.5 standard – available data are insufficient to support designation as attainment or non-attainment. Both natural and anthropogenic sources of particulate matter (including vehicle

emissions, wind generated dust, construction dust, wildfire and human caused wood smoke, and sea salts) in the NCAB have led to the PM10 non-attainment designation.

To address non-attainment for PM10, the NCUAQMD adopted a Particulate Matter Attainment Plan in 1995. This plan presents available information about the nature and causes of PM10 standard exceedances and identifies cost-effective control measures to reduce PM10 emissions to levels necessary to meet California Ambient Air Quality Standards.

Once in full operation, the project would indirectly generate minimal air emissions due to increased vehicle trips to the site (see Transportation section). The project would temporarily generate a minor amount of particulate emissions over the duration of construction in the form of dust and vehicle emissions as a result of earthwork, grading, paving, and other construction activities. The project would not cause any long-term regional scale increase in the emissions of particulate matter or other air pollutants. To further reduce potential impacts to air quality to a level below the thresholds of significance, state law requires the construction contractor to operate in accordance with Air Quality Regulation 1 – Air Quality Control Rules, which will reduce potential fugitive dust emission impacts. These rules and regulations are set forth to achieve, maintain, and protect health-based State and Federal Ambient Air Quality Standards and prevent deterioration of levels of air quality which may jeopardize human health and safety; prevent injury to plant and animal life; avoid damage to property; and preserve the comfort, convenience, and enjoyment of the natural attractions of the NCAB.

Pursuant to Air Quality Regulation 1, Chapter IV, Rule 400 – General Limitations, a person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health or safety of any such persons or the public or which cause or have a natural tendency to cause injury or damage to business or property. Visible emissions include emissions that are visible to the naked eye, such as smoke from a fire. The project is not expected to produce any source of visible emissions except for minimal dust due to site-grading discussed above. This potential impact would be reduced to a less than significant level by adherence to the NCUAQMD's rules and regulations as noted above.

The project will not result in adverse air quality impacts including exceeding or violating an air quality plan.

III c) The closest air basin monitoring station to the project site is located in Eureka at 529 I Street, approximately two and one-half miles west of the project alignment. For the purposes of this analysis, the I Street monitoring station data is considered reflective of the project site. From 2009-2011, data collected at the monitoring station exceeded the California 24-hour PM10 standard of 50 micrograms per cubic meter on average six days per year (there was insufficient, or no data published for 2012). In addition, data collected at the monitoring station exceeded the California three-year average standard greater than 20 micrograms per cubic meter for years 2009 through 2012 (CARB 2010).

The construction activities associated with the proposed project will result in temporary emissions of diesel and gasoline engine combustion products and earthen dust. The project involves a relatively low level of construction activity, limited in scope and duration, with respect to air quality, and the net increase to PM10 will be minor and temporary. These ordinary construction emissions will not

result in violations or attainment plan conflicts. Although minor potential impacts are expected, they will be less than significant with adherence to the NCUAQMD's rules and regulations.

Once in full operation, the project may result in an increased number of vehicle trips to the project vicinity to visit the Zoo (see Section XVI Transportation for further discussion on increased traffic). When viewed together with background vehicle emission levels, and considering that any increase in motor vehicles trips is likely to cause a corresponding increase in non-motorized activity at the site, PM₁₀ emissions related to the project are expected to be less than significant. The proposed project would not obstruct implementation of the NCUAQMD Particulate Matter Attainment Plan, violate air quality standards, or contribute substantially to an existing or projected air quality violation.

Given the relatively small footprint of the project, short duration of motorized construction activities, and limited use of machinery and equipment it is not anticipated that construction activities would result in PM₁₀ emissions above the de minimis threshold (100 tons per year). It is also not anticipated that any of the other criteria pollutants would be emitted at a significant level. Therefore, impacts would be less than significant.

III d) Activities occurring near sensitive receptors should receive a higher level of preventative planning. Sensitive receptors include school-aged children (schools, daycare, playgrounds), the elderly (retirement community, nursing homes), the infirm (medical facilities/offices), and those who exercise outdoors regularly (public and private exercise facilities, parks). Sensitive receptors adjacent to, or near, the project alignment, include residences along Glatt Street (100+ feet from the project site) and school-aged children at Washington Elementary School (0.2 miles from the project site). The NCUAQMD has advised that, generally, an activity that individually complies with the state and local standards for air quality emissions will not result in a cumulatively considerable increase in the countywide PM₁₀ air quality violation. Therefore, staff concludes that with the required compliance with NCUAQMD standards and regulations, the project will not result in adverse air quality impacts, nor result in a cumulatively considerable increase in the PM₁₀ non-attainment status.

III e) The project would not create odors that could reasonably be considered objectionable by the general public because no aspect of project construction is anticipated to create objectionable odors except for limited exhaust fumes from diesel powered equipment. Therefore, impacts would be less than significant.

FINDINGS: Based on the conclusions above and adherence to the NCUAQMD's rules and regulations, the project will not result in any significant adverse air quality impacts, nor result in a cumulatively considerable increase in PM-10 emissions; therefore, impacts would be less than significant. No mitigation measures are required.

IV. BIOLOGICAL RESOURCES. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		✓		
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		✓		
c) Have a substantial adverse effect on Federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?			✓	
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?			✓	
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?			✓	
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan?				✓

THRESHOLDS OF SIGNIFICANCE: This Initial Study considers whether the proposed project would result in significant adverse direct or indirect effects to: (a) individuals of any plant or animal species (including fish) listed as rare, threatened, or endangered by the Federal or State government, or effects to the habitat of such species; (b) more than an incidental and minor area of riparian habitat or other sensitive habitat (including wetlands) types identified under Federal, State, or local policies; (c) more than an incidental and minor area of wetland identified under Federal or State criteria; (d) key habitat areas that provide for continuity of movement for resident or migratory fish or wildlife, (e) other biological resources identified in planning policies adopted by the City of Eureka; or (f) conflict with an applicable conservation plan.

DISCUSSION: This discussion is based on information from the following sources: the SHN Engineers & Geologists 2017 Natural Resource Assessment conducted for the project, California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDDB) search and California Native Plant Society’s (CNPS) Inventory of Rare and Endangered Vascular Plants, and U.S. Fish and Wildlife Service (USFWS) Information for Planning Conservation (IPaC) and Critical Habitat Portal (Appendix B). Table IV-1 and IV-2 identifies sensitive species which have the potential to be present within the project area.

Botanical/biological surveys and habitat assessments were conducted on April 18 and July 28, 2017. These site visits included seasonally appropriate floristic surveys, with an attempt to identify all species present within the project-related area of potential effects, including possible species of special concern. In addition to surveying for target species, a list of all botanical and wildlife species encountered was compiled (Appendix B). Plants were identified to the lowest taxonomic level possible to distinguish special status species from others.

The proposed Zoo expansion area will occur within previously disturbed areas which are already impacted by human activities and land use within Sequoia Park (see Figure 3 for study area and natural resources). It is characterized by mature second growth redwood forest, with trails in various stages of disrepair, throughout the area. The Sequoia Park Zoo makes up the eastern boundary of the study area, while the western portion of the study area drops steeply into a ravine within the center of Sequoia Park. The Ravine wraps around the majority of the study area, and represents the edge of the proposed project. Urban development surrounds Sequoia Park with more dense development to the north and west, and development density becoming less to the east and south.

The majority of the study area is composed of the Sequoia sempervirens Forest, with redwoods constituting over 50 percent of the relative cover and Douglas fir (*Pseudotsuga menziesii*), Sitka spruce (*Picea sitchensis*), and grand fir (*Abies grandis*) as lesser co-dominants. Within riparian and mesic locations of this vegetation stand, red alder (*Alnus rubra*) and bigleaf maple (*Acer macrophyllum*) are also present within the tree stratum. The shrub and herb layer within this stand is dominated by evergreen huckleberry (*Vaccinium ovatum*), false lily of the valley (*Maianthemum dilatatum*), large fairy bells (*Prosartes smithii*), redwood sorrel (*Oxalis oregana*), and western sword fern (*Polystichum munitum*), with additional dominance by the invasive English ivy (*Hedera helix*).

The central portion of the study area has a break in the redwood canopy allowing for the development of *Rubus* (*parviflorus*, *spectabilis*, *ursinus*) shrubland alliance (coastal brambles), with thimbleberry, salmonberry, or California blackberry exhibiting over 50 percent cover, with dominance varying between the three species. Lesser dominant species included canyon gooseberry (*Ribes menziesii*), Henderson's sedge (*Carex hendersonii*), inside-outflower (*Vancouveria planipetala*), and the false lily of the valley. The *Rubus* (*parviflorus*, *spectabilis*, *ursinus*) shrubland alliance patches may represent a transitional vegetation community, with encroaching tree species eventually shading out the *Rubus* patches, except in areas that are cleared or opened by tree blow-downs.

Common wildlife species expected on the site are those typically associated with deciduous riparian forests, urban landscapes, coniferous forests, and urban/wildland interfaces of northwestern California. Wildlife species observed at the site included common raven (*Corvus corax*), American robin (*Turdus migratorius*), song sparrow (*Melospiza melodia*), turkey vulture (*Cathartes aura*), and Pacific tree frog (*Pseudacris regilla*). Other wildlife species are likely to inhabit the surrounding area and it is expected that there are many other bird, mammal, and amphibian species that might use the project site, if only transitionally. However, human activities within the project site may limit the abundance of a variety of birds and animals.

IV a) Plants - Based on a review for special status plant species, 49 special status plant species have been reported from the region consisting of the site's quadrangle and the surrounding quadrangles. Of the special status plant species reported for the region, 39 plant species are considered to have a low potential to occur at the project site and 10 species have a moderate or higher potential (listed below in Table IV-1 Sensitive Plant Species Potentially Present). Site investigations were conducted on April 18 and July 28, which is considered an optimal time for detecting potentially occurring listed species.

Table IV-1: Sensitive Plant Species Potentially Present

Scientific Name	Common Name	Status (R Plant Rank)	General Habitat	Micro-Habitat	Potential of Occurrence
<i>Chrysosplenium glechomifolium</i>	Pacific golden saxifrage	4.3	North Coast coniferous forest, riparian forest	Streambanks, sometimes seeps, sometimes roadsides. 10-220 m.	Present
<i>Erythronium revolutum</i>	coast fawn lily	2B.2	Bogs & fens, broadleaf upland forest, north coast conifer forest.	Mesic sites; streambanks. 60-1405 m.	Moderate, not detected
<i>Fissidens pauperculus</i>	minute pocket moss	1B.2	North coast coniferous forest, Redwood.	Grows on damp soil along the coast. In dry streambeds & on stream banks. 10-1024 m.	Moderate, not detected
<i>Listera cordata</i>	heart-leaved twayblade	4.2	Lower montane conifer forest, north coast conifer forest.	Bogs and fens, 5-1370 m.	Moderate, not detected
<i>Lycopodium clavatum</i>	running-pine	4.1	Lower montane conifer forest, north coast conifer forest, marsh & swamp.	Forest understory, edges, openings, roadsides; mesic sites with partial shade and light. 45-1225 m.	Moderate, not detected
<i>Mitellastrca caulescens</i>	leafy-stemmed mitrewort	4.2	Broadleaf upland forest, lower montane conifer forest, meadow & seep, N. coast conifer forest.	Mesic sites. 5-1700 m.	Moderate, not detected
<i>Monotropa uniflora</i>	ghost-pipe	2B.2	Broadleaved upland forest, north coast conifer forest.	Often under redwoods or west hemlock. 15-855 m.	Moderate, not detected
<i>Montia howellii</i>	Howell's montia	2B.2	Meadows and seeps, north coast coniferous forest, vernal pools.	Vernally wet sites; often on compacted soil. 10-1005 m.	High, not detected
<i>Pleuropogon refractus</i>	nodding semaphore grass	4.2	Meadow & seep, low montane conifer forest, N. coast conifer forest, riparian forest.	Mesic sites along streams, grassy flats in shaded redwood groves. 0-1600 m.	High, detected adjacent to project site
<i>Usnea longissima</i>	Methuselah's beard lichen	4.2	North coast coniferous forest, broadleaf upland forest.	In the "redwood zone" on tree branches of a variety of trees, incl. big leaf maple, oaks, ash, Douglas-fir, and bay. 45-1465 m in California.	Moderate, not detected

Site investigations located populations of two listed plant species within and adjacent to the project area. The pacific golden saxifrage was observed within the seasonal waterways and associated wetlands surrounding the project area (see Figure 3). The nodding semaphore grass was observed

adjacent to the project area; however, the small population is approximately 80-feet to the west of the edge of the project area and will not be impacted by this project.

Pacific golden saxifrage is susceptible to trampling and encroachment by non-native vegetation as well as changes in hydrology. Potential impacts from this project include trampling during construction of the canopy walk over the drainages, and introduction of additional non-native species. The project is not anticipated to impact this species with the implementation of **Mitigation Measure IV-1 – Special Status Plant Avoidance**. These avoidance measures will reduce potential impacts to this plant to a less than significant level.

Wildlife - Based on a review of special status animal species, 51 special status animal species have been reported with the potential to occur in the project region. Of the special status animal species potentially occurring in the region, 43 animal species are considered to have a low potential to occur at the project site and 8 species have a moderate to high potential (listed below in Table IV-2 Sensitive Wildlife Species Potentially Present).

Table IV-2: Sensitive Wildlife Species Potentially Present

Scientific Name	Common Name	Fed/State Listed	General Habitat	Micro-Habitat	Potential of Occurrence
<i>Accipiter cooperii</i>	Cooper's hawk	F=None S=None, WL	Cismontane woodland Riparian forest Riparian woodland. Upper montane conifer forest Woodland, chiefly of open, interrupted or marginal type.	Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also, live oaks.	High
<i>Accipiter striatus</i>	sharp-shinned hawk	F=None S=None, WL	Cismontane woodland, lower montane conifer forest, riparian forest, riparian woodland Ponderosa pine, black oak, riparian deciduous, mixed conifer & Jeffrey pine habitat. Prefers riparian.	North-facing slopes, with plucking perches are critical requirements. Nests usually within 275 ft of water.	High
<i>Falco peregrinus anatum</i>	American peregrine falcon	F=Delisted S=Delisted, FP	Many open habitats, however, more likely along coastlines, lake edges, mountain edges. Near wetlands, lakes, rivers, or other water; on cliffs, banks, dunes, mounds; also, human-made structures.	Nest consists of a scrape or a depression or ledge in an open site.	Moderate
<i>Pandion haliaetus</i>	osprey	F=None S=None, WL	Riparian forest. Ocean shore, bays, freshwater lakes, and larger streams.	Large nests built in tree-tops within 15 miles of a good fish-producing body of water.	Present
<i>Strix occidentalis</i>	northern spotted owl	F=T S=SSC	North coast conifer forest, Old growth	High, multistory canopy dominated by big trees,	Moderate

<i>caurina</i>	(NSO)		Redwood Old-growth forests or mixed stands of old growth & mature trees. Occasional in younger forests w/ patches of big trees.	many trees w/cavities or broken tops, woody debris & space under canopy.	
<i>Rana aurora</i>	northern red-legged frog	F=None S=None, SSC	Klamath/N. coast flowing waters, riparian forest, riparian woodland. Humid forests, woodlands, grasslands, & streamsides in NW California, usually near dense riparian cover.	Generally near permanent water, but can be found far from water, in damp woods and meadows, during nonbreeding season.	High
<i>Rhyacotriton variegatus</i>	southern torrent salamander	F=None S=None, SSC	Lower montane conifer forest, old-growth, redwood forest, riparian forest. Coastal redwood, Douglas fir, mixed conifer, montane riparian and montane hardwood-conifer habitats. Old growth forest.	Cold, well-shaded, permanent streams and seepages, or within splash zone or on moss-covered rock within trickling water.	Moderate
<i>Bombus occidentalis</i>	western bumble bee	None	Once common & widespread, species has declined precipitously from central CA to southern B.C., perhaps from disease. Pollinates a wide variety of flowers. Will gnaw through flowers to obtain nectar their tongues are too short to reach.	Nest in cavities or abandoned burrows.	Moderate
<p>Species indicator status as assigned by Federal Endangered Species Act (FESA), California Endangered Species Act (CESA), and California Department of Fish and Wildlife (CDFW)</p> <p>F: Federal Listed FP: Fully Protected S: State Listed SSC: Species of Special Concern T: Threatened WL: Watch List</p>					

Birds – There is the potential for special status bird species to be impacted by the proposed project since several medium to large diameter trees will be removed as part of the expansion project, while some trees will be used to attach the canopy walk and will have platforms located around the trunk. Those areas represent potential nesting habitat and will be subject to disturbance from the Canopy Walk. The following are birds with moderate to high potential to occur on site:

- Although habitat may exist locally for the Cooper's hawk (*Accipiter cooperii*), it was not detected within the study area. Project-related activities could impact this species due to proposed removal of trees, and increased disturbance due to the presence of the canopy walk

within potential nesting habitat. However, it is anticipated that the trees used for the Canopy Walk will remain unusable for this species and the relatively small number of trees scheduled to be removed for the expansion, or used for the canopy walk, are not anticipated to have a large cumulative impact on this species within Sequoia Park.

- The sharp-shinned hawk (*Accipiter striatus*) was not detected within the study area. Project-related activities are not anticipated to have a significant impact on this species or its habitat as large diameter trees will be left intact, and vegetation clearing will occur outside the migratory bird nesting season.
- The American peregrine falcon (*Falco peregrinus anatum*) prefers open areas and was not found during site surveys. It will not be impacted by the removal of trees associated with this project.
- The osprey (*Pandion haliaetus*) occurs near rivers, lakes, and coast where large numbers of fish are present. Ospreys are most common around major coastal estuaries and salt marshes. This species was detected flying over the study area on two occasions, indicating that suitable habitat is available nearby. The area within the study area represents potential nesting habitat, although more suitable nesting sites occur nearer to waterways, such as Ryan Slough. Because of the presence of more suitable nesting habitat nearer to waterways outside of the city, it is not expected that project-related activities will have a significant impact on this species or its habitat. Any tree removal and vegetation clearing will occur outside the migratory bird nesting season.
- Two Northern Spotted Owl (NSO) surveys were conducted (on May 25th & June 1st) that resulted in no NSO response or detection. It was noted at almost every Call Station during those surveys that there were significant amounts of ambient road/traffic noise, dogs barking, people talking, and other assorted human related disturbances and activities associated with an urban setting. USFWS recommended a third NSO survey and provided no NSO detections occurred, the USFWS would make a determination on the activities being proposed by the Eureka Sequoia Park Zoo. A third NSO Survey Visit was conducted on July 1, 2017. No NSO's were observed or detected. The stands of timber adjacent to the west of the Zoo are young, even aged stands that are comprised of dense understory and no decent flight paths and offered no vertical thermal relied strata and are therefore considered very poor Northern Spotted Owl habitat.

Due to the relatively small number of trees scheduled to be removed for the expansion or used for the canopy walk, this project is not anticipated to have a large cumulative impact on special status bird species potentially occurring within Sequoia Park. Impacts will be minimized by retaining a maximum number of large diameter trees and the lowest 20-25 feet of trees slated for removal will be retained to create snag habitat (**Mitigation Measure IV-2 – Snag Habitat**). No nesting birds were observed during the site visits by the biologist, however, to ensure this project does not impact nesting birds, vegetation clearing will occur outside of the nesting season (**Mitigation Measure IV-3 – Pre-Construction Nesting Surveys**). The existing use and high level of human traffic within the park make it increasingly less likely that the expansion and canopy walk will have a significant impact on bird species acclimated to high level of background noise and disturbance. There is no proposed change to the Zoo's hours of operation. It is currently open from 10 a.m. to 5 p.m. seven days per week in the summer. The winter time hours are the same, except that on Mondays, the zoo is open from 12 p.m. to 4 p.m.

Mammals – Special status mammals are not likely to be affected by the proposed project. No listed mammal species are expected to occur within the study area. The fragmented nature of the forest

present within Sequoia Park and the location of the park within an urban setting limit the potential for the Humboldt martin (*Martes caurina humboldtensis*), the fisher (*Pekania pennanti*), the white-footed vole (*Arborimus albipes*), and the Sonoma tree vole (*Arborimus pomo*). Constant disturbance due to human use of the park further diminishes the potential for the occurrence of these species.

Amphibians – Northern red-legged frog (*Rana aurora*) and southern torrent salamander (*Rhyacotriton variegatus*) habitat may exist locally for this species, however, it was not detected within the study area. Special status amphibians are not likely to be affected by the proposed project since all construction and facilities development is located outside the 50-ft wetland buffer as shown on Figure 3. Restoration efforts such as invasive plant (English Ivy) removal may occur within the 50-foot buffers. These efforts within riparian and seasonally wet areas will occur between July 15 and October 31 to minimize potential impacts to amphibians. If restoration action must occur outside that date range, a qualified professional will survey the area, two weeks prior to activities, for sensitive amphibians. If found, appropriate buffers will be established (**Mitigation Measure IV-1**).

Fish – Special status fishes are not likely to be affected by the proposed project. The study area does not include any streams, or waterways capable of supporting any fish species. Wetlands and seasonal waterways will be avoided and will be protected by a 50-foot buffer. Invasive plant removal will occur within the 50-foot buffer in order to improve the degraded habitat.

Reptiles – Special status reptiles are not likely to be affected by the proposed project. No habitat exists within or immediately adjacent to the project area for the western pond turtle.

Insects – The western bumblebee pollinates a wide variety of flowers and is known to frequent cultivated flower beds. Although habitat may exist within the area surrounding the study area for this species, it was not detected within the study area. Project-related activities are not anticipated to have a significant impact on this species or its habitat. This species prefers abundant flowering plants that are found within sunny areas and not within dense forested areas and will not be impacted by the removal of trees associated with this project.

No special-status animals or plants are expected to be impacted by the proposed project. To reduce impacts to special status plants (Pacific golden saxifrage) to a less than significant level **Mitigation Measure IV-2** will be implemented. To reduce potential impacts to special status or nesting/migratory birds **Mitigation Measure IV-3 and Mitigation Measure IV-4** will be implemented and during project construction.

IV b) Sensitive natural communities are habitats that are generally defined by vegetation type and geographical location and are increasingly restricted in abundance and distribution. Two natural communities (defined as vegetation alliances) were identified within the study area (Figure 3). The majority of the study area is composed of the *Sequoia sempervirens* (Redwood forest) Alliance (G3 S3). The central portion of the study area is less densely forested, was composed of the *Rubus (parviflorus, spectabilis, ursinus)* shrubland (coastal brambles) Alliance (G4 S3).

The *Rubus (parviflorus, spectabilis, ursinus)* shrubland Alliance (coastal brambles) community within the study area, is composed of varying dominance by thimbleberry (*Rubus parviflorus*), salmonberry (*Rubus spectabilis*), and California blackberry (*Rubus ursinus*). Portions of this

vegetation community are quite dense; however, several unofficial foot trails bisect this community. Currently, this vegetation community exists within a relatively open area with reduced canopy cover and increased sunlight penetration, and is slated to be developed for the Zoo expansion (Figure 3). Over half of this community is in proposed location for the Native Predators black bear/coyote exhibit. This exhibit will highlight the North Coast's native predators and the important roles they play in our ecosystem. Since the ideal habitat for these animals is the existing native vegetation, the majority of the existing plants will be kept. Certain plants will be removed to accommodate the realignment of the perimeter trail and Zoo boundary fence. Any coastal bramble that will be removed, will be replaced at a ratio of 1:1. The project's impacts on this community will be mitigated to a less than significant level through the implementation of **Mitigation Measure IV-5 - Coastal Bramble** replacement.

Within the study area, this *Sequoia sempervirens* (Redwood forest) Alliance community is composed of second- and old-growth redwood with several developed areas containing recreation trails and access roads. Project-related activities are anticipated to impact individual trees but not cumulatively impact the community. A risk assessment will be conducted to evaluate the health of trees near the Zoo expansion. Redwood that are considered hazardous will be pruned or removed to increase safety for park visitors and exhibit animals. If possible, the lowest 20-25 feet will be retained to create snag habitat and to keep the forest soils intact (Mitigation Measure IV-2). Non-defensive arborist techniques will be used if possible. If pruning is necessary, the percentage of area needed for photosynthesis will be taken into account.

As described in the Project Description section, the ADA accessible portion of the Canopy Walk will be supported by a series of free-standing, steel or fiberglass reinforced polymer (FRP) pipes/posts with concrete foundations embedded into the forest floor. The foundations may include helical piers with concrete footing caps or drilled pilings (pipes set in concrete-filled holes). The helical piers consist of a 1½" -2" diameter steel shaft with 4" - 6" steel, helical flights. They are drilled into the ground like a corkscrew. A concrete footing (approximately 24" x 24" x 24") will be poured on top of the helical piers to provide a connection between the helical piers and the support pipes. The drilled pilings will consist of an approximately 24" diameter hole, up to 15' deep, filled with concrete, into which the pipe is set. Final foundation design will be prepared during the final Project design process.

Drilling and excavating into the forest floor may cut through large structural and fine fibrous (feeder) roots associated with each tree. Impact to the fine fibrous roots is less significant as they will readily grow back. The size of the areas that will be disturbed and the potential impact are considered to be an insignificant considering the overall amount of biomass underground. However, cutting through enough large structural roots near the base of the trees could destabilize the trees. The helical piers tend to work their way through and around root masses rather than cutting through them. The drilled pilings would cut a hole approximately 24" in diameter to the design depth. These structural roots are typically within the dripline of the tree and most critical near the base. In order to minimize impact to tree roots **Mitigation Measure IV-6**, strategic pole placement to avoid large roots, will be implemented. These poles will be strategically placed at least 6 feet from large redwood tree bases.

The cable-suspended walkways of the Canopy Walk will be directly attached to trees. The City and Zoo Foundation consulted with a number of certified arborists, canopy biologists, canopy walk and adventure park developers, engineers, designers, and builders during the development of this

Project, and in the evaluation of the potential impacts, and in the design of mitigation measures. A day-long design charrette was conducted to evaluate the conceptual design. Letters from two of the credentialed attendees can be viewed in Appendix C. The proposed design is based on expert opinion, and is the least impactful option.

The project team determined the use of choker cables or tree collars is an unacceptable design that would negatively impact the tree. Tree attachment bolts (TAB) were determined to be the least damaging method of tree attachment (see Project Description). This technique includes drilling holes into or through the trees. The holes are filled with the stainless steel or coated steel rods and washers or Tree Attachment Bolts (TABs). This state-of-the-art hardware is designed to transfer the imposed loads into the structural core of the tree while minimizing the impacts to the live cambium and bark layers. The TAB system allows the tree to seal the hole and continue to grow around the protruding bolt. There are numerous examples of the successful use of TABs in a variety of tree types including redwood. Trees in general and redwoods in particular are very good at compartmentalizing wounds and minimizing the damage to the overall health of the tree.

The cable-suspended walkways and platforms could impose horizontal and vertical loads on the trees as well as restricting their free movement as they respond to wind. The vertical loads imposed by wrap-around platforms and the live and dead loads of the walkways are transferred down through the trunk into the roots. These loads will be insignificant when compared to the loads from the tree itself and the typical wind-loads present in the forest. The horizontal loads will tend to draw the trees toward each other. The trees will respond to an imposed load by growing back against it to regain a neutral, balanced position. A concern is that the trees will adjust to compensate for the loads and if the loads are removed (cables snap) the tree could rebound and topple over backwards. Many design features have been included to mitigate the potential impact of the horizontal loads (**Mitigation Measure IV-7 – Tree Stability**).

Each tree that comprises the Canopy Walk will have a platform attached. Placement and design will allow space for tree growth and movement. Close human contact with the tree at each platform could result in scuffing and erosion of the bark. Visitors could lean against and touch the bark. These actions could result in erosion of the bark down to the cambium layers. **Mitigation Measure IV-8** will be in place to ensure the impact to the bark is minimized. The cable suspended walkway has been designed as a one-way circuit, and a limited number of visitors will be allowed on each span at a time. The cable-suspended walkways will only be attached to second growth redwood trees. No portion of the Canopy Walk will attach to old growth redwoods.

To improve and ensure forest community health and to mitigate impacts to individual trees, **Mitigation Measure IV-9 – Redwood Forest Alliance** will be implemented.

Canopy habitat within the old-growth redwood canopy may occur within the project area. While canopy habitat within old-growth redwoods is not specifically listed as a special status habitat type, its limited distribution within select remaining old-growth redwood forest canopies warrants mention. The few remaining old-growth trees within Sequoia Park may host canopy habitat that is in turn, host to many species. Additional canopy habitat is provided on all surfaces of the tree as substrate for numerous lichen and bryophyte species. No walkways will be attached to old growth redwoods. Cables will only attach to second growth trees. Therefore, no impact will occur to old growth redwood canopy habitat.

Project-related activities, specifically the redwood canopy walk, are not expected to have a significant impact on this habitat due to the careful design of this project element. The Canopy Walk walkways and platforms will not be attached above the first large diameter branch or iteration within a redwood. One second-growth tree may be rigged to allow limited access up into the higher reaches of the canopy but would not be open to the general public and would only be used for scientific or educational purposes. The rigging would include additional tree attachment hardware and possibly steps and platforms. Access would require climbing gear (ropes and harnesses) and special permission from the Zoo.

Project-related activities are not anticipated to impact wetlands or riparian habitat adjacent to the project area. Invasive species removal will occur within the riparian areas in order to increase the health of a special-status plant, the Pacific golden saxifrage, located near the wet areas (see Mitigation Measure IV-1).

Two natural communities within the project area will be moderately impacted by the Zoo expansion project. With the implementation of **Mitigation Measure IV-5**, the impact to *Rubus* shrubland Alliance will be reduced to a less than significant level. Transplanting *Rubus* species into the former trail alignment around the base of the old-growth trees will speed revegetation and create coastal bramble communities adjacent to the expansion area. **Mitigation Measure IV-6, IV-7, IV-8, and IV-9** will reduce the impact to *Sequoia sempervirens* Alliance to a less than significant level.

IV c) Wetlands exist within the drainages to the north, south, and west of the project area (see Figure 3). These wetland areas exist within eroded gullies containing class three waterways that eventually flow into Martin Slough. The drainages containing the wetlands and waterway are dominated by lady-fern (*Athyrium filix-femina*), skunk cabbage (*Lysichiton americanus*), redwood sorrel (*Oxalis oregana*), English ivy (*Hedera helix*), and in places the pacific golden saxifrage (*Chrysosplenium glechomifolium*).

The streams and associated wetlands are seasonal and are within the urban boundary for the City of Eureka, which establishes a 25-foot buffer from the edge of bank. All of the ground disturbances associated with this project will occur outside a 50-foot wetland buffer. The Canopy Walk will cross 50+ feet above multiple wetlands and the trees currently chosen for attachment are located within the 50-foot buffer. Some are located near the 25-foot buffer. Construction of these tree attachments will occur by hand crews, and staging will be located outside the 50-foot buffer. Therefore, a less than significant impact will occur.

Unmaintained trails and primitive trails facilitate erosion and sediment accumulation in wetlands near the project site. This leads to poor water quality and plant health. The trail improvements (trail realignment and primitive trail elimination) included in this project will alleviate this issue and improve the local wetlands and riparian.

IV d) Wildlife movement corridors are areas that connect suitable wildlife habitat areas in a region otherwise fragmented by rugged terrain, changes in vegetation, or human disturbance. Natural features such as canyon drainages, ridgelines, or areas with vegetative cover provide wildlife corridors. Wildlife movement corridors are important because they provide access to mates, food, and water; allow the dispersal of individuals away from high population density areas, and facilitate the exchange of genetic traits between populations.

The study area includes drainages connecting to Martin Slough, as well as mature old- and second-growth redwood forest, in addition to surrounding urbanized landscapes. It is likely that wildlife use Sequoia Park as refugia within the urban region of Eureka as well as a movement corridor between developed areas, and more natural areas surrounding Humboldt Bay. Most of the wildlife movement corridors are expected to be concentrated on nearby perennial drainages. The project is not anticipated to impact nearby perennial drainages. The project does not include any features that would interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. The project would not preclude wildlife mobility, breeding, or reproduction and therefore would have a less than significant impact.

IV e) The project would be constructed consistent with and in compliance with applicable City policies or ordinances protecting biological resources. The impact is less than significant.

IV f) The project will not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan because none exists for the project area. No impact has been identified.

FINDINGS: With the incorporation of mitigation, the proposed project would have a less than significant adverse impact on biological resources (See also Mitigation Measures in the Hydrology and Water Quality Section of this Initial Study).

MITIGATION MEASURES:

Mitigation Measure IV-1: Amphibian Survey. If possible, restoration activities shall take place between July 15 and October 31, to minimize potential impacts to amphibian species noted in Section IV-a. If work must be completed during that time, a qualified biologist shall conduct surveys of all disturbance areas within the 50 feet of wetlands to verify absence of sensitive amphibian species. Surveys shall be conducted not more than two weeks prior to start of vegetation removal. If sensitive amphibian species are found during the survey, an appropriate buffer area shall be established until the dates of seasonal avoidance are reached (July 15 to October 31).

Mitigation Measure IV-2: Special Status Plant Avoidance. Areas of special-status plants shall be noted and marked by a qualified professional to ensure they are not trampled during construction. If any portion of the community is harmed, it shall be restored to a level sufficient to ensure no net loss of the target species five years after the completion of construction. If translocation and/or re-planting or re-seeding into appropriate habitat in the immediate project area is required for conservation, it shall be done by hand, by a qualified Biologist. Additionally, English Ivy shall be removed around sensitive-species to assist in improving those communities.

Mitigation Measure IV-3: Snag Habitat. Although no nesting birds were observed in the study area, and a minimal number of trees are slated for removal, the potential to impact special status bird species does exist. To minimize that potential future impact, the lowest 20-25 feet of trees slated for removal shall be retained to create snag habitat. If the lower 20-25 feet is still deemed a hazard to humans or animals, the entire tree shall be removed.

Mitigation Measure IV-4: Pre-Construction Nesting Surveys. If possible, vegetation clearing activities shall take place between August 16 and March 13, outside of the active nesting

season for migratory bird species (i.e., March 15 to August 1). If work must be completed during the nesting season, a qualified biologist shall conduct preconstruction surveys of all ground disturbance areas and all trees adjacent to the Canopy Walk to verify absence of nesting migratory birds in the project area prior to vegetation removal and/or the start of construction. These surveys shall be conducted not more than two weeks prior to start of vegetation removal or any construction activities. If nesting migratory birds are found during the preconstruction surveys, an appropriate buffer area shall be established until the young birds have fledged. Buffers shall be 250-feet for raptors, 100-feet for threatened and endangered species, 50-feet for other special-status bird species; however, buffers may be modified after consultation with, and agreement by CDFW. If state listed California Endangered Species Act (CESA), federally listed Endangered Species Act (ESA), or raptors are found outside of but near the construction area, appropriate buffers shall be implemented. If non-listed state CESA, and/or non-listed federal ESA, including state species of special concern, are found near, but outside of the construction area, no buffers will be implemented.

Mitigation Measure IV-5: Coastal Bramble Replacement. Coastal Brambles removed by the Zoo expansion project shall be replaced 1:1. Where primitive trails are eliminated, *Rubus* species shall be transplanted from the expansion area to those areas. Areas shall be monitored for 5 years to ensure vegetation survival and success of coastal bramble habitat creation, and trail removal revegetation. If the transplanted *Rubus* species does not survive, they shall be replaced with the same species.

Mitigation Measure IV-6: Large Root Avoidance. The foundations for the pipe supports for the ADA segment of the Canopy Walk shall be strategically located to minimize placement within the dripline and to avoid damage to the structural roots. Poles placement at a distance 3 times the trunk diameter away from the base of old growth trees shall be prioritized. If large structural roots are encountered, an attempt shall be made to realign or relocate the hole to avoid the root.

Mitigation Measure IV-7 – Tree Stability. To mitigate the potential impact of the horizontal loads, the suspended walkways shall be designed to be as light as possible. To reduce the horizontal loads, the walkways shall be as short and as narrow (2' to 3'-wide) as possible and the route shall be a one-way loop to minimize the number of people on the walkway at any one time. The trees shall be evaluated by engineers and arborists pre-construction to determine if the imposed loads will trigger a significant response. If deemed necessary by the arborists and/or engineers, guy wires shall be used to balance the horizontal loads. If guy wires are required, they shall be attached to the walkways and affixed to the ground with helical anchors. The suspended cables and guy wires shall have slack and shall not rigidly restrain the trees.

Mitigation Measure IV-8 – Bark Erosion. Netting or a rigid barrier shall be installed around the inner ring of the Canopy Walk platforms to prevent damage but still allow the public to see the trunk.

Mitigation Measure IV-9: Redwood Forest Alliance.

- a. A maximum number of trees shall be retained within the Zoo expansion area.
- b. Trails shall be realigned/relocated further from the base of old growth trees, where possible.
- c. Primitive (undesignated) trails shall be eliminated through native planting and mulching.
- d. Split rail fences and informative signs shall be installed to deter additional primitive trail creation and use.

- e. Invasive species shall be removed in areas near the Canopy Walk.
- f. English Ivy shall be removed from redwoods.
- g. Native redwood forest plants shall be planted to increase habitat and scenic resources.

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

THRESHOLDS OF SIGNIFICANCE: This Initial Study considers to what degree the proposed project would cause (a) physical changes in known or designated historical resources, or in their physical surroundings, in a manner that would impair their significance; (b) physical changes in archaeological sites that represent important or unique archaeological or historical information; (c) unique paleontological resource site or unique geologic feature; or (d) disturbance of human burial locations.

DISCUSSION: The following information and analysis is based on a review of regional archaeological and ethno-geographic literature and historical maps, a project area record search at the California Historical Resources Information System’s Northwest Information Center (NWIC) in Rohnert Park, California; correspondence with local Native American tribal representatives; and a pedestrian field survey. These investigations were conducted for the proposed project by Roscoe and Associates during September 2017. The full text of the reports are not included in this Initial Study because of their confidential nature. They are available for review by qualified persons (archaeologists, Tribal Historic Preservation Officers, etc.) at the City of Eureka Development Services Department at 531 K Street, Eureka.

The land that is now Sequoia Park was sold to the City of Eureka in 1894 by Bartlin Glatt. Additional parklands that make up the Park and Zoo was added later through a trade for city owned land. Sequoia Park Zoo is the oldest zoo in California, dating from 1907; it is the smallest accredited zoo in the Nation and the only accredited zoo between San Francisco and Portland.

V a) The Sequoia Park Zoo area is a modern, developed zoo, with very few elements from the historic era, such as original paddocks, containment structures or other architectural elements from its founding, with a handful of exceptions. There are two known historical resources present within the Master Plan boundary and study area, as well as adjacent to the zoo.

- The Fairy house was designed and constructed by architect Robert Usher in 1952. This Master Plan does not propose any modifications to the Fairy house or its stump; both will remain in place and unaltered.
- The Heritage Garden was established circa 1907 and has remained mostly unchanged since the 1920s. The garden eventually became known for 100 varieties of Dahlias. The cedar

hedge along Glatt Street was planted in 1906 and now reaches twelve feet high. No construction activities are proposed within the Heritage Garden.

The Heritage Garden, which is outside the study area and the Fairy House will remain in place and unaltered. Therefore, Roscoe and Associates concluded that the project will not cause a substantial adverse change to a historic resource and the impact is less than significant.

V b,c) No archaeological or paleontological resources were identified through Roscoe and Associates research. Additionally, the project would not directly or indirectly destroy any unique geologic features. Therefore, this project is anticipated to have no significant impact.

Although unexpected, if Native American resources are discovered during project construction and determined to be significant or unique, the project could potentially cause a substantial adverse change in the significance of archaeological resources, as defined in Section 15064.5 of the State CEQA Guidelines, and/or destroy unique paleontological resources. If buried materials are encountered during project construction, work shall stop in the immediate vicinity of the find(s) until the Project Manager can take the appropriate steps outlined in **Mitigation Measure V-1**.

V d) No cemeteries or historic Native American villages have been identified within or near the project site. Therefore, this project will have no known impact on human remains. However, the project site is located within the traditional territory of the Wiyot Indian tribe. Thus, the project site has the potential to contain human remains, including those interred outside of formal cemeteries, and project construction activities would have the potential to disturb such remains, if present. This impact would be less than significant with **Mitigation Measure V-2** incorporated.

FINDINGS: Based on the discussion above, the project is expected to result in less than significant impacts to cultural resources with the implementation of mitigation measures.

MITIGATION MEASURES:

Mitigation Measure V-1: Resource Discovery. If potential archaeological or paleontological resources are encountered during project subsurface construction activities or geotechnical testing, all work within 50 feet of the find shall be stopped, and a qualified archaeologist funded by the City of Eureka and approved by the City of Eureka shall be contacted to evaluate the find, determine its significance, and identify any required mitigation. The applicant shall be responsible for implementing the mitigation prior to construction activities being re-started at the discovery site.

Mitigation Measure V-2: Human Remains. In accordance with California Health and Safety Code Section 7050.5 and California Public Resources Code Sections 5097.94 and 5097.98, if human remains are uncovered during project construction activities, work within 50 feet of the remains shall be suspended immediately, and the City of Eureka Development Services Department (DSD) and Humboldt County Coroner shall be immediately notified. If the remains are determined by the Coroner to be Native American in origin, the Native American Heritage Commission (NAHC) shall be notified within 24 hours, and the guidelines of the NAHC shall be adhered to in the treatment and disposition of the remains.



VI. GEOLOGY AND SOILS. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.			✓	
ii) Strong seismic ground shaking?		✓		
iii) Seismic-related ground failure, including liquefaction?		✓		
iv) Landslides?			✓	
b) Result in substantial soil erosion or the loss of topsoil?		✓		
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?			✓	
d) Be located on expansive soil, as defined by the California Building Code (2007), creating substantial risks to life or property?				✓
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				✓

THRESHOLDS OF SIGNIFICANCE: This Initial Study considers project-related effects that could involve or result from: (a) damage to project elements as a direct result of fault movement along a fault identified in the Alquist-Priolo study or other known fault; damage to project elements as a direct or indirect effect of seismically derived ground movement; damage to project elements because of landslides that are not seismically related; (b) project-derived erosion by water or wind of more than a minimal volume of earth materials; (c) project-derived or project-caused secondary instability of earth materials that could subsequently fail, damaging project elements or other sites or structures; (d) location of project elements on expansive soils that are identified by professional geologists, which could result in damage to project elements or other sites or structures; or (e) soils incapable of supporting the use of septic tanks or alternate wastewater disposal systems.

DISCUSSION:

VI a) i) Humboldt County is a very active tectonic region subject to seismic ground shaking from earthquakes as a result of close proximity to the triple junction fault zone. However, the proposed Zoo project does not occur on any fault zones and an Alquist-Priolo Earthquake Fault Zone has not been mapped in the City of Eureka. The potential for surface fault rupture at the project site is low and therefore the impact is less than significant.

ii) The project is in close proximity to the Freshwater fault to the north and North Spit fault to the south, according to the California Geological Survey 2010 Fault Activity Map of California (CGS

2010a). A rupture event originating in a nearby fault would generate very strong shaking at the project site. The only project components that may present a hazard in the event of a seismic incident are the suspended features of the canopy walk, the platforms, and occupied buildings; however, all constructed features would comply with the 2016 California Building Code (CBC), including the requirements of the special Seismic Design Category zones (SDC). Considering the distance from known faults to the project, lack of constructed features that impose a risk in a seismic event, and adherence to CBC and SDC requirements, potential impacts resulting from seismic events are anticipated to be less than significant. However, a geotechnical investigation shall be conducted to ensure engineering designs take into consideration all seismic threats, and identify and reduce any potentially significant environmental impacts from seismic ground shaking and other related events. **Mitigation Measure VI-1** will be implemented to ensure the impact is less than significant.

iii) There is a small area that has been mapped as a potential liquefaction site directly adjacent to the project area. There are no construction activities planned to occur on the area of potential liquefaction. The geotechnical investigation mentioned above and in **Mitigation Measure VI-1** will further evaluate the potential for liquefaction in the project area. The mitigation measures will reduce potential impacts by liquefaction to a less than significant level.

iv) The project area has a low slope instability rating and does not have a high potential for landslides. Elevations range from 145 feet to 165 feet above mean sea level. Most of the project site has a slope less than 15% (Web-GIS). The project site and surrounding area contain gulches and steep ravines that slope downwards towards lowlands, wetlands, and farmed bottomlands. The majority of the land within the immediate half-mile radius of the project site consists of 6,000 sf residential lots and single-family homes, as well as public lands including schools, parks, and a domestic water reservoir. There is little to no history of slope instability in the surrounding area. The majority of construction activities would occur in the flat upland portions of the terrace; therefore, people and structures would not be exposed to landslide risks. The impact is less than significant.

VI b) Construction activities, including cut, fill, removal of vegetation, and operation of heavy equipment would disturb soil and, therefore, have the potential to cause erosion. All planned facilities, exhibits, and infrastructure are in areas that are relatively flat or gently sloped. The ADA segment of the canopy walk is located on a flat area; however, the cable-suspended walkways expand over gulches reaching 60 feet deep which have a slope greater than 15%. Construction of cable-suspended walkways in these steeply sloped areas will occur by hand crews. These crews will walk their climbing equipment through the forest to each attachment tree and hoist equipment to the platform elevation using low impact arborist methods. No heavy equipment or grading will occur within areas that have a slope greater than 15%.

Construction activities would be performed in compliance with the Best Management Practices (BMPs) prescribed in the Eureka Municipal Code, Regional Water Quality Control Board (RWQCB) regulations and the CBC. BMPs may include: silt fences, straw bales and wattles, soil stabilization controls, and sediment detention basins. In areas where any development would be located within or in close proximity to designated ESHA, BMPs would be implemented to prevent erosion and sedimentation from trail construction. Protection measures include a Stormwater Pollution Prevention Plan (SWPPP) which would be required prior to any grading or construction activities in excess of one acre (see Mitigation Measure IX-1, in Hydrology and Water Quality section, below).

The project would remove existing primitive trails that exacerbate soil erosion in the project area. In

addition, native planting and mulching would occur in areas where non-native plants are removed. Both the removal of primitive trails and the planting of native vegetation would decrease the risk of substantial soil erosion and loss of topsoil. Therefore, no substantial soil erosion or loss of topsoil would result from the project and **Mitigation Measure VI-1** will be implemented to ensure a less than significant impact will occur as a result of the project.

VI c) The project site is classified as Quaternary (Pleistocene) older alluvium, lake, playa, and terrace deposits according to the California Geological Survey, Geologic Map of California (CGS, 2010). The Zoo project site is mapped as “Low Instability” and “Relatively Stable” on the Humboldt County GIS Portal. The project will comply with the seismic requirements of the CBC. The project area is on predominately flat ground with little potential for landslides. Some trail work is located in highly sloped areas and would be done by hand and would not increase the risk of landslides. The impact is less than significant.

VI d) According to the Natural Resource Assessment prepared for the project, the soil textures on the project site consist of loam/clay loam soils derived from soft sedimentary rock (Appendix B). The project is not located on expansive soils with heavy clays that shrink and swell relative to water content in the soil pores. These soils, known as vertisols, are not found on the site, therefore, no related substantial risks to life or property are anticipated. No impact has been identified.

VI e) The proposed project does not include septic tanks or other alternative wastewater disposal systems, and no impact related to wastewater disposal in soils would result. The project area is served by existing municipal wastewater disposal infrastructure. No impact has been identified.

FINDINGS: Based on the discussion above, the project will not result in significant adverse geological and soil impacts that cannot be reduced to a less-than-significant level with incorporation of mitigation.

MITIGATION MEASURES:

Mitigation Measure VI-1: Geotechnical Study. A California registered Geotechnical Engineer shall conduct a design-level geotechnical study for the project. The geotechnical study shall evaluate seismic hazards and provide recommendations to mitigate the effect of strong ground shaking; any unstable, liquefiable, or expansive soils; or settlement in adherence with current California Building Code (CBC) standards for earthquake resistant construction. The seismic criteria shall take into account the active faults in the Eureka area and beyond, and ground motions and shaking related to the faults shall be accounted. The study shall provide recommendations on grading, drainage, paving, and foundation design.

The project shall be designed and constructed in conformance with the specific recommendations contained in the design-level geotechnical study, including recommendations for grading, ground improvement, and foundation support. The recommendations made in the geotechnical study shall be incorporated into the final plans and specifications and implemented during construction. Professional inspection of foundation and excavation, earthwork and other geotechnical aspects of site development shall be performed during construction in accordance with the current version of the CBC.

VII. GREENHOUSE GAS EMISSIONS. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			✓	
b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?			✓	
<p>THRESHOLDS OF SIGNIFICANCE: This initial study considers to what degree the project would contribute to greenhouse gas emissions and global warming.</p>				
<p>DISCUSSION: Climate change refers to change in the Earth’s weather patterns including the rise in the Earth’s temperature due to an increase in heat-trapping or "greenhouse" gases (GHGs) in the atmosphere. Unlike emissions of criteria and toxic air pollutants, which have local or regional impacts, emissions of GHGs that contribute to global warming or global climate change have a broader, global impact. Global warming is a process whereby GHGs accumulating in the atmosphere contribute to an increase in the temperature of the Earth’s atmosphere. The principal GHGs contributing to global warming are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and fluorinated compounds. These gases allow visible and ultraviolet light from the sun to pass through the atmosphere, but they prevent heat from escaping back out into space. Among the potential implications of global warming are rising sea levels, and adverse impacts to water supply, water quality, agriculture, forestry, and habitats. Like most criteria and toxic air contaminants, much of the GHG production comes from motor vehicles. GHG emissions can be reduced to some degree by improved coordination of land use and transportation planning at the city, county and subregional level, and other measures to reduce automobile use. Energy conservation measures also can contribute to reductions in GHG emissions (BAAQMD 2012).</p>				
<p>The California Global Warming Solutions Act of 2006 (Assembly Bill 32) definitively established the state’s climate change policy and set GHG reduction targets (Health & Safety Code §38500 et seq.). The state set its target at reducing greenhouse gases to 1990 levels by 2020.</p>				
<p>The regulatory agency, the North Coast Unified Air Quality Management District (NCUAQMD) does not have rules, regulations, or thresholds of significance for non-stationary or construction-related GHG emissions. In 2011, the NCUAQMD adopted Rule 111 - Federal Permitting Requirements for Sources of Greenhouse Gases to establish a threshold above which New Source Review (NSR) and federal Title V permitting applies and to establish federally enforceable limits on potential to emit greenhouse gases for stationary sources. These are considered requirements for stationary sources and should not be used as a threshold of significance for non-stationary source projects.</p>				
<p>The existing Eureka General Plan predates modern planning relevant to GHG emissions and global warming. As of the release of this document for public review, the City is in the process of updating its General Plan.</p>				
<p>VII a, b) GHG emissions will be generated by short-term construction related activities and by the continued long-term operation of the project. Construction of the project would cause GHG emissions as a result of combustion of fossil fuels used in construction equipment. The project would require the use of several pieces of heavy earthmoving equipment, delivery trucks, construction commute and utility</p>				

vehicles, paving equipment, in addition to generators, and other small engine-powered tools. The NCUAQMD has not adopted thresholds for construction-related GHG emissions against which to evaluate significance and has not established construction-generated criteria air pollutant screening levels above which quantitative air quality emissions would be required. GHG emissions from construction will be temporary and will comply with all applicable NCUAQMD rules and regulations.

The operations of the Zoo produce minimal GHG due to travel, facility maintenance, and utility usage. Measures are proposed to reduce the GHG emissions associated with Zoo operations, including energy efficiency options like high efficiency lighting, low flow water systems, and renewable energy production options (PV solar). These measures will comply with the State’s goal to reduce GHG emissions.

Since the NCUAQMD does not have specific guidelines for GHG emissions, the guidelines established by the Sacramento Metropolitan Air Quality Management District (SMAQMD) suggest that the SMAQMD would expect quantitative analysis be conducted for projects substantially greater in scope than the proposed project. For example, quantitative analysis would be expected for a school or commercial facility construction project over 30 acres, a city park over 60 acres, or a single family residential development with over 180 units (SMAQMD 2009). Project emissions during construction and operation of the project would not approach the level of emissions associated with these reference project types and would not cause a considerable contribution to the cumulative GHG impact. Given the project’s relatively limited scale, scope, and duration, the project would not have a noticeable or considerable contribution to the cumulative GHG impact. The construction impact and operational impact would be less than significant.

FINDINGS: Based on the discussion above, the project would not significantly impact GHG emissions or conflict with regulations related to the reduction of GHG emissions and no mitigation is required.

VIII. HAZARDS AND HAZARDOUS MATERIALS. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			✓	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			✓	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?			✓	
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				✓
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?				✓

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				✓
g) Impair implementation of, or physically interfere with an adopted emergency response plan or emergency evacuation plan?			✓	
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized area or where residences are intermixed with wildlands?			✓	

THRESHOLDS OF SIGNIFICANCE: This Initial Study considers to what degree the proposed project would involve: (a) potential storage or use, on a regular basis, of chemicals that could be hazardous if released into the environment; (b) operating conditions that would be likely to result in the generation and release of hazardous materials; (c) use of hazardous materials, because of construction-related activities or operations, within a quarter-mile of an existing or proposed school; (d) project-related increase in use intensity by people within the boundaries of, or within two miles of, the Airport Planning Areas; (e) project-derived physical changes that would interfere with emergency responses or evacuations; (f) potential major damage because of wildfire.

DISCUSSION:

VIII a) Project construction would require the use of hazardous materials such as fuels, lubricants, paints, and solvents. Following construction, the project would not require use, storage, or transport of hazardous materials. Numerous federal and state laws and regulations ensure the safe transportation, use, storage and disposal of hazardous materials. Worker safety regulations cover hazards related to exposure to hazardous materials. Regulations and criteria for the disposal of hazardous materials mandate disposal at appropriate landfills. Because the City of Eureka, contractors, and other construction service providers would be required to comply with existing hazardous materials laws and regulations for the transport, use, and disposal of hazardous materials, the impacts associated with the potential to create a significant hazard to the public or the environment would be less than significant.

VIII b) The project would utilize heavy equipment and machinery to perform some tasks including grading, paving, and transportation of materials. There is always the possibility when equipment is operating that an accident could occur, and fuel could be released onto the soil. Equipment on site during construction would be required to have emergency spill cleanup kits immediately accessible in the case of any fuel or oil spills. Existing hazardous materials laws and regulations regarding transport, use, storage, and disposal of such materials, worker safety and exposure regulations, and building safety codes will be obeyed by all contractors and construction service providers (City of Eureka General Plan 7.E Hazardous Materials and Toxic Contamination). Staging, fueling and maintenance of equipment shall be conducted only in upland locations and no closer than 150 feet from open water or in any location where hazardous material spills could become entrained in ESHA. Therefore, with the best management practices listed above, the project will have a less than significant impact.

VIII c) Washington Elementary School is located directly across the street from the project site (less than 0.25 miles). All existing hazardous materials laws and regulations for the safe transport, use, and disposal of hazardous materials will be followed by project contractors and workers. Therefore, the project will have a less than significant impact on the nearby school.

VIII d) The project alignment is not located on any areas in the California Environmental Protection Agency (Cal/EPA) list of hazardous materials facilities that meet “Cortese List” requirements under Government Code Section 65962.5.

There is one permitted underground storage tank facility located adjacent to the project site at 3517 W Street. This storage tank was leaking waste oil and motor fluids near an aquifer used for drinking water supply. The cleanup was completed, and the case closed on 12/31/2003. There are no other known underground storage tank facilities within 1,000 feet of the project site. Therefore, the one formerly hazardous site located near the project area is contained and no impact will occur.

VIII e, f) The nearest airport to the proposed project is Murray Field which is approximately 2.5 miles northeast of the project on the south side of Highway 101, east of Jacobs Avenue. The project would not result in airport-related safety hazards for people residing or working in the project area. There are no other public or private airports/airstrips within two miles of the project. Therefore, no impact has been identified.

VIII g) The project is located entirely outside of the Tsunami Inundation Area according to the Tsunami Inundation Map for Emergency Planning for the Eureka quadrangle (CalEMA et al. 2009). The project site is currently used by the public for zoo visitation and trail exploration and emergency response plans and evacuation plans are already in place. Therefore, the project will have a less than significant impact.

VIII h) The California Department of Forestry and Fire Protection (CAL FIRE) is required by law to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. These Fire Hazard Severity Zones (FHSZ) influence how people construct buildings and protect property to reduce risk associated with wildland fires. The project alignment is located in a local responsibility area (LRA) meaning an area where local governments have financial responsibility for wildland fire protection. The project is in an area that has a low fire rating and a moderate fire hazard severity level. Construction activities including heavy equipment, vehicles, power tools, and personnel smoking in and around the project site could cause the ignition of a wildfire. However, the site is not in a high fire risk area and the expansion of the Zoo will not increase the fire risk level. Therefore, the likelihood of wildfire exposure remains the same and the impact is less than significant.

FINDINGS: Based on the discussion above, the project would not create or exacerbate any hazards to the public, and no mitigation is required.

IX. HYDROLOGY AND WATER QUALITY. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements?			✓	

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?			✓	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off-site?		✓		
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?		✓		
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?		✓		
f) Otherwise substantially degrade water quality?			✓	
g) Place housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary of Flood Insurance Rate Map or other flood hazard delineation map?				✓
h) Place within a 100-year flood hazard area structures, which would impede or redirect flood flows?				✓
i) Expose people or structures to a significant risk or loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				✓
j) Result in inundation by seiche, tsunami, or mudflow?				✓

THRESHOLDS OF SIGNIFICANCE: This Initial Study considers to what degree the proposed project would involve: (a) improvements that would violate standards set for water quality and for discharge of waste water; (b) use of, or interference with groundwater such that the amount of flow of groundwater is adversely impacted; (c) drainage improvements that would substantially alter or cause an increase in the amount or flow of drainage, or that would affect the free-flow of a stream or river or cause an increase in silt runoff as to cause adverse impact; (d) added runoff from the site that would exceed the capacity of drainage facilities; (e) the creation of polluted runoff or other general adverse water quality impacts; (f) substantially degrading water quality; (g) and (h) the placement of housing or other structures within the 100-year flood plain, or other area subject to flooding; (i) exposure of people/structures to significant loss from flooding from a levee or dam; or (j) development in such a manner or location that it would be adversely affected by seiche, tsunami or mudflow.

DISCUSSION:

The project location is within the Humboldt Bay watershed (hydrologic unit code 18010102). The study area contains a predominantly west aspect, resulting in westward surface water flow of unnamed tributaries of Martin Slough, which flows into the Elk River and Humboldt Bay. The mouth of the Elk River into Humboldt Bay is approximately 4.95 river miles from the project location. The confluence of Martin Slough with Elk River is approximately 3.4 river miles from the

project location.

IX a) Minimal grading will occur in the areas of expansion and renovation for facility placement (night houses and the Bear Lodge) and trail development/rehabilitation. The majority of expanded exhibit space (approximately 1.5 acres) will be kept in its natural state to maintain appropriate habitat for native exhibit species (cougars, black bears, coyotes, fishers, bobcats, ringtails). No grading will occur for the canopy walk as it is either elevated on support posts or suspended from trees. The minor grading necessary for construction would be conducted in accordance with the BMPs described in the Eureka Municipal Code, CBC, California Stormwater Quality Association (CASQA) BMP guidelines and the regulations of the RWQCB.

Because the project involves only minor vegetation removal, excavation, grading and other earthwork activities, and includes BMPs, no violations to water quality standards or waste discharge requirements are expected to result. If minor earthwork activities need to occur outside the dry season, they would be conducted in accordance with the requirements of the Eureka Municipal Code and RWQCB. The project will have a less than significant impact.

IX b) The project will not use any groundwater for any purpose, including irrigation, domestic or commercial demands. The project does not involve operations that would substantially deplete groundwater supplies or interfere with groundwater recharge. Also, the amount of impervious surface created by the project is minimal when compared to the remaining adjacent undeveloped surfaces, thereby not affecting groundwater recharge. The project is not expected to result in any change in the use or recharge of any groundwater source or aquifer. Therefore, the project will have a less than significant impact.

IX c, d) There are no proposed changes to drainage patterns associated with the proposed project, and the project will not affect flooding potential. The project construction will include more than one acre of ground disturbance which will trigger the preparation of a SWPPP. On-site retention of water during construction will occur to ensure no polluted runoff leaves the site. The preparation of a SWPPP and adherence to the RWQCB's requirements for the preparation of SWPPP's would result in a less than significant impact on stormwater-related siltation and erosion on- or off-site, or flooding on- or off-site.

Areas of added impervious surface (parking lot, buildings) will incorporate LID features to retain water on-site and avoid erosion impacts. This project includes trail realignment and rehabilitation which improve existing drainage issues within the park and forest. Many primitive trails have been created illegally over the years and contribute to erosion and siltation within the forest watershed. This project aims to remove these pathways through native planting, fencing and trail re-alignments and encouraging visitors to stay on the established trail through education and signage. Therefore, the project will have a less than significant impact with the implementation of **Mitigation Measure IX-1**.

IX e) The renovation and expansion does not include a significant increase in the amount of impervious surface requiring stormwater drainage systems. The project design maintains the majority of the natural vegetation and permeable ground surface; therefore, will not create or contribute runoff water, which would exceed the capacity of the existing stormwater drainage system.

The existing 10-foot-wide asphalt perimeter trail will be realigned and improved, adding

approximately 400 linear feet to replace an existing compacted dirt trail. Parking lots added at the north and south sides of the Zoo will include LID features to retain stormwater onsite and therefore will not contribute to existing stormwater drainage systems or provide substantial sources of polluted runoff.

Project construction will implement site design measures, source control, and/or treatment control BMPs to reduce potential pollutants, including sediment from erosion or siltation, to the maximum extent practicable. The project design provides for minimal grading and will conform to the natural topography to maintain the existing drainage flow on-site. Additionally, the existing vegetation will act as a natural biofilter. BMPs are required during construction activities and will include, but are not limited to, features such as stabilized construction entrance/exit areas, permeable surfaces, and silt fencing. Silt fences and fiber rolls would be specified to minimize surface transport of sediments.

Since ground disturbance is more than one acre, a SWPPP will be required. To mitigate the potential for increased stormwater runoff resulting from construction of impervious trail or building surfaces, **Mitigation Measure IX-1** states that the applicant shall, prior to commencement of any construction, submit a SWPPP to the City of Eureka Public Works Stormwater Division. The SWPPP shall be subject to approval by the NCRWQCB, and City of Eureka Building, Planning, Engineering, and Public Works Departments. SWPPP implementation shall be subject to enforcement by the aforementioned agencies.

The SWPPP shall incorporate BMPs as appropriate. No debris, soil, silt, sand, slash, sawdust, rubbish, cement or concrete washings, oil or petroleum products, or other organic or earthen material from construction operations shall be allowed to enter or be placed where it may become entrained in any flowing or standing water. Erosion control measures and BMPs would be implemented during all phases of construction. Once construction is complete, the only vehicles that will be permitted access to the project area are City maintenance vehicles and emergency vehicles. Maintenance vehicles and emergency vehicles are expected to access the area very rarely. Therefore, oil, gas or other fluids would not be expected to be a significant source of polluted stormwater runoff as outlined in **Mitigation Measure IX-2**.

Due to the factors above, it has been found that the project will not result in significantly increased erosion or sedimentation potential and will not permanently alter any drainage patterns of the site or area on- or off-site. Therefore, with mitigation the project will have a less than significant impact.

IX f) The ADA segment of the Canopy Walk is located on flat ground, the cable-suspended walkways expand over gulches reaching 60 feet deep with a slope greater than 15%. Construction of cable-suspended walkways in these steeply sloped areas will occur by hand crews. Crews will walk their equipment through the forest to each attachment tree and hoist equipment to the platform elevation using low impact arborist methods. No heavy equipment or grading will occur within areas that have a greater than 15% slope. This will minimize the potential for erosion caused by construction.

Trail development and rehabilitation will require minimal grading. In areas where the trail would be located in close proximity to designated ESHA, BMPs would be implemented to prevent erosion and sedimentation from construction. Therefore, the project will have a less than significant impact.

IX g) The project does not include housing; therefore, no housing will be placed in the 100-year flood hazard area. No impact will occur.

IX h) According to Humboldt County’s GIS Portal, which is based on the Federal Emergency Management Agency’s (FEMA) National Flood Insurance Program Flood Insurance Rate Map for the City of Eureka, this project is not within the 100-year flood hazard area. Therefore, the project would not place structures that would redirect or impede flood flows within the FEMA-designated 100-year floodplain. No impact will occur.

IX i) The project is not in close proximity to any dam or levee that has the potential to expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam. No impact has been identified.

IX j) This project site does not have an enclosed or partially enclosed body of water capable of a seiche event. The site is located out of the tsunami inundation zone. The project site is located over 1 mile away from the tsunami evacuation zone. Therefore, no impact will occur from inundation by seiche or tsunami.

The majority of the site is gently sloping, well vegetated, and has no debris-flow source, and therefore the potential for mudflows is negligible. No construction is proposed for steeply sloped areas and minimal soil disturbance will occur. Therefore, mudflows are unlikely, and no impact has been identified.

Findings: Based on the discussion above, the project is expected to result in less than significant impacts to hydrology and water quality with the implementation of mitigation measures.

Mitigation Measure IX-1: SWPPP. A SWPPP, to be implemented during construction, shall be submitted to the City of Eureka Public Works Stormwater Division and subject to approval by the NCRWQCB, and City of Eureka Building, Planning, Engineering, and Public Works Departments.

Mitigation Measure IX-2: Stormwater Detention. All post-construction stormwater shall be detained on site through capture and low impact development design.

X. LAND USE AND PLANNING. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Physically divide an established community?				✓
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				✓
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				✓

THRESHOLDS OF SIGNIFICANCE: This Initial Study considers to what degree the proposed project would (a) divide an established community or conflict with existing land uses within the project’s vicinity, such as agriculture resources; (b) conflict with the Eureka General/Coastal Plans designation, policies, and zoning ordinances regarding commercial, public, and quasi-public facilities; and (c) conflict with applicable environmental plans and protection measures enforced by regulatory agencies that have jurisdiction over the project, such as habitat conservation plans or a natural community conservation plan.

DISCUSSION:

The City of Eureka’s General Plan outlines policies, standards, and programs to guide decisions concerning Eureka’s land use and development. The City of Eureka Zoning Code includes local ordinances used to enforce land use standards in accordance with the goals and objectives of the General Plan.

The site has the primary General Plan Land Use designation of Parks and Recreation (PR) and zoning of Public (P). The Eureka General Plan states the PR designation has a goal “To provide for park and recreational systems which include sufficient diversity of areas and facilities to effectively serve a population with varied characteristics, densities, needs and interests, consistent with protecting environmentally sensitive habitats” (Eureka General Plan 5-1).

X a) The entirety of the project area is located on a parcel zoned Public (P) with a designated land use of Parks and Recreation (PR). The project does not traverse or divide established neighborhoods or communities. Therefore, there is no impact.

X b) The primary existing land uses in the project area include the City of Eureka-owned Sequoia Park Zoo and surrounding park. The project would enhance an already existing public park by providing increased recreational opportunities, safer trail access and enhanced zoo experiences. The project would comply with all applicable land use plans, policies or regulations. Therefore, there is no impact.

X c) There are no habitat or natural community conservation plans that cover the project area, therefore, no impact has been identified.

FINDINGS: The project would not require a General Plan Land Use designation or zoning change, would not physically divide the community or conflict with any applicable habitat conservation plan or natural community conservation plan with jurisdiction over the area. The impact is less than significant.

XI. MINERAL RESOURCES. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State?				✓
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				✓

THRESHOLDS OF SIGNIFICANCE: This Initial Study considers to what degree the proposed project would interfere with the extraction of commodity materials or otherwise cause any short-term or long-term decrease in the availability of mineral resources that would otherwise be available for construction or other consumptive uses.

DISCUSSION:

XI a, b) The proposed project may require minor use of quarry rock, gravel, sand, and other similar materials for trail improvements, building foundation, and exhibit design features. The level of mineral resources required for this project is not expected to have any significant impact on locally available minerals or mineral resources valuable to the region or State. There are no locally important mineral resource recovery sites in the project vicinity, and the project site contains no mineral resources that would be impacted by the project. No impact has been identified.

FINDINGS: The mineral resources needed for the zoo improvements within the City would be of limited quantities and the project is expected to have a less than significant impact on local mineral resources.

XII. NOISE. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		✓		
b) Expose persons to or generate excessive ground borne vibration or ground borne noise levels?			✓	
c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?			✓	
d) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		✓		
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				✓
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				✓

THRESHOLDS OF SIGNIFICANCE: This Initial Study considers whether the proposed project would produce: (a) sound-pressure levels in excess of the City of Eureka noise standards; (b) long-term ground vibrations and low-frequency sound that would interfere with normal activities and which is not currently present in the project area; (c) a substantial increase in ambient short-term or long-term sound-pressure levels; (d) a substantial temporary or periodic increase in ambient noise levels; or (e) and (f) expose people to excessive noise levels within the vicinity of a public or private airport.

DISCUSSION:

XII a) The City of Eureka includes residential noise exposure policies in the General Plan Policy Document, Part II, Section 7 (February 1997). The overall goal under “Residential Noise Exposure” is “To protect Eureka residents from the harmful and annoying effects of exposure to excessive noise.” For non-transportation related noise, the maximum allowable noise at the property line of lands designated for noise-sensitive uses cannot exceed 65dB (nighttime, 10 p.m. to 7 a.m.) to 70dB (daytime, 7 a.m. to 10 p.m.). Transportation noise sources are defined as “public roadways, railroad line operations, and aircraft in flight.”

The surrounding area is characterized by parkland, schools, public facilities (US National Guard Armory and City Parks corporation yard), sports fields, residences, and W street (a primary City street).

In order to prevent construction noise from disturbing homes and businesses in the project vicinity during the generally quieter nighttime hours, construction activities will be limited to the hours of 7:00 AM to 7:00 PM on weekdays and 8:00 AM to 6:00 PM on Saturdays, Sundays, and Holidays, except in emergencies or with prior approval from the City of Eureka (**Mitigation Measure XII-1**). With mitigation incorporated, the minor incremental increase in noise associated with construction will not expose persons to noise levels in excess of applicable standards and would not represent a significant increase in noise. With mitigation incorporation, the minor incremental increase in noise associated with trail construction, use, and maintenance activities would not expose persons to noise levels in excess of applicable standards and would not represent a significant increase in noise. The impact is less than significant with mitigation incorporated.

XII b) Project related activities would not involve the use of explosives or other intensive construction techniques that could generate significant ground borne vibration or noise.

Prior to completing final design for the project, the project will require the completion of a geotechnical analysis at the location of the Departure Deck and any building footings or animal containment fence to determine the bearing capacity of the soils and to determine if any piles will be necessary during construction. If piles will be necessary, the geotechnical analysis will also determine how deep the piles would need to be and if alternative structural supports (helical coil anchors) are also suitable as they produce limited construction noise during installation.

Minor vibration adjacent to mechanized equipment and road/trail treatments during construction work would be generated only on a short-term basis. Therefore, ground borne vibrations and noises would have a less than significant impact.

XII c) The project is a passive recreational facility and animal exhibit; motorized vehicles would be prohibited in the facility, except for the use of a small utility vehicle by Staff for routine maintenance. The project does not involve any operational feature that would cause any permanent increase to noise levels. The project will, therefore, not result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project. The impact is less than significant.

XII d) Construction activities would result in a minor temporary increase in ambient noise levels from construction equipment and construction-related traffic. Constructing the project will include using heavy equipment for excavating, grading and compaction, paving, and hauling materials and

equipment. The construction phase would increase localized truck trips to transport materials and equipment to and from the proposed trail corridor. Although construction-related noise would be unavoidable, it would be temporary and intermittent and construction hours would be limited, as required by **Mitigation Measure XII-1** presented below. The proposed project would comply with all applicable City policies discussed above to abate construction-related noise impacts. The impact on ambient noise levels would be less than significant with incorporation of mitigation.

XII e, f) The project site is approximately 2.5 miles southwest of Murray Field Airport and is located outside the airspace analysis zone identified in the 1993 Airport Land Use Compatibility Plan for Murray Field. The southern portion of the proposed project alignment is approximately 3.5 miles east of the City-owned Eureka Municipal Airport in Samoa. These airports are relatively distant to the project and the project would not expose people in the project area to excessive noise levels from either airport. No impact has been identified.

The project would not result in any changes to the noise levels related to an airport or private airstrip and would not expose people to excessive noise levels from an airport or private airstrip. Based on this analysis, the project is expected to have no airport-related impact.

FINDINGS: Based on the discussion above, with mitigation, the project is expected to result in less than significant impacts to noise.

MITIGATION MEASURES:

Mitigation Measure XII-1: Construction Hours. Construction activities shall be limited to the hours of 7:00 AM to 7:00 PM on weekdays and 8:00 AM to 6:00 PM on Saturdays, Sundays, and Holidays, except in emergencies.

XIII. POPULATION AND HOUSING. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Induce substantial population growth in an area, either directly (e.g., by proposing new homes and/or businesses) or indirectly (e.g., through extension of roads or other infrastructure)?				✓
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				✓
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				✓
<p>THRESHOLDS OF SIGNIFICANCE: This Initial Study considers to what degree the proposed project would result in, or contributes to, population growth, displacement of housing units, demolition or removal of existing housing units, or any project-related displacement of people from occupied housing.</p> <p>DISCUSSION: XIII a, b, c) This project does not directly or indirectly induce substantial population growth or displace substantial numbers of housing or people.</p>				

The project would consist of enhancements to public recreational facilities. Zoo renovation and expansion would not involve construction of any facility that would directly or indirectly induce population growth. Therefore, the project would have no impact on population growth.

By its nature and based on the project description, the project will not be growth inducing or growth inhibitive. There is no housing being displaced or built as part of the project and the project will not displace any people, necessitating the construction of replacement housing elsewhere. This project would have no impact on housing.

FINDINGS: Based on the discussion above, the project would not result in substantial adverse impacts regarding population and housing. No impact has been identified, and no mitigation is required.

XIV. PUBLIC SERVICES.

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Fire protection?			✓	
b) Police protection?			✓	
c) Schools?				✓
d) Parks?				✓
e) Other public facilities?				✓

THRESHOLDS OF SIGNIFICANCE: This Initial Study considers to what degree the proposed project would result in any changes in existing fire or police protection service levels, or a perceived need for such changes, as well as any substantial changes in the need for, or use of, schools, parks, or other public facilities.

DISCUSSION:

XIV a, b) The City of Eureka Police Department and Humboldt Bay Fire currently serve the project area. The nearest fire station is approximately 1.0 mile from the project site, and the nearest police department is approximately 2.9 miles from the project site. This project would not necessitate any related new or altered facilities. The project would not result in significant adverse effects on service ratios for the police or fire departments. The proposed project may result in increased motorized and non-motorized traffic in the vicinity. The proposed project will facilitate improved foot access on trails and access for maintenance and emergency personnel. The project is not expected to substantially increase the need for patrols by local law enforcement or emergency services. A less than significant impact with respect to fire and police facilities is anticipated.

XIV c). The proposed project is in an area served by the Eureka City School District. The nearest school is Washington Elementary School located less than 0.2 miles away. The Zoo expansion would provide additional opportunities for school field trips, and would not necessitate additional school

facilities. There is no impact associated with schools.

XIV d, e) The proposed project would present an enhanced recreational opportunity by expanding the existing Sequoia Park Zoo and surrounding trail area. The Zoo is currently accessible by multiple bus lines that are operated through the Redwood Transit Service (RTS) seven days a week. The closest bus stop to the Zoo is located directly outside of the entrance, and the second closest bus stop is located 0.4 miles away. The project would increase park opportunities within the City of Eureka near an existing park, and would not result in the need for new or public facilities. This project will have no impact on parks or public facilities.

FINDINGS: The project does not involve the construction of new or physically altered governmental facilities including but not limited to fire protection facilities, police facilities, schools, or parks in order to maintain acceptable service ratios, response times or other performance service ratios or objectives for any public services. Therefore, the project will not have an adverse physical effect on the environment because the project does not require new or significantly altered services or facilities to be constructed. The impact is less than significant, and no mitigation is required.

XV. RECREATION. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?			✓	
b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?		✓		

THRESHOLDS OF SIGNIFICANCE: This Initial Study considers to what degree any aspect of the proposed project would be related to the demand for recreational facilities or increase use of existing recreational areas such that those areas are physically degraded, including secondary effects such as degradation through over-use of environmentally sensitive areas.

DISCUSSION:

The project site includes the 7.5-acre Sequoia Park Zoo existing footprint as well as a 1.5-acre expansion into the adjacent 67 acre Sequoia Park forest. Sequoia Park offers many recreational opportunities for the surrounding community and for visitors to the area. The City of Eureka owns and maintains Sequoia Park Zoo and the surrounding park land. This project will enlarge the zoo footprint by 1.5 acres in order to construct the Canopy Walk and additional animal enclosures. Existing recreational facilities will be improved in the project area and some new recreational facilities will be added as a result of this project.

V a) The project would have a long-term positive effect on recreation by increasing recreational opportunities in the area. The proposed Zoo expansion will offer visitors new recreational opportunities in the form of walking paths, animal exhibits, and a Canopy Walk. The proposed project would not lead to an increase in the use of existing recreational facilities that would contribute to the physical deterioration of recreational facilities. In fact, the project enhances the existing forest trail system and would have an overall beneficial impact to the trail system. Increasing accessibility

and recreational opportunities may deter illegal activity, such as illegal dumping or camping, thereby enhancing public safety and the overall health of the park. The impact is less than significant.

V b) The proposed Zoo expansion project involves a number of new recreational facilities as well as an expansion of existing recreational uses. Sequoia Park is currently used by recreational trail goers, and many of the paths in the park are primitive trails that contribute to erosion and degradation of the forest floor. The proposed Zoo expansion will improve permanent trails that are currently degraded, create new trails in appropriate areas, and remove primitive trails. Any physical effects on the environment from either the construction of the project or the general expansion of the Zoo will be mitigated through specific mitigation measures outlined in the Aesthetics, Biology, Cultural, Geology, and Hydrology, and Noise sections of this report. Therefore, a less than significant impact is expected to occur.

FINDINGS: As discussed above, the proposed recreational facilities are not expected to have an adverse physical effect on the environment (refer to Biological Resources as well as Hydrology and Water Quality, above). The impact is less than significant, and no mitigation is required.

XVI. TRANSPORTATION AND TRAFFIC. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Exceed the capacity of the existing circulation system, based on an applicable measure of effectiveness (as designated in a general plan policy, ordinance, etc.), taking into account all relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?			✓	
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?				✓
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that result in substantial safety risks?				✓
d) Substantially increase hazards due to design features (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?			✓	
e) Result in inadequate emergency access?			✓	
f) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?				✓

THRESHOLDS OF SIGNIFICANCE: This Initial Study considers to what degree, if any, the proposed project would be associated with (a) changes in traffic, circulation, or other changes that might be perceived as adverse, including traffic effects resulting from temporary construction-related changes; (b) any project-related changes in levels-of-service on County or State highways; (c) a change in air traffic patterns that would result in a safety risk; (d) substantially increasing hazards due to a design feature; (e) project-associated travel restrictions that would prevent

emergency vehicles from reaching the locations where they were needed; or (f) conflicts with plans or policies regarding alternative modes of transportation.

DISCUSSION:

The Sequoia Park Zoo is located west of the intersection of W Street and Russell Street in Eureka, California. Regional access to/from the zoo is primarily provided by Harris Street. Harris Street runs east-west and terminates at the intersection of Highway 101 to the west and the intersection of Hall Avenue to the east. Local access to/from the zoo is provided by W and Dolbeer Streets from the north, and Hemlock Street in the County, from the south. W and Dolbeer Streets both connect to Harris; to the south, Hemlock Street connects to Walnut Drive, a minor arterial that provides access to Cutten and other areas outside the City limits. The zoo is open from 10 a.m. to 5 p.m. seven days per week in the summer. The wintertime hours are the same, except that on Mondays, the zoo is open from 12 p.m. to 4 p.m. Vehicle parking is currently provided by the existing on-street parking along W Street; City-owned parking on Russell Street; and on-street parking on Dolbeer Street, Chester Street, and Madrone Avenue. Additional parking lots are proposed with the zoo expansion.

A traffic impact study was completed on November 28, 2017 by SHN Engineers & Geologists and their partners, Spack Consulting, a firm that specializes in traffic studies. The study was performed to determine the traffic impacts associated with the build out of the proposed expansions on the studied roads and intersections where impact is anticipated. The Dolbeer Street and W Street, Harris Street and the Walnut/Hemlock Street intersections, parking, and traffic generation were analyzed. For the purposes of the study, the expansion is assumed to be built and fully in use by 2020. It should be noted that negligible changes are expected on corridors not analyzed in this study and improvements along those corridors may be needed in the future to accommodate incremental traffic growth from this and other area developments.

XVI a) An intersection capacity analysis was conducted for the existing intersections in accordance with the 2010 Highway Capacity Manual (Transportation Research Board, 2010). Intersection turning movement counts were collected at each study intersection during the p.m. peak hour and the pickup time peak hour during Washington School’s normal dismissal times under weekday conditions. Intersections are assigned a level of service (LOS) letter grade for the peak hour of traffic based on the number of lanes at the intersection, traffic volumes, and traffic control. LOS A represents light traffic flow (free flow conditions); LOS F represents heavy traffic flow (over capacity conditions). LOS C at intersections is typically considered acceptable by the City of Eureka.

The LOS results for the existing study hours are shown in Table XVI-1. These are based on the existing lane configurations and lane usages. The existing turning movement volumes were used in the LOS calculations. The LOS calculations were done in accordance with the Highway Capacity Manual (Transportation Research Board, 2010), using VISTROTTM software. The complete LOS calculations, which include grades for individual movements, are included in the Traffic Study (Appendix D).

Table XVI-1 Existing Peak Hour Level of Service ¹		
Intersection	LOS	
	School Pickup Time Peak	p.m. Peak Hour

	Hour	
W and Harris ²	C (c)	D (d)
Dolbeer and Harris ²	E (e)	E (e)
Walnut and Hemlock ²	C (c)	C (d)
1. The first letter is the level of service (LOS) for the intersection. The second letter (in parentheses) is the LOS for the worst operating movement. 2. Unsignalized intersection		

The project is expected to increase recreational use levels in the project area, which could result in minor amounts of additional motorized and non-motorized traffic. Therefore, a trip generation analysis was performed for the site based on previous zoo expansion attendance data and average daily attendance from 2014 to 2017 for the summer months of June, July, and August. Currently, the average number of daily visitors is 369. The previous two expansions at the zoo saw short-term attendance increases of 49% (Red Panda Exhibit, 2010) and 61% (Watershed Heroes, 2014). For the purpose of this study, it was estimated that there would be a 50% increase in average daily attendance resulting in approximately 570 total visitors. At 3 people per vehicle, the standard vehicle occupancy for entertainment events and similar land uses, the zoo would generate approximately 190 daily vehicle trips in 2020 and 232 in 2040 (assuming a 1% growth rate). Table XVI-2 shows the anticipated number of visitors in 2020 and 2040 with and without the expansion for comparison.

Year	Without Expansion		With Expansion		Increase in Visitors	Increase in Vehicle Trips
	# of Visitors	# of Daily Vehicle Trips	# of Visitors	# of Daily Vehicle Trips		
2020 ¹	380	127	570	190	190	63
2040	464	155	696	232	232	77
1. Assumes 1% annual growth rate in the number of visitors during the summer months 2. Assumes 3 visitors per vehicle						

The traffic generated by the development was assigned to the area roadways according to the distribution pattern and then added to the study roadways.

- The Harris and W Street intersection is assumed to receive 40% of incoming and outgoing traffic.
- The Harris and Dolbeer Street intersection is assumed to receive 35% of incoming and outgoing traffic.
- The Hemlock and Walnut Drive intersection is assumed to receive 25% of incoming and outgoing traffic.

The forecasted LOS capacity for the 2020 build peak hour scenarios are shown in Table XVI-3 with LOS results for the 2040 peak hour scenarios shown in Table XVI-4. These are based on the existing traffic control, lane usages, and lane configurations at the study intersection. No improvements were modeled at the existing study intersections.

Table XVI-3 2020 Peak Hour Level of Service ¹		
Intersection	Pickup Peak Hour Build	p.m. Peak Hour Build
W and Harris ²	C (c)	D (d)
Dolbeer and Harris ²	E (e)	E (e)
Walnut and Hemlock ³	C (c)	C (d)

1. The first letter is the level of service (LOS) for the intersection. The second letter (in parentheses) is the LOS for the worst operating movement.
 2. 2-way stop intersection
 3. All-way stop intersection

Table XVI-4 2040 Peak Hour Level of Service ¹				
Intersection	Pickup Time Peak Hour		p.m. Peak Hour	
	No-Build	Build	No-Build	Build
W and Harris ²	C (c)	C (c)	E (E)	E (E)
Dolbeer and Harris ²	F (f)	F (f)	F (f)	F (f)
Walnut and Hemlock ³	C (d)	D (d)	E (f)	E (f)

1. The first letter is the level of service (LOS) for the intersection. The second letter (in parentheses) is the LOS for the worst operating movement.
 2. 2-way stop intersection
 3. All-way stop intersection

Based on these results, the added traffic from the proposed development would not significantly change or impact traffic operations. The only change in LOS is at the Walnut and Hemlock Drive intersection during the pickup time peak hour. The intersection delay changes from 24.74 seconds in the No-Build Scenario to 25.21 seconds in the Build Scenario. That slight increase causes the LOS to change from C to D. The increase is caused by an additional six vehicles leaving the zoo and three heading to the zoo through this intersection. The addition of nine vehicles during the peak hour causes the incremental delay change, but does not warrant major alterations to this intersection. The impact to service capacity is less than significant.

Currently the Zoo has 231 on- and off-street parking spaces available to visitors (not including accessible spaces). The proposed expansion will generate additional parking demand. The Zoo Master Plan includes plans to build additional parking lots: 9 spaces along Glatt Street, an 18-space parking lot off Glatt Street near the Parks Corp Yard, and a 16-space parking lot off W Street at the south end of the Zoo. A parking assessment was performed with the traffic impact study to determine if the existing parking facilities combined with proposed parking have the capacity to meet the demands of the increase in attendance. With the proposed parking additions, the zoo would have approximately 274 parking spaces in close proximity. Since these spaces are not exclusively for Zoo patrons, and a site visit was also conducted to verify parking conditions during times that are busy with other uses (such as soccer and baseball games, parties at Sequoia Park). Parking was not at full capacity.

Eureka Municipal Code 155.117 Schedule of Off-Street Parking Space Requirements, (C)(10), requires public buildings and grounds other than schools and administrative offices to have one space for each two employees, plus the number of additional spaces prescribed by the director. Code 155.117 (C)(7) requires land uses of libraries, museums, art galleries, and similar uses to have one space for each 600 square feet of gross floor area, and one space for each two employees. SHN Consulting Engineer's Parking Study/Report for Sequoia Park and Zoo Modification Project (October 2002) estimated there to be approximately 1.5 acres of publicly accessible areas. With the previous expansions and the proposed expansion, 2 acres may be a more realistic area. This would require approximately 145 parking spaces, if the zoo is considered a similar use to libraries, museums and art galleries.

The anticipated daily vehicle trips in 2040, for the zoo with the proposed expansion, are 232 trips. Existing conditions appear to supply approximately 231 spaces split between the zoo, the park, surrounding baseball fields, Washington School. Additional parking is available on several nearby streets for overflow during high demand scenarios. After the expansion, approximately 274 parking spaces will be available to zoo visitors. Although the spaces are shared by other uses in the area, there is roughly the same amount of on-street parking along Dolbeer as there is on W Street that can be used at times when peak parking demands align.

Increased traffic from the proposed development will not have a significant enough impact on traffic operations to warrant any major upgrade or change to the existing or future transportation system. Existing parking combined with proposed additional parking spaces appear to provide sufficient capacity to meet the increased attendance to the zoo. Therefore, this project will have a less than significant impact.

XVI b) The project area is not subject to a Congestion Management Program (CMP) as one does not exist for the project area. The project will not contribute to a congestion problem; therefore, there would be no impact.

XVI c) The proposed project does not contain any component that involves air transportation. Therefore, the project would not cause a change in air traffic patterns. No impact has been identified.

XVI d) This project does not include any major traffic design modifications and would not change the geometry of the street or roadway network. The only modifications include the addition of two small parking lots and the rearrangement of parallel parking to angled parking spaces on Glatt Street. All spaces will be constructed according to City of Eureka building and design standards. Therefore, no potentially hazardous roadway design features would be introduced by the project. No incompatible uses are being introduced by this project. The impact is less than significant.

XVI e) Emergency access to the project site and surrounding areas will not be altered by this project. No roadways will be modified. The maintenance access trail on the western boarder of the Zoo, will be enhanced to improve emergency access to the forest. The Master Plan has been reviewed by the Eureka Police Department and Humboldt Bay Fire, and no concerns were noted. The plans will be reviewed by each agency again prior to issuance of the Building Permit. Based on the information above, a less than significant impact would occur.

XVI f) Pedestrian sidewalks and bicycle lanes will not be modified. During traffic counting for the traffic impact study, interactions between pedestrians and vehicles appeared to operate well; no

confusion or dangerous scenarios were observed. The Zoo is currently accessible by multiple bus lines that are operated through the Redwood Transit Service (RTS) seven days a week. The closest bus stop to the Zoo is located directly outside of the entrance, and the second closest bus stop is located 0.4 miles away. This project does not propose to modify any alternative transportation opportunities and does not conflict with any adopted policies, plans, or programs supporting alternative transportation. Therefore, no impact will occur.

FINDINGS: Based on the above, it is concluded that the project would have a less than significant impact on transportation or traffic and no mitigation is required.

XVII. TRIBAL CULTURAL RESOURCES. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a tribal cultural resource listed or eligible for listing in the California Register of Historical Resources, or in the local register of historical resources as defined in Public Resources Code §5020.1(k)?		✓		
b) Cause a substantial adverse change in the significance of a tribal cultural resource determined by the lead agency to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code §5024.1?		✓		

THRESHOLDS OF SIGNIFICANCE: This Initial Study considers to what degree the proposed project would cause (a) change in the significance of a tribal cultural resource listed or eligible for listing in the California Register of Historical Resources, or in the local register of historical resources as defined in Public Resources; or (b) a tribal cultural resource determined by the lead agency to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code §5024.1.

DISCUSSION:

A Cultural Resources Investigation has been completed by Roscoe and Associates, as has consultation with local Native American tribal representatives and a pedestrian field survey. The Native American Heritage Commission (NAHC) was contacted and they provided a list of Native American individuals and tribes with ancestral interest in this portion of Humboldt County. James Roscoe sent letters to representatives of the Bear River Band of Rohnerville Rancheria, the Wiyot Tribe and the Blue Lake Rancheria. The letters included a brief a project description and a project location map. Written emailed responses were received from representatives of all three contacted groups: Erika Cooper, Tribal Historic Preservation Officer (THPO) for the Bear River Band of Rohnerville Rancheria, Janet Eidness THPO for the Blue Lake Rancheria and Ted Hernandez, Cultural Director for the Wiyot Tribe. Results of the field survey were also reported to the representatives and no concerns were expressed.

Regional ethno-geographic research indicates that the project area lies within the traditional territory of the Wiyot people, who occupied several hundred square miles in Humboldt County. Wiyot occupied the lands adjacent to Humboldt Bay and typically lived in villages that were close to water and wetlands where they had ample access to food (fish, shellfish, marine mammals, waterfowl, deer, elk, and small land animals), and traveled by water. No villages are known to have

been within the project area.

XVII a,b) No tribal cultural resources were identified through Roscoe and Associates research. The proposed project activities do have the potential to inadvertently uncover subsurface archaeological material. Although unexpected, if Native American resources are discovered during project construction and determined to be significant or unique, the project could potentially cause a substantial adverse change in the significance of tribal cultural resources. If buried materials or human remains are encountered during project construction, work shall stop in the immediate vicinity of the find(s) until the Project Manager can take the appropriate steps outlined in **Mitigation Measure V-1** and/or **V-2** detailed in the Cultural Resources section above. The project will have a less than significant impact with mitigation.

FINDINGS: Based on the discussion above, the project is expected to result in less than significant impacts to cultural resources with the implementation of mitigation measures.

MITIGATION MEASURES:

Mitigation Measure V-1: Resource Discovery. If potential archaeological or paleontological resources are encountered during project subsurface construction activities or geotechnical testing, all work within 50 feet of the find shall be stopped, and a qualified archaeologist funded by the City of Eureka and approved by the City of Eureka shall be contacted to evaluate the find, determine its significance, and identify any required mitigation. The applicant shall be responsible for implementing the mitigation prior to construction activities being re-started at the discovery site.

Mitigation Measure V-2: Human Remains. In accordance with California Health and Safety Code Section 7050.5 and California Public Resources Code Sections 5097.94 and 5097.98, if human remains are uncovered during project construction activities, work within 50 feet of the remains shall be suspended immediately, and the City of Eureka Development Services Department (DSD) and Humboldt County Coroner shall be immediately notified. If the remains are determined by the Coroner to be Native American in origin, the Native American Heritage Commission (NAHC) shall be notified within 24 hours, and the guidelines of the NAHC shall be adhered to in the treatment and disposition of the remains.

XVIII. UTILITIES AND SERVICE SYSTEMS. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?			✓	
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			✓	

c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			✓	
d) Have insufficient water supplies available to serve the project from existing entitlements and resources (i.e., new or expanded entitlements are needed)?			✓	
e) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?			✓	
f) Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs?			✓	
g) Violate any Federal, State, and local statutes and regulations related to solid waste?			✓	

THRESHOLDS OF SIGNIFICANCE: This Initial Study considers to what degree the proposed project would: (a) exceed wastewater treatment requirements of the RWQCB; (b) require or result in a substantial demand for new water or wastewater facilities affecting existing entitlements and resources; (c) require or result in an increase in runoff intensity that exacerbates drainage conditions and changes; (d) have insufficient water supplies available to serve the project; (e) result in inadequate wastewater capacity; (f) result in an insufficient provision for solid waste disposal; and (g) violate any regulations related to solid waste.

DISCUSSION:

XVIII a, b, e) The proposed project will marginally increase the number of Drainage Fixture Units (DFUs) over the existing infrastructure currently on site. Current visitor serving facilities are sized appropriately for sewer and water capacity and areas of Zoo expansion will increase the number of DFUs by no more than 30% over the existing amount at the zoo. A less than significant impact will occur.

XVIII c) Expansion of Zoo facilities will result in on-site stormwater management including either newly designed LID features (rain gardens, detention/retention basins, etc.) or connections into the existing stormwater system. As discussed in the Hydrology and Water Quality section, there are proposed changes to drainage patterns associated with the project and a SWPPP will be prepared to address potential runoff and erosion during construction (Mitigation Measure IX-1). No off-site stormwater facilities will be constructed or expanded as a result of this project. Based on the information above, the impact is less than significant.

XVII d) There is a sufficient water supply available to serve the project; Humboldt Bay Municipal Water District currently supplies approximately 40 MGD, but is capable of providing up to 75 MGD. The project may require the temporary use of water for construction, establishment of vegetation, and during routine maintenance operations. These minor water demands would not require or result in the construction of new water supply facilities or new water entitlements; therefore, a less than significant impact is anticipated.

XVIII f, g) The solid waste provider is the Humboldt Waste Management Authority (HWMA). The project is not expected to generate a significant increase of services for solid waste disposal needs. The proposed project would generate limited solid waste during both construction and operation. Construction solid waste would include the one-time temporary generation of construction waste

associated with the proposed development of the project. Recyclable construction materials (e.g. scrap metal, wood, concrete, glass) will be shipped to local businesses for reuse, with non-recyclable materials sent to the HWMA transfer station in Eureka.

HWMA trucks solid waste produced in the County to State licensed landfills located in Anderson, California and Medford, Oregon in compliance with local, state, and federal regulations pertaining to solid waste disposal. These facilities have sufficient capacity to serve the project's solid waste disposal needs, and a less than significant impact is anticipated.

FINDINGS: The project is expected to have less than significant impacts related to utilities or service systems. Please refer to the City of Eureka Public Works Department letter regarding utility impact assessment (Appendix E).

XIX. MANDATORY FINDINGS OF SIGNIFICANCE.	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?		✓		
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects).		✓		
c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?		✓		

XIX a) As discussed herein, the project, with incorporation of mitigation measures, does not have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory.

XIX b) A cumulative impact is any environmental impact that would occur due to the combination of the proposed project together with other projects causing related impacts. These impacts occur when the incremental impact of the project, when combined with the effects of other past, present and reasonably foreseeable future projects, are cumulatively considerable. This typically occurs when impacts compound or increase existing environmental problems.

As discussed in Section X. Land Use and Planning, the project is consistent with the development contemplated in the City of Eureka's General Plan. The project's impacts would not add appreciably to any existing or foreseeable future significant cumulative impact, such as visual quality, historic resources, traffic impacts, or air quality degradation. Incremental impacts, if any, would be negligible and undetectable. As reported throughout the document, any applicable cumulative impacts to which this project would contribute would be mitigated to the less-than-significant level.

XIX c) The project has been designed to avoid significant environmental impacts. This Initial Study identifies additional mitigation measures which are expected to reduce environmental impacts to a less than significant level. As discussed herein, the project is not expected to cause any environmental effects that would cause harm to human beings either directly or indirectly.

FINDINGS: With the implementation of all mitigation measures identified in this report, the environmental impacts will be reduced to a less than significant level.

SOURCE/REFERENCE LIST:

The following documents/websites/data were used in the preparation of this Initial Study. The documents are available for review at the Development Services Department, 3rd floor, City Hall, during regular business hours. The websites can be viewed at the link provided.

1. Bay Area Air Quality Management District (BAAQMD). 2012. *California Environmental Quality Act Air Quality Guidelines*. Accessed online on November 20, 2017 at: http://www.baaqmd.gov/~media/files/planning-and-research/ceqa/baaqmd-ceqa-guidelines_final_may-2012.pdf
2. California Air Resources Board (CARB). 2013. iADAM: Air Quality Data Statistics. Accessed online at: <http://www.arb.ca.gov/adam/index.html>
3. California Department of Conservation. 2015. *CGS Information Warehouse: Regulatory Maps*. Accessed on November 20, 2017 at: <http://maps.conservation.ca.gov/cgs/informationwarehouse/index.html?map=regulatorymaps>
4. California Department of Toxic Substances Control (DOTC). 2013. *Hazardous Waste and Substances Site List*. Accessed online on December 9, 2013 at: <http://www.calepa.ca.gov/SiteCleanup/CorteseList/>
5. California Emergency Management Agency, California Geological Survey, University of Southern California (CalEMA et al.). 2009. *Tsunami Inundation Map for Emergency Planning Eureka Quadrangle*.
6. California Geologic Survey (CGS). 2010 *Fault Activity Map of California*. Accessed online on November 20, 2017 at: <http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html>
7. City of Eureka. (1997). *City of Eureka General Plan*.
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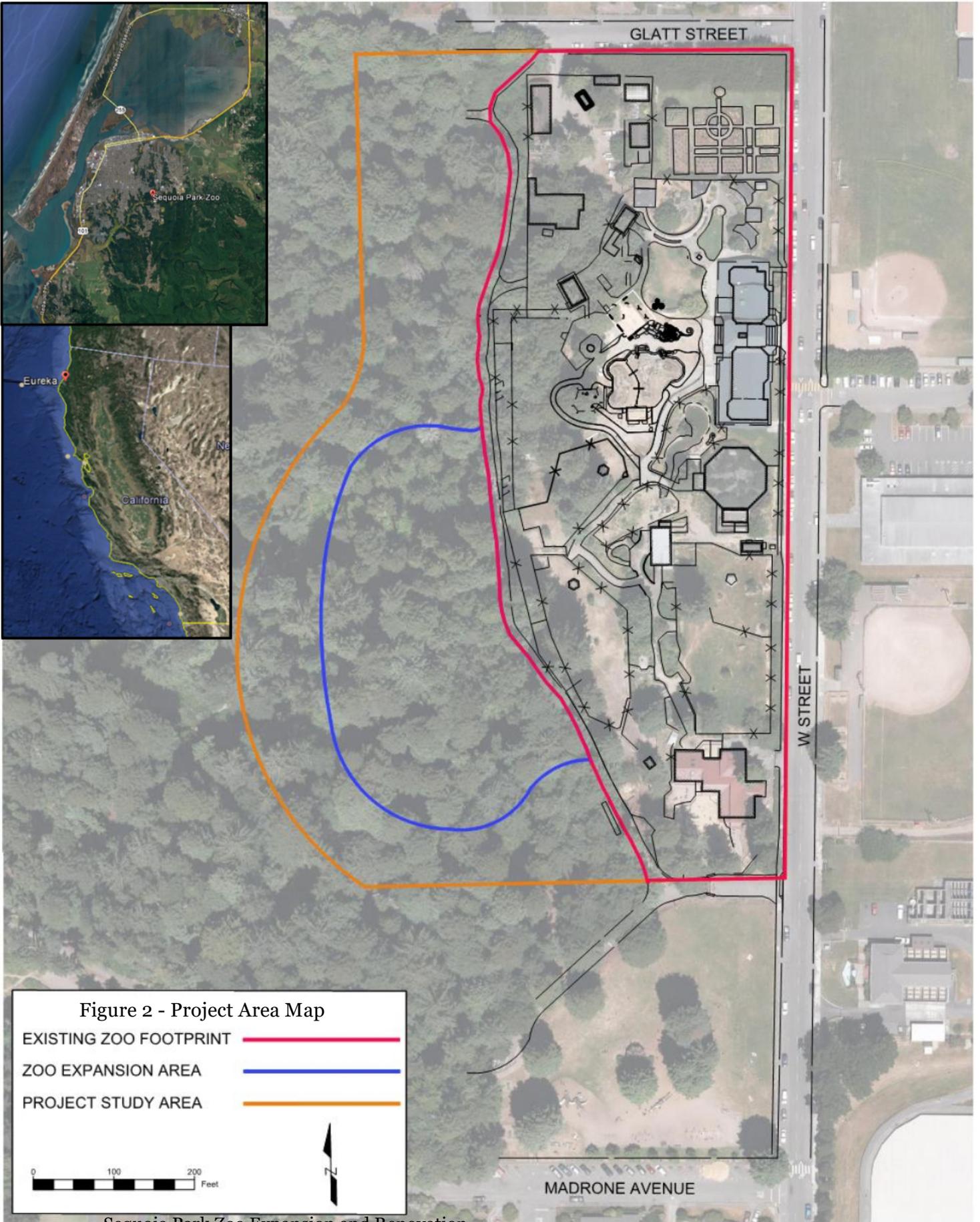


Figure 2 - Project Area Map

EXISTING ZOO FOOTPRINT —

ZOO EXPANSION AREA —

PROJECT STUDY AREA —

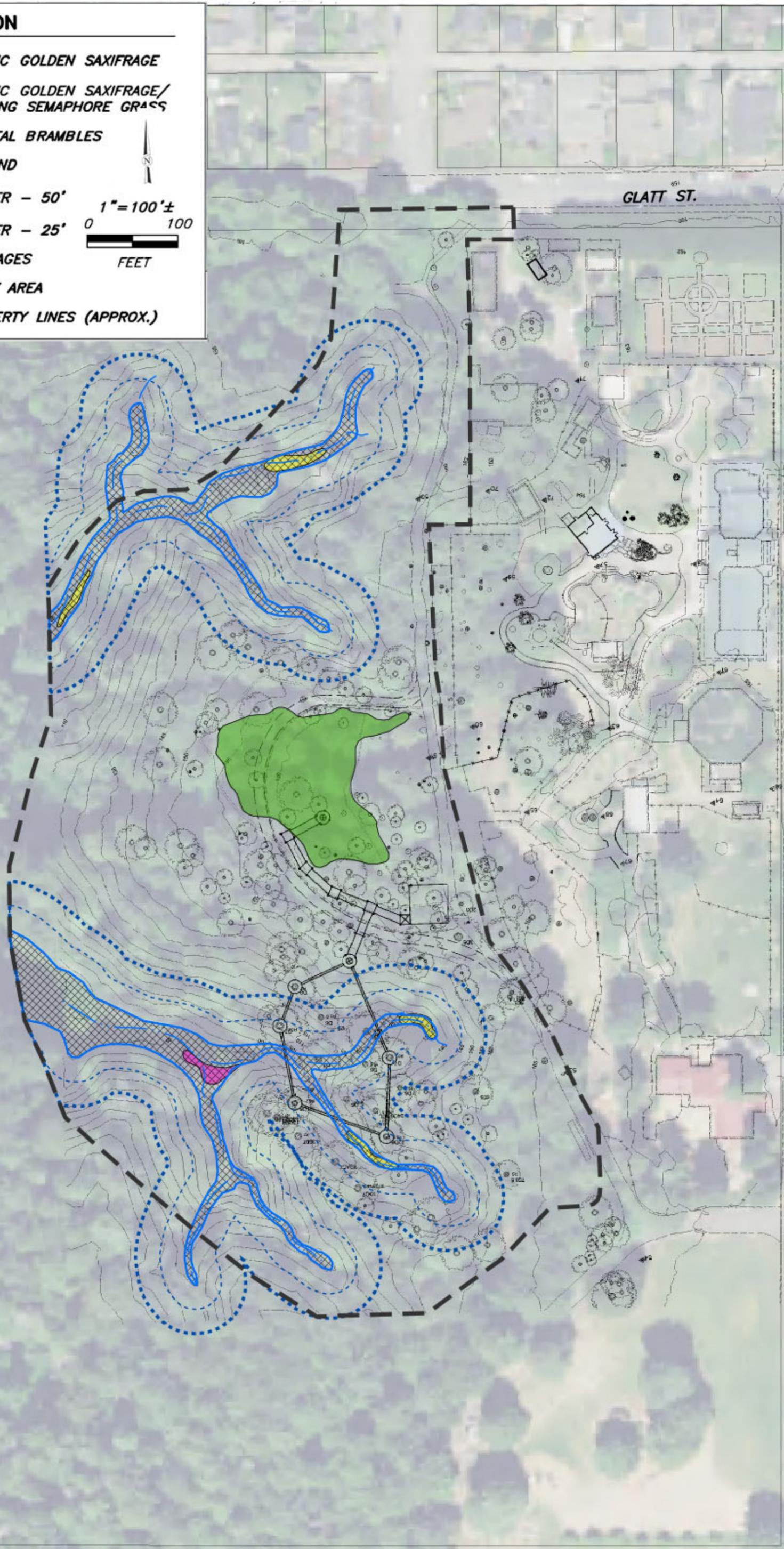
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N

Sequoia Park Zoo Expansion and Renovation

EXPLANATION

- PACIFIC GOLDEN SAXIFRAGE
- PACIFIC GOLDEN SAXIFRAGE/
NODDING SEMAPHORE GRASS
- COASTAL BRAMBLES
- WETLAND
- BUFFER - 50'
- BUFFER - 25'
- DRAINAGES
- STUDY AREA
- PROPERTY LINES (APPROX.)



<p>Consulting Engineers & Geologists, Inc.</p>	<p>City of Eureka Sequoia Park Zoo Expansion NRA Eureka, California</p>	<p>Vegetation Communities & Sensitive Natural Habitat SHN 017073</p>
<p>September 2017</p>	<p>NRA_Fig3_VegCommunities</p>	<p>Figure 3</p>

Appendix B

Natural Resource Assessment

Sequoia Park Zoo Expansion and Renovation



Natural Resources Assessment

Sequoia Park Zoo Expansion Project

Eureka, California

Prepared for:

City of Eureka

SH Engineers & Geologists

1062 G Street, Suite I

Arcata, CA 95521

707-822-5785

Sequoia Park Zoo Expansion and Renovation

September 2017

017073



Reference: 017073.100

September 26, 2017

Rob Dumouchel
City of Eureka
1011 Waterfront Drive
Eureka, CA 95501

Subject: Natural Resources Assessment, Sequoia Park Zoo Expansion

Dear Mr. Dumouchel:

SHN Engineers & Geologists has prepared this Natural Resources Assessment for the Sequoia Park Zoo Expansion project. This report addresses potential impacts to vegetation communities, special status species habitat, and special status species.

Two special status species were documented within or adjacent to the project area. With recommended buffers, the proposed project will not have a substantial effect on these special status plant populations. Vegetation communities are likely to be impacted by the proposed project; however recommended mitigation measures will reduce potential impacts to less than significant.

Please call me at 707-822-5785 if you have any comments or concerns.

Sincerely,

SHN Engineers & Geologists

Joseph Saler
Biologist/Botanist

JLS:ceg

Enclosure: Natural Resources Assessment

Reference: 017073

Natural Resources Assessment

Sequoia Park Zoo Expansion Project Eureka, California

Prepared for:

City of Eureka
1011 Waterfront Drive
Eureka, CA 95501

Prepared by:



Engineers & Geologists
1062 G Street, Suite I
Arcata, CA 95521
707-822-5785

September 2017

QA/QC: JLS

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Abbreviations and Acronyms

°F	degrees Fahrenheit	G4/S4	apparently secure species heritage rank
ACOE	Army Corps of Engineers	G5/S5	secure species heritage rank
BIOS	Biogeographical Information and Observation System	IPaC	Information for Planning and Conservation
C	candidate species status	MBTA	Migratory Bird Treaty Act
CCH	Consortium of California Herbaria	NCCP	Natural Community Conservation Planning Act
CCR	California Code of Regulations	NEPA	National Environmental Policy Act
CDFW	California Department of Fish and Wildlife	NMFS	National Marine Fisheries Service
CEQA	California Environmental Quality Act	NPPA	Native Plant Protection Act
CESA	California Endangered Species Act	NRA	natural resource assessment
CFGC	California Fish and Game Code	NSO	Northern Spotted Owl
CFR	Code of Federal Regulations	NWI	National Wetland Inventory
CNDDDB	California Natural Diversity Database	PT	proposed threatened species status
CNPS	California Native Plant Society	RWQCB	Regional Water Quality Control Boards
CRPR	California Rare Plant Rank	SAA	Streambed Alteration Agreement
CT	candidate threatened species status	SHN	SHN Engineers & Geologists
CWA	Clean Water Act	SMA	Streamside Management Area
D	delisted species status	SMAO	Streamside Management Area Ordinance
DPS	Northern California distinct population segment/species status	SSC	species of special concern
EPA	Environmental Protection Agency	SWRCB	State Water Resources Control Board
ESU	evolutionarily significant unit/species status	T	threatened species status
FESA	Federal Endangered Species Act	U.S.	United States
FP	fully protected species status	USC	U.S. Code
G1/S1	critically imperiled species heritage rank	USFWS	United States Fish and Wildlife Service
G2/S2	imperiled species heritage rank	USGS	United States Geological Survey
G3/S3	vulnerable species heritage rank	VegCAMP	Vegetation Classification and Mapping Program
		WDR	Waste Discharge Requirement
		WL	watch list species status

1.0 Introduction

SHN Engineers & Geologists has conducted site investigations, literature reviews, and an assessment to determine biological resources present within the proposed expansion area of the Sequoia Park Zoo. This natural resource assessment (NRA) has been prepared to evaluate the potential for special status biological resources within the project area, including natural communities.

The Sequoia Park Zoo has been looking to expand in order to better showcase the wildlife that occurs in our local natural environment. In addition, a canopy walk is proposed that will enable the public to explore the redwood canopy, and gain knowledge about the natural environment that makes up a large portion of Humboldt County. The proposed expansion and canopy walk requires that the Zoo expand into a currently forested portion of Sequoia Park.

As part of the expansion an approximately one-acre portion of forest will need to be selectively thinned, graded, fenced, and Zoo facilities will need to be constructed. The canopy walk will be constructed within numerous redwood (*Sequoia sempervirens*) trees growing within a ravine below the proposed expansion. An all-weather access road will be constructed along the outside of the zoo fence to allow access to the park and back side of the Zoo. The proposed Zoo expansion, currently under design, consists of the following elements (see Figures 1-3):

- Selective tree cutting and grading within approximately one-acre of forest, and constructing infrastructure for the Zoo , including pathways, enclosures, and exhibits;
- construction of a canopy walk that will allow people to walk into the lower reaches of the redwood canopy, with elevated walkways between numerous trees; and
- construction of an all-weather access road around the perimeter of the Zoo expansion using technology that is least damaging to roots.

These proposed plans are part of the Sequoia Park Zoo expansion that would enable the Zoo to increase their ability to house local wildlife species in an area the general public can have access; however the expansion would occur within an already forested area that represents potential habitat for redwood forest dependent species.

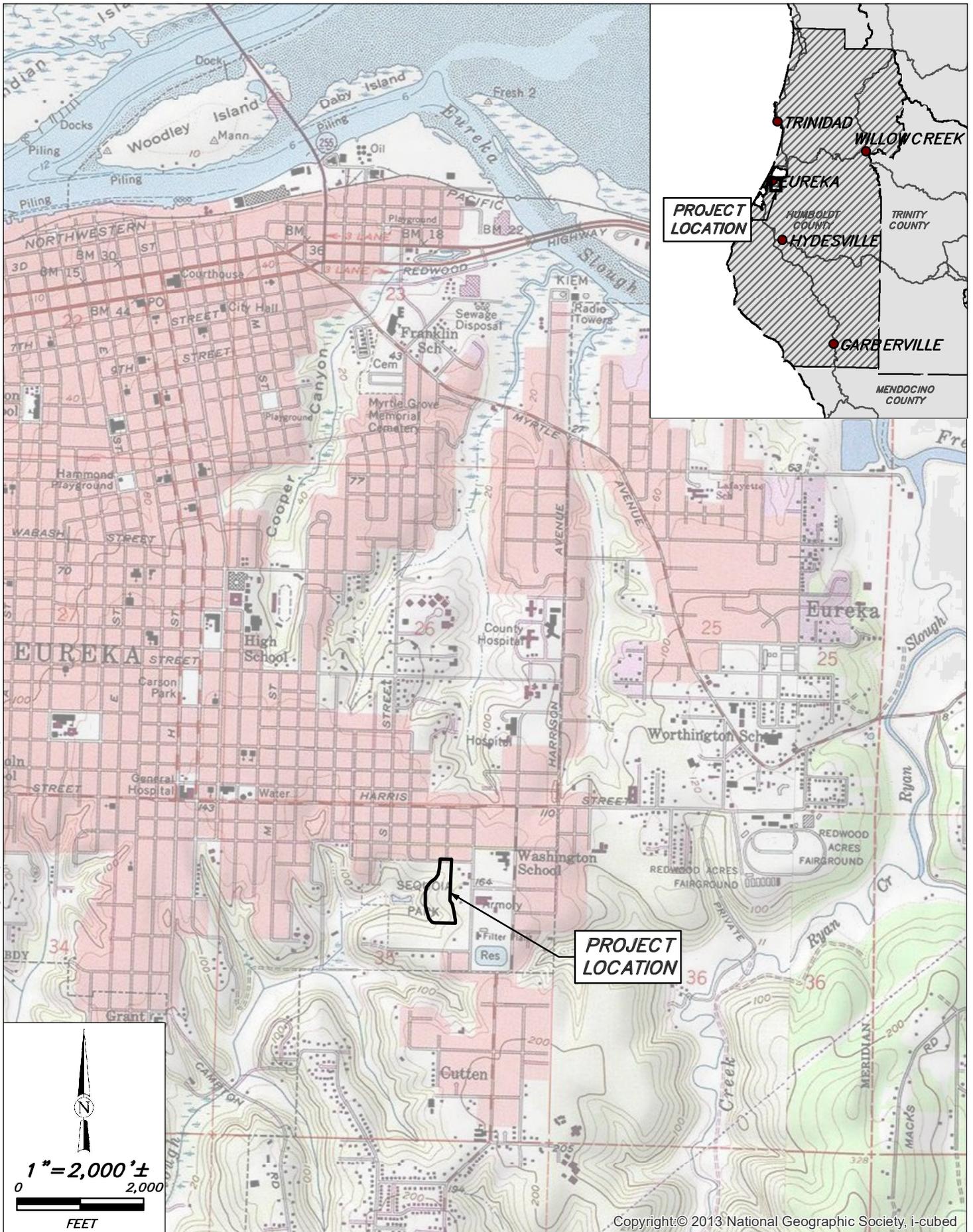
1.1 Project Location

The project is located within the City of Eureka, California approximately 2.25 miles south east of Humboldt Bay, and 4,000 feet west of Ryan Slough, near the southeastern city limits. The site is accessed off W Street south of Harris Street in Eureka (Township 5N, Range 1W) within the 7.5-minute Eureka United States Geological Survey (USGS) Quadrangle (Figure 1) with a center point latitude and longitude of 40.776774, -124.145516.

1.2 Site Description

The project is located within Sequoia Park in the City of Eureka. The proposed expansion area is characterized by mature second growth redwood forest, with trails throughout the area. The Sequoia Park Zoo makes up the eastern boundary of the study area, while the western portion of the study area drops steeply into a ravine within the center of Sequoia Park. The Ravine wraps

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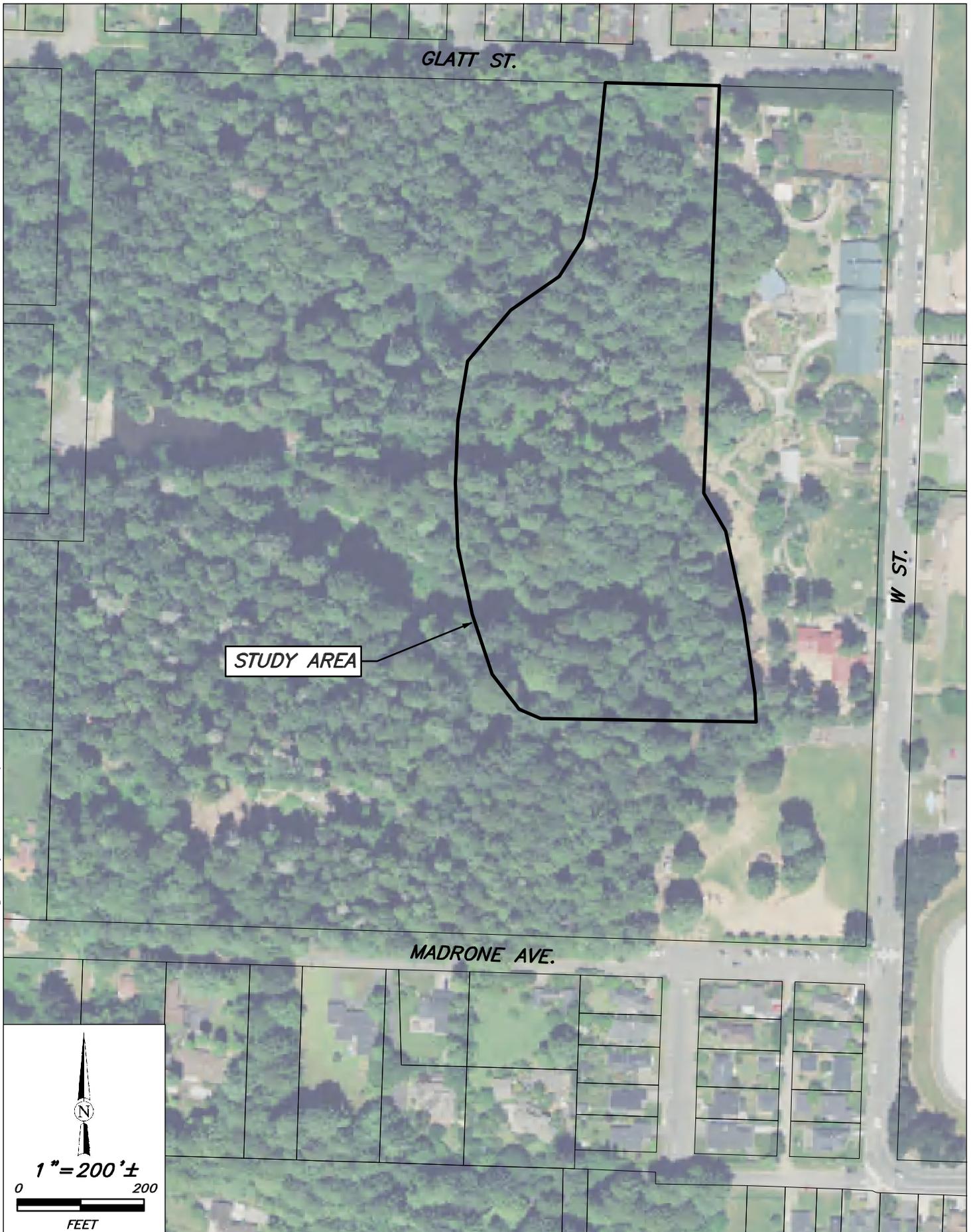
SHN
 Consulting Engineers
 & Scientists
 Sequoia Park Zoo Expansion and Renovation
 September 2017

City of Eureka
 Sequoia Park Zoo Expansion NRA
 Eureka, California

Project Location
 SHN 017073

Figure 1

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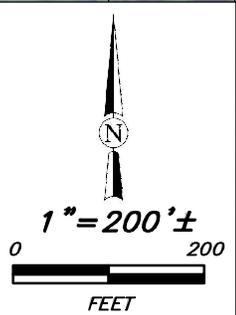


STUDY AREA

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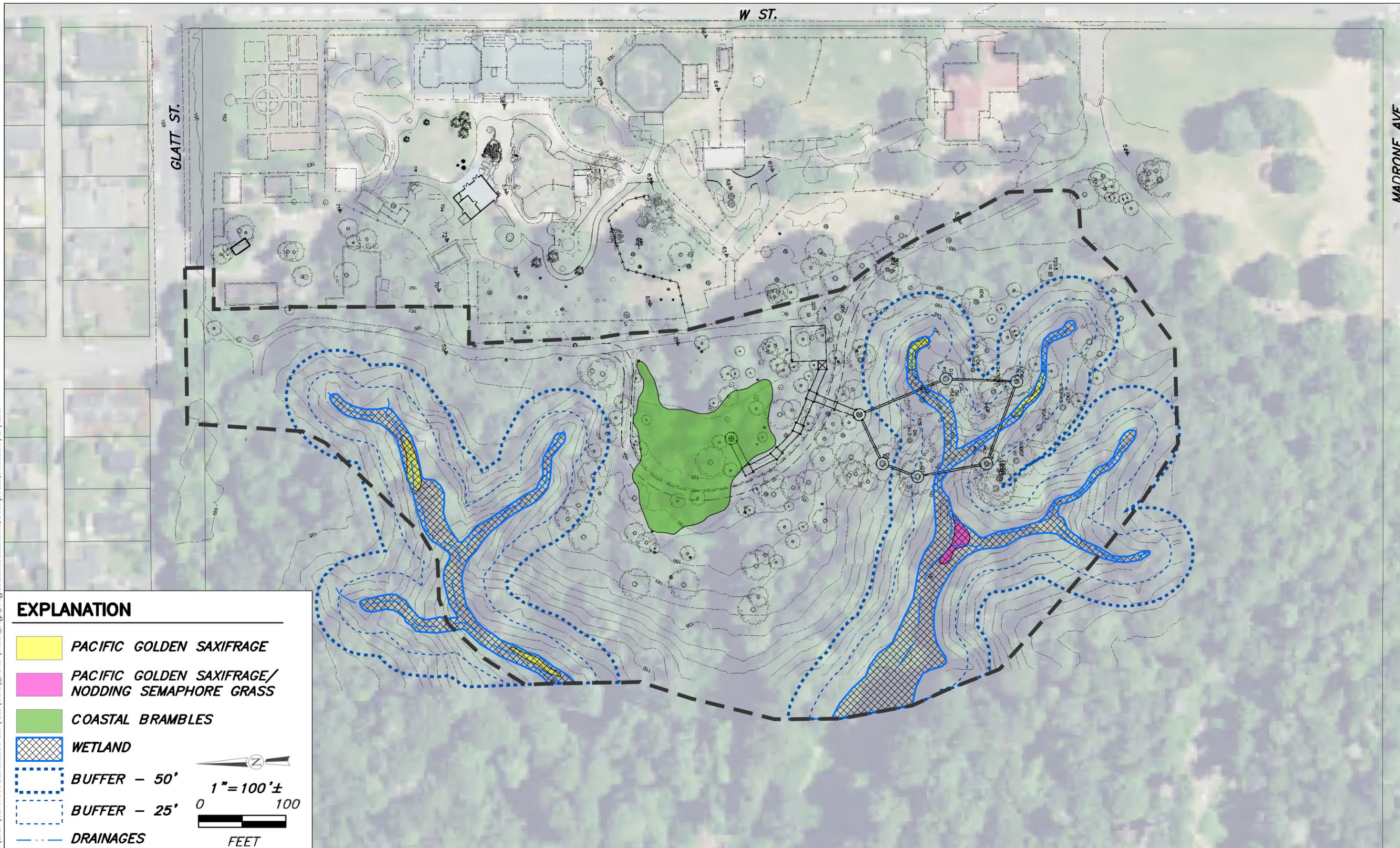
MADRONE AVE.

W ST.



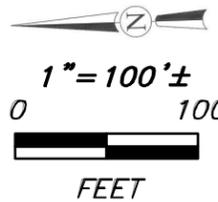
 <p>SHN Consulting Engineers & Geologists, LLC</p>	<p>City of Eureka Sequoia Park Zoo Expansion NRA Eureka, CA</p>	<p>Study Area SHN 017117</p>
<p>Sequoia Park Zoo Expansion and Renovation September 2017</p>		<p>NRA_Fig2_StudyArea Figure 2</p>

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EXPLANATION

- PACIFIC GOLDEN SAXIFRAGE
- PACIFIC GOLDEN SAXIFRAGE/
NODDING SEMAPHORE GRASS
- COASTAL BRAMBLES
- WETLAND
- BUFFER - 50'
- BUFFER - 25'
- DRAINAGES
- STUDY AREA
- PROPERTY LINES (APPROX.)



around the majority of the study area, and represents the edge of the proposed project. Urban development surrounds Sequoia Park with more dense development to the north and west, and development density becoming less to the east and south.

2.0 Methodology

2.1 Literature Review

This Natural Resources Assessment includes a review of pertinent literature on habitat characteristics of the site, and a review of information related to special status species of plants and animals that could potentially use the described habitats.

The findings for this report are a result of several sources, including a review of existing literature regarding sensitive resources that have the potential to occur within the site. Resources for this determination included:

- California Natural Diversity Database (CNDDDB) query for the Eureka and surrounding USGS 7.5 minute topographic quadrangles (Tyee City, Arcata North, Arcata South, Cannibal Island, Fields Landing, and McWhinney Creek) (California Department of Fish and Wildlife [CDFW], 2017a)
- Biogeographical Information and Observation System (BIOS; CDFW, 2017b)
- Electronic Inventory of Rare and Endangered Vascular Plants of California (California Native Plant Society [CNPS], 2017) query for a list of all plant species reported for the Eureka and surrounding U.S.GS 7.5 minute topographic quadrangles
- Special Vascular Plants, Bryophytes, and Lichens of California List (CDFW, 2017c);
- Special Animals of California List (CDFW, 2017d)
- United States Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) was queried for threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of the proposed project and/or may be affected by the proposed project (USFWS, 2017a)

From the database queries, a list of potential target species for the study area was compiled. Tables A-1 and A-2 in Appendix A include species reported by the CNDDDB and USFWS, and species listed in the CNPS inventory of rare plants.

Additionally, USFWS's Critical Habitat Portal was queried for habitat designated as critical for species listed under the Federal Endangered Species Act (FESA). Martin and Ryan Sloughs are listed as critical habitat for the Northern California distinct population segment (DPS) for Steelhead (*Oncorhynchus mykiss*) and the tidewater goby (*Eucyclogobius newberryi*).

The closest documented CNDDDB occurrence of a special status species is an osprey (*Pandion haliaetus*) that was reported in 1998, approximately 2,500 feet to the southwest. Additionally, the project area lies within a large polygon for the western lily (*Lilium occidentale*), for a 1925 occurrence over 1 mile away that is presumed extirpated. Listed plant species from the local area

include the ghost pipe (*Monotropa uniflora*), Pacific gilia (*Gilia capitata* ssp. *pacifica*), northern meadow sedge (*Carex praticola*), Siskiyou checkerbloom (*Sidalcea malviflora* ssp. *patula*), maple-leaved checkerbloom (*Sidalcea malachroides*), and Lyngbye's sedge (*Carex lynbyei*).

Prior to the field investigation, a review of plant species reported from the project area was performed by querying the "Consortium of California Herbaria" database records and "Calflora" observations.

2.2 Field Observations and Studies

Botanical/biological surveys and habitat assessments were conducted on April 18 and July 28, 2017. The April and July site visits included seasonally appropriate floristic surveys, with an attempt to identify all species present within the project-related area of potential effects, including possible species of special concern (CDFW, 2009) (Figure 2). In addition to surveying for target species, a list of all botanical and wildlife species encountered was compiled (Table A-3 and Table A-4, in Appendix A). Plants were identified to the lowest taxonomic level possible to distinguish special status species from others. Nomenclature for special status animals conforms to California Department of Fish and Wildlife (CDFW, 2017b). Plant community names conform to *A Manual of California Vegetation, Second Edition* (Sawyer et al; 2009) and the VegCAMP (Vegetation Classification and Mapping Program) Natural Communities List (CDFW; 2010). Botanical nomenclature of species in this Assessment follows the *Jepson Manual* (Baldwin et al., 2012) and subsequent online revisions.

Site photographs from the site visits are included in Appendix B.

3.0 Environmental Setting

The project site is situated in central Humboldt County within the City limits of Eureka, at elevations ranging from approximately 145 feet to 165 feet above mean sea level. Geology within the location is characterized as an uplifted marine terrace composed of softly consolidated clay, silt, sand, and gravel. The terrace is deeply dissected with drainages and streams eroding gulches and steep ravines into the terrace. The flat upland portions of the terrace are surrounded by grades that slope sharply toward alluvial lowlands, wetlands, and farmed bottomlands. Vegetation is dominated by mature second-growth redwood forest and represents native habitat area within an urban setting; however the surrounding urban and sub-urban setting has contributed to a high percentage of non-native species cover within the understory and herbaceous stratum of the study area. The average 30-year precipitation data for this area from October 1 through August 24 is 40.33 inches (NOAA Eureka Station, 2016) with the majority of precipitation occurring between November and March. Temperatures in Eureka range from an average low of 46.2 degrees Fahrenheit (°F) in December to an average high of 59.6°F in September; extremes in temperatures are relatively uncommon due to the regional maritime influence.

3.1 Hydrology

The project location is within the Humboldt Bay watershed (hydrologic unit code 18010102). The study area contains a predominantly west aspect, resulting in westward surface water flow of unnamed tributaries of Martin Slough, which flows into the Elk River and Humboldt Bay. The mouth of the Elk River into Humboldt Bay is approximately 4.95 river miles from the project location. The confluence of Martin Slough with Elk River is approximately 3.4 river miles from the project location.

The USFWS is the federal agency responsible for tracking wetland trends as well as maintaining a reliable inventory through its National Wetland Inventory (NWI) (USFWS, 2017b). The NWI can be queried for specific locations throughout the U.S. to aid federal, state, and local agencies in making reconnaissance level decisions concerning wetlands. According to the NWI, freshwater pond and riverine wetland types occur within the study area region, but outside of the project area (Appendix C).

Although NWI maps are excellent references for determining the presence or absence of wetlands, the resolution of the NWI tends to be on a macro scale, often with no field verification. Site-specific wetland delineations are necessary to determine an accurate distribution of wetlands within a proposed study area.

3.2 Soils

Soils within the project area were categorized as Larabee, Empire, and urban/industrial (McLaughlin and Harradine; 1965). Larabee soils (914) are loam/clay loam soils derived from soft sedimentary rock, such as is found on uplifted marine terraces. Empire soils (920) are similar to Larabee soils and are a loam/clay loam derived from soft sedimentary rock such as is found on uplifted marine terraces. Both soil types support high timber growth. The region's young alluvial deposits, softly consolidated sediments, and Franciscan formations to the south are reported as sandstone, shale, and minor conglomerates within the coastal belt of northwestern California.

3.3 Vegetation Communities

The majority of the study area is composed of the *Sequoia sempervirens* Forest Alliance (Sawyer et al., 2009), with redwoods constituting over 50 percent of the relative cover and Douglas fir (*Pseudotsuga menziesii*), Sitka spruce (*Picea sitchensis*), and grand fir (*Abies grandis*) as lesser co-dominants. Within riparian and mesic locations of this vegetation stand, red alder (*Alnus rubra*) and bigleaf maple (*Acer macrophyllum*) are also present within the tree stratum. The shrub and herb layer within this stand is dominated by evergreen huckleberry (*Vaccinium ovatum*), false lily of the valley (*Maianthemum dilatatum*), large fairy bells (*Prosartes smithii*), redwood sorrel (*Oxalis oregana*), and western sword fern (*Polystichum munitum*), with additional dominance by the invasive English ivy (*Hedera helix*).

The central portion of the study area has a break in the redwood canopy allowing for the development of *Rubus* (*parviflorus*, *spectabilis*, *ursinus*) shrubland alliance (coastal brambles) (Sawyer et al., 2009, VegCAMP, 2010), with thimbleberry, salmonberry, or California blackberry exhibiting over 50 percent cover, with dominance varying between the three species. Lesser dominant species included canyon gooseberry (*Ribes menziesii*), Henderson's sedge (*Carex hendersonii*), inside-out-flower (*Vancouveria planipetala*), and the false lily of the valley. The *Rubus* (*parviflorus*, *spectabilis*,

ursinus) shrubland alliance patches may represent a transitional vegetation community, with encroaching tree species eventually shading out the *Rubus* patches, except in areas that are cleared or opened by tree blow-downs.

Areas surrounding Sequoia Park contain an urbanized landscape lacking distinct natural vegetation communities. This region is composed of horticultural and exotic species of plants that are typical of developed residential and industrial locations including Monterey pine cultivars (*Pinus radiata* X), Himalayan blackberry, Scotch broom (*Cytisus scoparius*), curly dock (*Rumex crispus*), bird's foot trefoil (*Lotus corniculatus*), and non-native grasses. Additional Vegetation Communities exist to the south of Sequoia Park within the lowlands and sloughs, but will not be directly impacted by this project and are not analyzed in this report.

3.4 Wildlife Habitats

Common wildlife species expected on the site are those typically associated with deciduous riparian forests, urban landscapes, coniferous forests, and urban/wildland interfaces of northwestern California. Wildlife species observed at the site included common raven (*Corvus corax*), American robin (*Turdus migratorius*), song sparrow (*Melospiza melodia*), turkey vulture (*Cathartes aura*), and Pacific tree frog (*Pseudacris regilla*). Other wildlife species are likely to inhabit the surrounding area and it is expected that there are many other bird, mammal, and amphibian species that might use the project site, if only transitionally. However, human activities within the project site may limit the abundance of a variety of birds and animals.

3.5 Wildlife Movement Corridors

Wildlife movement includes migration (i.e., usually one-way per season), inter-population movement (i.e., long-term genetic flow), and small travel pathways (i.e., daily movement corridors within an animal's territory). While small travel pathways usually facilitate movement for daily home range activities, such as, foraging or escape from predators, they also provide connection between outlying populations and the main corridor, permitting an increase in gene flow among populations.

These linkages among habitat types can extend for miles from primary habitat areas and occur on a large scale throughout California. Habitat linkages facilitate movement between populations located in discrete areas and populations located within larger habitat areas. The mosaic of habitats found within a large-scale landscape results in wildlife populations that consist of discrete sub-populations constituting a large single population, which is often referred to as a meta-population. Even where patches of pristine habitat are fragmented, such as occurs with coastal scrub, the movement between wildlife populations is facilitated through habitat linkages, migration corridors, and movement corridors. Depending on the condition of the corridor, genetic flow between populations may be high in frequency, thus allowing high genetic diversity within the population, or may be low in frequency. Low-frequency genetic flow may potentially lead to complete isolation and, if pressures are strong, potential extinction (McCullough, 1996; Whittaker, 1998).

The study area includes drainages connecting to Martin Slough, as well as mature second-growth redwood forest, in addition to surrounding urbanized landscapes. It is likely that wildlife use natural portions of the study area as movement corridors. Most of the wildlife movement corridors

are expected to be concentrated on nearby perennial drainages. It is likely that wildlife use Sequoia Park as refugia within the urban region of Eureka as well as a movement corridor between developed areas, and more natural areas surrounding Humboldt Bay.

3.6 Offsite Conditions

The habitats adjacent to the project area within Sequoia Park are similar to their respective zones within the project area. Habitat values outside of Sequoia Park are significantly lower than those in the project area, with suburban and urban development of the City of Eureka surrounding Sequoia Park and the project area.

4.0 Regulatory Setting

Regulatory authority over biological resources is shared by federal, state, and local authorities under a variety of legislative acts. The following section summarizes the federal, state, and local regulations for special status species, jurisdiction waters of the U.S. and State of California, and other sensitive biological resources. This section provides a listing and overview of these federal and state laws; only select regulations will be applicable to this project.

4.1 Federal Laws

4.1.1 Clean Water Act Sections 404 and 401

Under Section 404 (33 U.S. Code (USC) 1344) of the Clean Water Act (CWA), as amended, the Army Corps of Engineers (ACOE) retains primary responsibility for permits to discharge dredged or fill material into waters of the U.S. All discharges of dredged or fill material into jurisdictional waters of the U.S. that result in permanent or temporary losses of waters of the U.S. are regulated by the ACOE. A permit from the ACOE must be obtained before placing fill or grading in wetlands or other waters of the U.S., unless the activity is exempt from CWA Section 404 regulation (for example, certain farming and forestry activities).

The ACOE defines wetlands as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (ACOE Environmental Laboratory, 1987). In other words, the ACOE defines wetlands by the presence of all three wetland indicators: hydrophytic vegetation, hydric soils, and wetlands hydrology.

Waters of the U.S. are defined at 33 Code of Federal Regulations (CFR) Part 328. They include traditional navigable waters; relatively permanent, non-navigable tributaries of traditional navigable waters; and certain wetlands. Following recent court cases, the U.S. Environmental Protection Agency (EPA) and ACOE published a memorandum entitled Clean Water Act Jurisdiction (U.S. ACOE/ U.S. EPA, 2008) to guide the determination of jurisdiction over waters of the U.S., especially for wetlands. The applicability of Section 404 permitting over discharges to wetlands is, therefore, a two-step process: 1) determining the areas that are wetlands, and 2) where a wetland is present, assessing the wetland’s connection to traditional navigable waters and non-navigable tributaries to determine whether the wetland is jurisdictional under the CWA. A wetland is considered jurisdictional if it meets certain specified criteria.

The ACOE is required to consult with the USFWS and/or National Marine Fisheries Service (NMFS) under Section 7 of the FESA if the action subject to CWA permitting could result in “Take” of federally listed species or an adverse effect to designated critical habitat. The project is within the jurisdiction of the Sacramento District of the ACOE.

Section 401 of the CWA (33 U.S.C. 1341) requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the U.S. to obtain a certification from the state in which the discharge originates or would originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the affected waters at the point where the discharge originates or would originate, that the discharge will comply with the applicable effluent limitations and water quality standards. A certification obtained for the construction of any facility must also pertain to the subsequent operation of the facility. The responsibility for the protection of water quality in California rests with the State Water Resources Control Board (SWRCB) and its nine Regional Water Quality Control Boards (RWQCB). The project is within the jurisdiction of the North Coast RWQCB.

4.1.2 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 U.S.C. Sections 661-667e, March 10, 1994, as amended 1946, 1958, 1978, and 1995) requires that whenever waters or channel of a stream or other body of water are proposed or authorized to be modified by a public or private agency under a federal license or permit, the federal agency must first consult with the USFWS and/or NMFS and with the head of the agency exercising administration over the wildlife resources of the state where construction will occur (in this case the CDFW), with a view to conservation of birds, fish, mammals, and all other classes of wild animals and all types of aquatic and land vegetation upon which wildlife is dependent.

If direct permanent impacts occur to waters of the U.S. from a proposed project, then a permit from ACOE under CWA Section 404 is required for the construction of the proposed project. ACOE is required to consult with USFWS and/or NMFS as appropriate regarding potential impacts to federally listed species under FESA. Such action may prompt consultation with CDFW, which would review the project pursuant to California Endangered Species Act (CESA) and issue a consistency letter with USFWS and/or NMFS, if required.

4.1.3 Federal Endangered Species Act

The United States Congress passed the FESA in 1973 to protect species that are endangered or threatened with extinction. The FESA is intended to operate in conjunction with the National Environmental Policy Act (NEPA) to help protect the ecosystems upon which endangered and threatened species depend and within which they live. The USFWS and the NMFS are the designated federal agencies responsible for administering the FESA.

The FESA prohibits the “Take” of endangered or threatened wildlife species. A “Take” is defined as harassing, harming (including significantly modifying or degrading habitat), pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting wildlife species, or any attempt to engage in such conduct (16 U.S.C. 1531, 50 CFR 17.3). An activity can be defined as a “Take” even if it is unintentional or accidental. Taking can result in civil or criminal penalties. Activities that could result in “Take” of a federally listed species require an incidental “Take” authorization

resulting from FESA Section 7 consultation or FESA Section 10 consultation. Plants are legally protected under the FESA only if “Take” occurs on federal land or from federal actions, such as issuing a wetland fill permit.

A federal endangered species is one that is considered in danger of becoming extinct throughout all, or a significant portion, of its range. A federal threatened species is one that is likely to become endangered in the foreseeable future. The USFWS also maintains a list of species proposed for listing as threatened or endangered. Proposed species are those for which a proposed rule to list as endangered or threatened has been published in the Federal Register. In addition to endangered, threatened, and proposed species, the USFWS maintains a list of candidate species. Candidate species are those for which the USFWS has on file sufficient information to support issuance of a proposed listing rule.

Pursuant to the requirements of the FESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally listed endangered or threatened species may be present in the project area and determine whether the proposed project will have a potentially significant impact on such a species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under the FESA or result in the destruction or adverse modification of critical habitat designated or proposed to be designated for such species (16 U.S.C. 1536[3], [4]). Project-related impacts to species on the FESA endangered or threatened list would be considered significant and would require mitigation.

4.1.4 Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) of 1918 makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in CFR Part 10, including feather or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). The MBTA also prohibits disturbance and harassment of nesting migratory birds at any time during their breeding season. The USFWS is responsible for enforcing the MBTA (16 U.S.C. 703). The migratory bird nesting season is generally considered to be between March 15 and August 1 within the study region.

4.2 State Laws

4.2.1 Porter-Cologne Water Quality Control Act

The state and RWQCB also maintain independent regulatory authority over the placement of waste, including fill, into waters of the State under the Porter-Cologne Water Quality Control Act. Waters of the State are defined by the Act as “any surface water or groundwater, including saline waters, within the boundaries of the state.” The SWRCB protects all waters in its regulatory scope, but has special responsibility for isolated wetlands and headwaters. These water bodies might not be regulated by other programs, such as Section 404 of the CWA. Waters of the State are regulated by the RWQCBs under the State Water Quality Certification Program, which regulates discharges of dredged and fill material under Section 401 of the CWA and the Porter-Cologne Water Quality Control Act. Projects that require an ACOE permit, or fall under other federal jurisdiction, and have the potential to impact waters of the State are required to comply with the terms of the Water Quality Certification Program. If a proposed project does not require a federal license or permit,

but does involve activities that may result in a discharge of harmful substances to waters of the State, the RWQCBs have the option to regulate such activities under their state authority in the form of Waste Discharge Requirements (WDRs) or certification of WDRs.

4.2.2 California Endangered Species Act

The State of California enacted the CESA in 1984. The CESA is similar to the FESA but pertains to state-listed endangered and threatened species. Under the CESA, the CDFW has the responsibility for maintaining a list of threatened and endangered species designated under State law (California Fish and Game Code [CFGF] 2070). Section 2080 of the CFGF prohibits “Take” of any species that the commission determines to be an endangered or threatened species. “Take” is defined in Section 86 of the CFGF as “to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.”

The State and federal lists of threatened and endangered species are generally similar; however, a species present on one list may be absent from the other. CESA regulations are also somewhat different from the FESA in that the State regulations included threatened, endangered, and candidate plants on non-federal lands within the definition of “Take.” CESA allows for “Take” incidental to otherwise lawful development projects.

Pursuant to the requirements of the CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any State-listed endangered or threatened species may be present in the project area and determine whether the proposed project will have a potentially significant impact on such species. Project-related impacts to species on the CESA endangered or threatened list (or, in addition, designated by the CDFW as a “Species of Special Concern,” which is a level below threatened or endangered status) would be considered significant and would require mitigation.

4.2.3 California Environmental Quality Act

California Environmental Quality Act (CEQA) Guidelines Sections 15125 (c) and 15380(d) provide that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria. Thus, CEQA provides the ability to protect a species from potential project impacts until the respective government agencies have an opportunity to designate the species as protected, if warranted.

The California Native Plant Society (CNPS) maintains a list of plant species native to California whose populations that are significantly reduced from historical levels, occur in limited distribution, or are otherwise rare or threatened with extinction. This information is published in the Inventory of Rare and Endangered Plants of California (CNPS, 2015). Taxa with a California Rare Plant Rank (CRPR) of 1A, 1B, 2A, 2B, and 3 in the CNPS inventory consist of plants that meet the definitions of the CESA of the CFGF, are eligible for State listing, and meet the definition of Rare or Endangered under CEQA Guidelines Sections 15125 (c) and 15380(d). Some taxa with a CRPR 4 may meet the definitions of the CESA of the CFGF. CRPR 4 populations may qualify for consideration under CEQA if they are peripheral or disjunct populations; represent the type locality of the species; or exhibit unusual morphology and/or occur on unusual substrates.

Additionally, CDFW maintains lists of special animals and plants. These lists include a species conservation ranking status from multiple sources, including FESA, CESA, federal departments

with unique jurisdictions, CNPS, and other non- governmental organizations. Based on these sources, CDFW assigns a heritage rank to each species according to their degree of imperilment (as measured by rarity, trends, and threats). These ranks follow NatureServe’s Heritage Methodology, in which all species are listed with a G (global) and S (state) rank. Species with State ranks of S1-S3 are also considered highly imperiled.

CEQA checklist IV (b) calls for the consideration of riparian habitats and sensitive natural communities. Sensitive vegetation communities are natural communities and habitats that are either unique, of relatively limited distribution in the region, or of particularly high wildlife value. However, these communities may or may not necessarily contain special status species. Sensitive natural communities are usually identified in local or regional plans, policies, or regulations, or by the CDFW (i.e., the CNDDDB and VegCAMP programs) or the USFWS. Impacts to sensitive natural communities and habitats must be considered and evaluated under the CEQA (California Code of Regulations [CCR]: Title 14, Div. 6, Chap. 3, Appendix G).

Although sensitive natural communities do not (at present) have legal protection, CEQA calls for an assessment of whether any such resources would be affected, and requires a finding of significance if there will be substantial losses. High quality occurrences of natural communities with heritage ranks of 3 or lower are considered by CDFW to be significant resources and fall under the CEQA Guidelines for addressing impacts. Local planning documents (such as general plans) often identify these resources as well. Avoidance, minimizations, or mitigation measures should be implemented if project-affected stands of rare vegetation types or natural communities are considered high-quality occurrences of the given community.

As a trustee agency under CEQA, CDFW reviews potential project impacts to biological resources, including wetlands. In accordance with the CEQA thresholds of significance for biological resources, areas that meet the state criteria of wetlands and could be impacted by a project must be analyzed. Pursuant to CFGC Section 2785, CDFW defines wet areas as “lands which may be covered periodically or permanently with shallow water and which include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, fens, and vernal pools.”

4.2.4 California Fish and Game Code Section 1600

Streams, lakes, and riparian vegetation as habitat for fish and other wildlife species, are subject to jurisdiction by the CDFW under Sections 1600-1616 of the CFGC. Any activity that will do one or more of the following: 1) substantially obstruct or divert the natural flow of a river, stream, or lake; 2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or 3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake generally require a Streambed Alteration Agreement (SAA).

The term “stream,” which includes creeks and rivers, is defined in the CCR as follows: “a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life.” This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation (14 CCR 1.72).

In addition, the term stream can include ephemeral streams, dry washes, watercourses with subsurface flows, canals, aqueducts, irrigation ditches, and other means of water conveyance if they

support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife. Riparian is defined as “on, or pertaining to, the banks of a stream”; therefore, riparian vegetation is defined as, “vegetation which occurs in and/or adjacent to a stream and is dependent on, and occurs because of, the stream itself” (CDFW, 1994). Removal of riparian vegetation also requires an SAA from the CDFW.

4.2.5 California Fish and Game Code Sections 3503 and 3513

According to Section 3503 of the CFGC it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird (except English sparrows [*Passer domesticus*] and European starlings [*Sturnus vulgaris*]). Section 3503.5 specifically protects birds in the orders Falconiformes and Strigiformes (birds-of-prey). Section 3513 essentially overlaps with the MBTA, prohibiting the “Take” or possession of any migratory non-game bird. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered “Take” by the CDFW.

4.2.6 Fully Protected Species and Species of Special Concern

The classification of “fully protected” was the CDFW’s initial effort to identify and provide additional protection to those animals that were rare or faced with possible extinction. Lists were created for fish, amphibian and reptiles, birds, and mammals. Most of the species on these lists have subsequently been listed under CESA and/or FESA. The CFGC sections (fish at Sec. 5515, amphibian and reptiles at Sec. 5050, birds at Sec. 3511, and mammals at Sec. 4700) dealing with “fully protected” species states that these species “...may not be taken or possessed at any time and no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected species,” (CDFW, 1998) although “Take” may be authorized for necessary scientific research. This language makes the “fully protected” designation the strongest and most restrictive regarding the “Take” of these species. In 2003, the code sections dealing with fully protected species were amended to allow the CDFW to authorize “Take” resulting from recovery activities for state-listed species.

Species of special concern (SSC) are broadly defined as animals not listed under the CESA, but that are nonetheless of concern to the CDFW because they are declining at a rate that could result in listing or historically occurred in low numbers and known threats to their persistence currently exist. This designation is intended to result in special consideration for these animals by the CDFW, land managers, consulting biologists, and others, and is intended to focus attention on the species to help avert the need for costly listing under CESA and cumbersome recovery efforts that might ultimately be required. This designation also is intended to stimulate collection of additional information on the biology, distribution, and status of poorly known at-risk species, and focus research and management attention on them. Although the SSC designation provides no special legal status, they are given special consideration under CEQA during project review.

Table 2 (Section 5) includes potentially occurring federal and State listed species and SSC animals that may occur in the project area.

4.2.7 Native Plant Protection Act of 1973

The Native Plant Protection Act (NPPA) of 1973 (Sec.1900-1913 of the CFGC) includes provisions that prohibit the taking of endangered or rare native plants from the wild and a salvage requirement for landowners. The CDFW administers the NPPA and generally regards as “rare”

many plant species included on Lists 1A, 1B, 2A, 2B, 3, and 4 of the CNPS Inventory of Rare and Endangered Vascular Plants of California (CNPS, 2015).

Table 1 (Section 5) includes potentially occurring endangered or rare native plants that may occur in the project area (including CNPS lists).

4.2.8 Natural Community Conservation Planning Act

The Natural Community Conservation Planning (NCCP) Act of 1991 is an effort by the State of California, and numerous private and public partners that is broader in its orientation and objectives than the CESA and FESA (refer to discussions above). The primary objective of the NCCP Act is to conserve natural communities at the ecosystem scale while accommodating compatible land use. The NCCP Act seeks to anticipate and prevent the controversies and gridlock caused by species listings by focusing on the long-term stability of wildlife and plant communities and including key interests in the process.

No regionally occurring natural community or associated plan is listed by the state for the project area.

4.3 Other Statutes, Codes, and Policies Affording Limited Species Protection – Humboldt County Streamside Management Area Ordinance

Riparian and wetland habitats receive protection under Humboldt County’s Streamside Management Area Ordinance (SMAO); as defined in Title 3, Section 314-61.1 of the Humboldt County Code. Development and work within Streamside Management Areas (SMAs) requires a special permit from the County, if those activities are not exempt.

The purpose of the SMAO is to provide oversight in the use and development of land located within wet areas such as rivers, creeks, springs, and other wetland types. This includes natural resource areas along both sides of streams containing the channel and adjacent land. In areas outside of urban development and expansion areas, SMAs are identified as a 100-foot setback from the stream transition line of perennial streams and 50-foot setback for streams with seasonal intermittent flow. In areas inside of urban development and expansion areas, SMAs are identified as a 50-foot setback from perennial streams and 25-foot setback for streams with seasonal intermittent flow. The stream transition line is defined in the Humboldt County General Plan as, “that line closest to a stream where riparian vegetation is permanently established,” which is typically interpreted in riparian areas as the closest rooted tree to the water course.

Routine maintenance activities are permitted under the SMAO, if trees that are more than 12 inches in diameter are not cut, and that no more than 6,000 cumulative square feet of woody vegetation is removed. Additionally, activities are not considered routine maintenance if they could result in a significant environmental impact. Significance with regard to environmental impact can be difficult to qualify on a case-by-case level. However, the California Department of Fish and Wildlife generally considers the removal of riparian woody vegetation greater than 4 inches in diameter as an activity that requires compensatory mitigation. Mitigation measures for projects

within SMAs can include retaining snags and trees that support nesting birds, replanting of disturbed areas equal to the development area, and other potential site-specific habitat improvements.

5.0 Special Status Biological Resources

An evaluation was conducted for the potential presence or absence of habitat for special status plant and animal species. CNDDDB RareFind (CDFW, 2017a), BIOS (CDFW, 2017b), and CNPS (CNPS, 2017) searches were completed for the 7.5-minute USGS Eureka quadrangle and all adjacent quadrangles. The aforementioned databases were queried for historical and existing occurrences of state and federally listed threatened, endangered, and candidate plant and animal species; species proposed for listing; and all plant species listed by the CNPS (On-line 2017 inventory). In addition, a list of all federally listed species that are known to occur or may occur in the vicinity was obtained from the USFWS' Information for Planning and Conservation database (USFWS, 2017a).

Table A-1 in Appendix A includes all plant species reported from the queries, their preferred habitat, and whether there is suitable habitat present within the study area for the species. Table A-2 includes all animal species reported from the queries, their preferred habitat, and whether there is suitable habitat present within the study area for the species. The potential for occurrence of those species included on the list were then evaluated based on the habitat requirements of each species relative to the conditions observed during the field surveys.

Each species was evaluated for its potential to occur on the study area according to the following criteria:

- **None.** Species listed as having “none” are those species for which:
 - there is no suitable habitat present in the study area (that is, habitats in the study area are unsuitable for the species requirements [for example, elevation, hydrology, plant community, disturbance regime, etc.]).
- **Low.** Species listed as having a “low” potential to occur in the study area are those species for which:
 - there is no known record of occurrence in the vicinity, and
 - there is marginal or very limited suitable habitat present within the study area.
- **Moderate.** Species listed as having a “moderate” potential to occur in the study area are those species for which:
 - there are known records of occurrence in the vicinity, and
 - there is suitable habitat present in the study area.
- **High.** Species listed as having a “high” potential to occur on the study area are those species for which:
 - there are known records of occurrence in the vicinity (there are many records and/or records in close proximity), and
 - there is highly suitable habitat present in the study area.

- **Present.** Species listed as “present” in the study area are those species for which:
 - the species was observed in the study area.

5.1 Special Status Plant Species

Based on a review for special status plant species, 49 special status plant species have been reported from the region consisting of the site’s quadrangle and the surrounding quadrangles. Of the special status plant species reported for the region, 39 plant species are considered to have a low potential to occur at the project site and 10 species have a moderate or higher potential. Species with a moderate or higher potential for occurrence within the study area are described below.

Chrysosplenium glechomifolium is a perennial herb in the Saxifragaceae family. Its elevation range is reported from 10 to 220 meters above sea level. Within its range state-wide, its blooming period is reported as February through June. This species is reported from north coast coniferous forests and riparian forests along streambanks, seeps, and other wetland areas. **This species was observed within the study area** in three disjunct locations, and additional habitat area was observed within and adjacent to the study area.

Erythronium revolutum is a perennial bulbiferous herb in the Liliaceae family. Its elevation range is reported from 60 to 1,405 meters above sea level. Within its range state-wide, its blooming period is reported as March through August. This species is reported from mesic sites and streambanks within north coast coniferous forests and broadleaf upland forests. Although habitat may exist locally for this species, it was not detected within the study area.

Fissidens pauperculus is a moss in the Fissidentaceae family. Its elevation range is reported from 10 to 1,024 meters above sea level. This species is reported from north coast coniferous forest with damp coastal soil. Although habitat may exist locally for this species, it was not detected within the study area.

Listera cordata is a perennial herb in the Orchidaceae family. Its elevation range is reported from 5 to 1,370 meters above sea level. Within its range state-wide, its blooming period is reported as February through July. This species is reported from bogs and fens, lower montane coniferous forests, and north coast coniferous forest habitats. Although habitat may exist locally for this species, it was not detected within the study area.

Lycopodium clavatum is a rhizomatous fern in the Lycopodiaceae family. Its elevation range is reported from 45 to 1225 meters above sea level. Within its range state-wide, its blooming period is reported as June through September. This species is reported from forest understory edges, openings, roadsides, and mesic sites with partial shade within lower montane conifer forests and north coast conifer forests. Although habitat may exist locally for this species, it was not detected within the study area.

Mitellastrum caulescens is a perennial rhizomatous herb in the Saxifragaceae family. Its elevation range is reported from 5 to 1,700 meters above sea level. Within its range state-wide, its blooming period is reported as April through October. This species is reported from broadleafed upland forests, lower montane coniferous forests, meadows and seeps, mesic north coast coniferous forests, and sometimes roadside habitats. Although habitat may exist locally for this species, it was not detected within the study area.

Monotropa uniflora is a mycoparasitic perennial herb in the Ericaceae family. Its elevation range is reported from 15 to 855 meters above sea level. Within its range state-wide, its blooming period is reported as June through September. This species is reported from broadleaf upland forest and north coast coniferous forests, often under redwoods or western hemlock. Although habitat may exist locally for this species, it was not detected within the study area.

Montia howellii is an annual herb in the Montiaceae family. Its elevation range is reported from 0 to 835 meters above sea level. Within its range state-wide, its blooming period is reported as March through May. This species is reported from vernal mesic meadows and seeps, north coast coniferous forests, and sometimes roadside habitats. Although habitat may exist locally for this species, it was not detected within the study area.

Pleuropogon refractus is a perennial rhizomatous herb in the Poaceae family. Its elevation range is reported from 0 to 1,600 meters above sea level. Within its range state-wide, its blooming period is reported as April through August. This species is reported from lower montane coniferous forests, meadows and seeps, north coast coniferous forests, and riparian forest habitats. This species was observed within an area adjacent to the study area, however it was not observed within the project area.

Usnea longissima is an epiphytic, fruticose lichen in the Parmeliaceae family. Its elevation range is reported from 50 to 1,460 meters above sea level. This species is reported from broadleafed upland forests, on tree branches in north coast coniferous forests; usually on old growth hardwoods and conifers. Although habitat may exist locally for this species, it was not detected within the study area.

Seasonally appropriate surveys of the study area located two sensitive botanical species within and nearby the study area within Sequoia Park. The findings in this report represent a “snapshot in time” and it is possible that false negative surveys for rare plant species could occur. This report documents the 2017 field investigations, and the findings presented here are based on best professional judgment.

5.2 Special Status Animal Species

Based on a review of special status animal species, 51 special status animal species have been reported with the potential to occur in the project region. Of the special status animal species potentially occurring in the region, 43 animal species are considered to have a low potential to occur at the project site and 8 species have a moderate to high potential. Species with a moderate or high potential for occurrence within the study area are described below.

5.2.1 Amphibians

The northern red-legged frog (*Rana aurora*) inhabits humid forests, woodlands, grasslands, and streamsides usually near dense riparian cover. They are generally near permanent water, but can be found far from water in damp woods and meadows during the non-breeding season. Although habitat may exist locally for this species, it was not detected within the study area. Project-related activities are not anticipated to have a significant impact on this species or its habitat due to seasonal avoidance timing, and avoidance of wetlands.

The southern torrent salamander (*Rhyacotriton variegatus*) inhabits coastal redwood, Douglas fir, mixed conifer, montane riparian, and montane hardwood-conifer forests, primarily within old-growth forests. They are found within cold, well-shaded permanent streams and seepages, or within splash zones or on moss covered rock with trickling water. Although limited habitat may exist locally for this species, it was not detected within the study area, nor is it expected to occur within the study area due to the urban nature of the surrounding landscape, and the lack of permanent stream flow within the study area. Project-related activities are not anticipated to have a significant impact on this species or its habitat due to seasonal avoidance timing.

5.2.2 Birds

The Cooper's hawk (*Accipiter cooperii*) builds stick platform nests in crotches of riparian deciduous trees and second-growth conifers near streams. Of all the raptors, it's most associated with urbanized landscapes. Although habitat may exist locally for this species, it was not detected within the study area. Project-related activities could impact this species due to proposed removal of trees within the expansion area, and increased disturbance due to the presence of the canopy walk within potential nesting habitat. Impacts will be minimized by retaining large diameter trees, as well as conducting vegetation clearing outside of the nesting season. Cooper's hawk have adapted well to human disturbance, so it is likely that this species will only be temporarily impacted by increased disturbance due to the canopy walk. It is anticipated that the trees used for the canopy walk will remain unusable for this species. The relatively small number of trees scheduled to be removed for the expansion, or used for the canopy walk are not anticipated to have a large cumulative impact on this species within Sequoia Park.

The sharp-shinned hawk (*Accipiter striatus*) breeds in riparian deciduous and mixed conifer habitats. It perches on north facing slopes; forages in woodland openings and brushy pastures where migrating birds are found. Although habitat may exist locally for this species, it was not detected within the study area. Project-related activities are not anticipated to have a significant impact on this species or its habitat. Large diameter trees will be left intact, and vegetation clearing will occur outside the migratory bird nesting season.

The American peregrine falcon (*Falco peregrinus anatum*) is found in many open habitats, and has been known to nest on human-made structures within open sites. It is most common in coastal areas and has adapted to urban settings. Although habitat may exist within the area surrounding the study area for this species, it was not detected within the study area. Project-related activities are not anticipated to have a significant impact on this species or its habitat. This species prefers open areas that will not be impacted by the removal of trees associated with this project.

The osprey (*Pandion haliaetus*) occurs near rivers, lakes, and coast where large numbers of fish are present. Ospreys are most common around major coastal estuaries and salt marshes. **This species was detected flying over the study area** on two occasions, indicating that suitable habitat is available nearby. The area within the study area represents potential nesting habitat, although more suitable nesting sites occur nearer to waterways, such as Ryan Slough. Because of the presence of more suitable nesting habitat nearer to waterways outside of the city, it is not expected that project-related activities will have a significant impact on this species or its habitat. Any tree removal and vegetation clearing will occur outside the migratory bird nesting season.

The northern spotted owl (*Strix occidentalis caurina*) generally inhabits older forested lands that contain multi-layered, multi-species, closed canopy structure, but they may occur in younger

forests with large snags, tree cavities, and large woody debris. This species requires open space within and below the upper canopy. Although habitat exists within Sequoia Park, the forested habitat is fragmented and located within the city of Eureka. A barred owl was observed during an evening survey in April. Barred owls are known to directly compete with northern spotted owls for habitat area and food, and are known to aggressively attack northern spotted owls. Protocol level northern spotted owl (NSO) surveys have been conducted in conjunction with this NRA report (see Appendix D for northern spotted owl survey results). No northern spotted owls were detected during the NSO surveys or during the NRA surveying. Project-related activities are not anticipated to have a significant impact on this species or its habitat, due to the fragmented nature of the forested habitat within Sequoia Park, the urban surroundings and the lack of suitable habitat within the project area.

5.2.3 Insects

The western bumblebee pollinates a wide variety of flowers and is known to frequent cultivated flower beds. This species was once widespread, but has declined precipitously, possibly due to disease. Although habitat may exist within the area surrounding the study area for this species, it was not detected within the study area. Project-related activities are not anticipated to have a significant impact on this species or its habitat. This species prefers abundant flowering plants that are found within sunny areas and not within dense forested areas and will not be impacted by the removal of trees associated with this project.

5.2.4 Mammals

No listed mammal species are expected to occur within the study area. The fragmented nature of the forest present within Sequoia Park and the location of the park within an urban setting limit the potential for the Humboldt martin (*Martes caurina humboldtensis*), the fisher (*Pekania pennanti*), the white-footed vole (*Arborimus albipes*), and the Sonoma tree vole (*Arborimus pomo*). Constant disturbance due to human use of the park further diminishes the potential for the occurrence of these species.

5.2.5 Fishes

Many special status fish species occur within Humboldt Bay and its associated watersheds (See Table A-2 in Appendix A). The study area does not include any streams, or waterways capable of supporting any fish species. Critical habitat for the Northern California distinct population segment (DPS) of Steelhead is mapped approximately 1 mile to the southwest in Martin Slough. Critical habitat for the tidewater goby is mapped approximately 2 miles to the southwest within Martin Slough. Martin Slough is hydrologically connected to the project area; however work will not be conducted within any drainages or streams. Additional critical habitat for the Northern California DPS of Steelhead is mapped in Ryan Slough approximately 4,000 feet east, and will not be impacted by this project.

5.2.6 Reptiles

No listed reptile species are expected to occur within the study area. The western pond turtle (*Emys marmorata*) is reported from the Eureka and surrounding quadrangle search, however there is no potential for occurrence of this species within the project area due to the lack of standing or flowing water within the project area. In addition, the forested habitat within the project area precludes the

existence of this species which needs open sunny areas for basking. A pond exists approximately 500 feet to the west of the project area that may support this species, however the shaded nature of the pond and the constant use of the park make it unlikely that this species would exist there. Project-related activities are not anticipated to have a significant impact on this species due to lack of potential habitat within or adjacent to the project area.

5.3 Special Status Natural Communities and Habitats

Sensitive natural communities are habitats that are generally defined by vegetation type and geographical location and are increasingly restricted in abundance and distribution. Recognition of natural communities is an ecosystem-based approach to maintaining biodiversity in California. Holland-type CNDDDB natural communities are habitat for numerous special status plant and animal species. CDFW no longer updates their tracking of Holland-type CNDDDB natural communities and has since standardized alliance and association-level vegetation nomenclature for California to comply with the National Vegetation Classification System.

5.3.1 Natural Communities

Two natural communities (defined as vegetation alliances) were identified within the study area (Figure 3). The majority of the study area is composed of the *Sequoia sempervirens* (Redwood forest) Alliance (G3 S3) (Figure 3). The central portion of the study area within an area less densely forested, was composed of the *Rubus (parviflorus, spectabilis, ursinus)* shrubland (coastal brambles) Alliance (G4 S3) (Figure 3). The area surrounding the study area including the Zoo, park areas, and urban development consists of urbanized landscapes containing horticultural varieties of non-native species.

The *Sequoia sempervirens* (Redwood forest) Alliance has a global heritage rank of G3 and a State heritage rank of S3.2, therefore qualifying for consideration under CEQA Guidelines checklist IVb. Within the study area, this community is composed of second- and old-growth redwood with several developed areas containing recreation trails and access roads. The redwood forest community within the study area is a good example of mature second-growth forest with scattered old-growth trees with conditions beginning to resemble those found in old-growth forests. This includes a multiple layered canopy, large basal diameter trees, and a more complex tree and canopy structure. The redwood forest within the study area represents a fragmented remnant within a park, and is surrounded by urban development. Project-related activities are anticipated to have unavoidable impacts to this vegetation community. Several grand firs (*Abies grandis*) infected with *Armellaria ostoyae* exist within the project area, and represent the majority of the trees slated for removal. Impacts will be reduced by following the recommendations listed within the recommendations section of this report.

The *Rubus (parviflorus, spectabilis, ursinus)* shrubland Alliance (coastal brambles) has a global heritage rank of G4 and a state heritage rank of S3, therefore qualifying for consideration under CEQA Guidelines checklist IVb. Within the study area, this community is composed of varying dominance by thimbleberry (*Rubus parviflorus*), salmonberry (*Rubus spectabilis*), and California blackberry (*Rubus ursinus*). Portions of this vegetation community are quite dense; however several unofficial foot trails bisect this community. Currently, this vegetation community exists within a relatively open area with reduced canopy cover and increased sunlight penetration, and is slated to be developed for the Zoo expansion. The *Rubus (parviflorus, spectabilis, ursinus)* shrubland (coastal brambles) Alliance represents a high quality example of this vegetation community within a mature

redwood forest and is nesting habitat for several bird species within a well-used park. Project-related activities are anticipated to have unavoidable impacts to this vegetation community. These impacts can be reduced by following the recommendations listed Section 7.0 Recommendations.

Habitat within the old-growth redwood canopy may occur within the project area. While canopy habitat within old-growth redwoods is not specifically listed as a special status habitat type, its limited distribution within select remaining old-growth redwood forest canopies warrants inclusion into this report. The few remaining old-growth trees within Sequoia Park may host canopy habitat that in turn, host to many species. Coast redwood canopy habitat can be quite complex. Tops of horizontal branches, crotches, and hollowed out trunks trap falling leaves and branchlets that are then colonized by leatherleaf fern (*Polypodium scolopendri*) and occasionally licorice fern (*Polypodium glycyrrhiza*). These species add to the organic matter and stabilize the increasing mass of organic debris. As the organic matter decays, it eventually stabilizes as humus that acts as a sponge, holding water through dry periods. This allows terrestrial organisms sensitive to drying out able to survive year-round in the canopy. Potential animals include salamanders, most notably the wandering salamander (*Aneides vagrans*), segmented worms, and mollusks (Sillett and Bailey, 2003). Additional canopy habitat is provided on all surfaces of the tree as substrate for numerous lichen and bryophyte species. Comprehensive studies in old-growth forests have revealed hundreds of species of epiphytic lichens and bryophytes occupying a wide range of substrates on a wide environmental gradient from sheltered to exposed locations from the base of the tree to the upper crown (Williams and Sillett, 2007). Project-related activities, specifically the redwood canopy walk, may have impacts on this habitat. See Section 6.0 Conclusions for potential impacts and Section 7.0 Recommendations for reducing impacts to this habitat type.

5.4 Wetlands and Riparian Habitats

Class three waterway and associated wetlands exist adjacent to the project area. The drainages containing the wetlands and waterway are dominated by lady-fern (*Athyrium filix-femina*), skunk cabbage (*Lysichiton americanus*), redwood sorrel (*Oxalis oregana*), English ivy (*Hedera helix*), and in places the pacific golden saxifrage (*Chrysozplenium glechomifolium*). Wetlands exist within the drainages to the north, south, and west of the project area (see Figure 3). These wetland areas exist within eroded gullies containing class three waterways that eventually flow into Martin Slough. The majority of the project will occur outside of wetland area, with actual ground disturbance occurring over 50 feet from the edge of wetland. Humboldt County SMA states that a 25-foot setback is required for seasonal or intermittent streams within urban areas and a 50-foot buffer is required for perennial streams within urban areas. The streams and associated wetlands are seasonal and are within the urban boundary for the City of Eureka, which would warrant a 25-foot buffer from the edge of bank. Because of sensitive plant species and perennial wet areas, a 50-foot buffer from the edge of wetland is recommended for the class three waterways and associated wetlands adjacent to the project area (see Figure 3). This would prevent encroachment into the waterways and wetlands adjacent to the project area during construction, and would ensure that development is situated at a distance that will prevent further degradation of these habitat areas. Project-related activities are not anticipated to impact wetlands or riparian habitat adjacent to the project area. See Conclusions and Recommendations for potential impacts and recommendations for reducing potential impacts to wetlands and riparian habitat.

6.0 Conclusions

The purpose of this report was to assess the biological resources and habitat available within the study area, and to evaluate project-related impacts. The habitat value and availability was assessed for special status species that occur within the study area. Recommendations for avoiding and mitigating impacts are addressed in Section 7.0.

6.1 Special Plant Status Species

Of the 49 special status plant species potentially occurring in the area, 39 are considered to have a low potential to occur within the project site and 10 are considered to have a moderate potential. Site investigations located populations of two listed plant species within and adjacent to the project area (see Figure 3). Site investigations were conducted on April 18 and July 28, which is considered an optimal time for detecting potentially occurring listed species. The pacific golden saxifrage was observed within the seasonal waterways and associated wetlands surrounding the project area (see Figure 3). This species is susceptible to trampling and encroachment by non-native vegetation as well as changes in hydrology. Potential impacts include trampling during construction of the canopy walk over the drainages, and introduction of additional non-native species. The project is not anticipated to impact this species if avoidance measures are in place (see Section 7.0 Recommendations). The nodding semaphore grass was observed adjacent to the project area; however the small population is approximately 80 feet to the west of the edge of the project area and will not be impacted by this project.

6.2 Special Wildlife Status Species

Of the 51 special status animal species potentially occurring in the region, 43 animal species are considered to have a low potential to occur at the project site and 8 species have a moderate to high potential.

Special status bird species may be impacted by the proposed project. Several medium to large diameter trees will be removed as part of the expansion project, while five trees will be used to attach the canopy walk and will have platforms located around the trunk. Project-related activities could impact this species due to proposed removal of trees within the expansion area, and increased disturbance due to the presence of the canopy walk within potential nesting habitat. It is anticipated that the trees used for the canopy walk will remain unusable for nesting due to year round disturbance from canopy walk visitors. The relatively small number of trees scheduled to be removed for the expansion or used for the canopy walk are not anticipated to have a large cumulative impact on special status bird species potentially occurring within Sequoia Park. Impacts will be minimized by retaining a maximum number of large diameter trees, as well as conducting vegetation clearing outside of the nesting season. The existing use and high level of human traffic within the park make it less likely that the expansion and canopy walk will have a significant impact on bird species acclimated to high level of background noise and disturbance.

Special status mammals are not likely to be affected by the proposed project. No listed mammal species are expected to occur within the study area. The fragmented nature of the forest present within Sequoia Park and the location of the park within an urban setting limit the potential for the Humboldt martin (*Martes caurina humboldtensis*), the fisher (*Pekania pennanti*), the white-footed vole

(*Arborimus albipes*), and the Sonoma tree vole (*Arborimus pomo*). Constant disturbance due to human use of the park further diminishes the potential for the occurrence of these species. See Section 7.0 Recommendations for reducing potential impacts to special status mammals.

Special status amphibians are not likely to be affected by the proposed project. Conducting project activities between July 15 and October 31 in areas near riparian and seasonally wet areas will minimize potential impacts to amphibians. A 50-foot buffer will be created from the edge of wetland that will prevent disturbance to wetlands and amphibian habitat.

Special status fishes are not likely to be affected by the proposed project. The study area does not include any streams, or waterways capable of supporting any fish species. Wetlands and seasonal waterways will be avoided and will be protected by a 50-foot buffer. See Section 7.0 for additional recommendations to avoid impacts to wetlands and seasonal waterways.

Special status reptiles are not likely to be affected by the proposed project. No habitat exists within or immediately adjacent to the project area for the western pond turtle.

6.3 Sensitive Natural Communities

The proposed project will have a total area of approximately 41,600 square feet. Of this, 15,756 square feet is composed of the coastal brambles vegetation community. It is anticipated that the majority of this vegetation community will be removed for the project with little room for avoidance. This will result in unavoidable impacts to this vegetation community. See Section 7.0 Recommendations for minimizing and mitigating for the removal of this vegetation community.

The Redwood forest vegetation community will be impacted by the proposed project. The project proposes removal of some medium- and large-diameter trees, as well as a canopy walk within large diameter second-growth and old-growth trees. Trees proposed for removal consist of several large diameter grand firs (*Abies grandis*) infected with *Armillaria ostoyae*, which has killed several grand firs within the project area, and caused several others to decline which will end in eventual mortality. See Section 7.0 Recommendations to reduce impacts to the redwood forest vegetation community.

The redwood canopy habitat may be impacted by this project, depending on the final design of the canopy walk. The canopy walk is proposed to be constructed between old-growth and large second-growth trees, reaching a height of 75 feet. If the canopy walk climbs above the first large diameter branch and redwood bark is not protected at each platform redwood canopy habitat could be impacted. See Section 7.0 Recommendations for reducing impacts to the redwood canopy within the old-growth trees. Impacts to individual trees and tree health is addressed in the arborist report.

6.4 Nesting Birds

Bird species may potentially nest within the area, but no nests were observed during the study. Nesting birds are protected by the MBTA and nests of native birds protected under CFGC (Section 3503). Project-related vegetation clearing may impact nesting birds, however impacts will be

minimized if clearing occurs outside the nesting season (March 15 through August 1), or, if not feasible, nesting bird surveys should be conducted. See Section 7.0 Recommendations to reduce impacts to nesting birds.

6.5 Impacts on Wildlife Movement

Most of the wildlife movement corridors are expected to be concentrated on nearby perennial drainages. It is likely that wildlife use Sequoia Park as refugia within the urban region of Eureka as well as a movement corridor between developed areas, and more natural areas surrounding Humboldt Bay. The project is not anticipated to impact nearby perennial drainages, nor is it expected to impact migration corridors within Sequoia Park, as the project will be attached to the existing Sequoia Park Zoo.

6.6 Development Effects

The proposed project is expected to impact natural communities within the project area, and could potentially impact habitat for listed botanical species. The activities associated with the proposed project will occur within previously disturbed areas, which are already impacted by human activities and land use within Sequoia Park.

Direct and indirect impacts to the S3 vegetation communities and sensitive habitat will not have substantial adverse effects or contribute substantially to potential cumulative effects with the implementation of the recommendations contained within Section 7.0.

7.0 Recommendations

SHN recommends that the following measures be implemented at the project site to minimize the potential impacts to listed plant species, animals, sensitive habitat, and wetlands:

1. Impacts to S3 vegetation communities should be mitigated and a plan developed that details mitigation for impacts to S3 vegetation communities including:
 - At least 1:1 replacement of Coastal brambles.
 - Removal of invasive species, especially around pacific golden saxifrage and nodding semaphore grass populations.
 - Stabilization of non-sanctioned trails and transplanting of *Rubus* species from the expansion areas into restored trail areas.
 - Removal of the trail from the base of the old-growth trees to another location away from the base of the trees.
 - Transplanting *Rubus* species from the expansion area into the former trail alignment around the base of the old-growth trees to speed revegetation and create coastal bramble communities adjacent to the expansion area.
 - Installation of split rail fences and informative signs to deter unofficial trail creation and use.

- Use of selectively cut logs and tree debris to stabilize slopes and deter use of unofficial trail use enabling revegetation to occur, and improving habitat value within the redwood forest of Sequoia Park.
 - A monitoring plan to ensure vegetation survival and success of coastal bramble habitat creation, and trail removal revegetation.
2. A maximum number of trees should be retained within the Zoo expansion area
 3. Diseased grand fir should be removed. If possible, the lowest 20-25 feet should be retained to create snag habitat within the expansion area.
 4. If the canopy walk climbs above the first large diameter branch or iteration within an old-growth redwood, then a canopy study should be conducted to ascertain canopy habitat conditions, species present, and potential impacts.
 5. Bark should be protected at each platform to protect against disturbance and destruction of bark (see arborist report).
 6. Native redwood forest plant species should be used in the Zoo expansion landscaping. This will maintain redwood forest conditions within the expansion.
 7. A 50-foot buffer should be maintained between the edge of wetlands and project activities (see Figure 3). If necessary, temporary fencing should be used to prevent encroachment into the buffer during construction.
 8. A 50-foot buffer should be maintained between listed plant species habitat and construction activities (see Figure 3).
 9. To avoid potential impacts to nesting birds, one of the following shall be implemented:
 - a. Conduct vegetation removal and other ground disturbance activities associated with any construction activities between August and mid-March, when birds are not typically nesting.
 - b. If vegetation removal or ground-disturbing activity is to take place during the nesting season (March 15 to August 1 for most birds), a qualified biologist shall conduct a pre-construction nesting bird survey. Preconstruction surveys for nesting pairs, nests, and eggs shall occur within the construction limits and within 100 feet (200 feet for raptors) of the construction limits. If active nests are encountered, species-specific measures shall be prepared by a qualified biologist in consultation with the USFWS and CDFW, and implemented to prevent abandonment of the active nest.
 10. BMPs should be incorporated during construction to prevent runoff and potential discharge into adjacent seasonal waterways.

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Species Lists

Table A-1
Regionally Occurring Special Status Plant Species Scoping List CNDDDB, CNPS, IPaC
Sequoia Park Zoo Expansion Project
Eureka and Surrounding 7.5 min Quadrangles

Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
<i>Abronia umbellata</i> var. <i>breviflora</i>	pink sand-verbena	Nyctaginaceae	None	None	G4G5-T2	S1	1B.1	June-Oct.	Coastal dunes and coastal strand.	Foredunes & interdunes with sparse cover. Usually the plant closest to the ocean. 0-10 m.	None
<i>Angelica lucida</i>	sea-watch	Apiaceae	None	None	G5	S3	4.2	May-Sept.	Coastal strand	Coastal bluff scrub, dunes, coastal scrub, salt marshes. 0-150 m	None
<i>Astragalus pycnostachyus</i> var. <i>pycnostachyus</i>	coastal marsh milk-vetch	Fabaceae	None	None	G2T2	S2	1B.2	April-Oct.	Coastal dunes, marshes & swamps, coastal scrub.	Mesic sites in dunes or along streams or coastal salt marshes. 0-155 m.	None
<i>Astragalus rattanii</i> var. <i>rattanii</i>	Rattan's milk-vetch	Fabaceae	None	None	G4T4	S4	4.3	April-July	Chaparral, cismontane woodland, lower montane conifer forest.	Open grassy hillsides, gravelly flats in valleys, and gravel bars of stream beds. 30-825 m.	None
<i>Bryoria pseudocapillaris</i>	false gray horsehair lichen	Parmeliaceae	None	None	G3	S2	3.2	Lichen	Coastal dunes, N. Coast conifer forest (immediate coast).	Usually on conifers. 0-90 m.	None
<i>Bryoria spiralifera</i>	twisted horsehair lichen	Parmeliaceae	None	None	G3	S1S2	1B.1	Lichen	North coast conifer forest.	Usually on conifers. 0-30 m.	None
<i>Cardamine angulata</i>	seaside bittercress	Brassicaceae	None	None	G5	S1	2B.1	Jan.-July	Lower montane, conifer forest, N. coast conifer forest, wetland	Wet areas, streambanks. 90-155 m.	Low
<i>Carex arcta</i>	northern clustered sedge	Cyperaceae	None	None	G5	S1	2B.2	June-Sept.	Bogs and fens, north coast conifer forest.	Mesic sites. 60-1405 m.	Low
<i>Carex leptalea</i>	bristle-stalked sedge	Cyperaceae	None	None	G5	S1	2B.2	March-July	Bogs and fens, meadows and seeps, marshes and swamps.	Mostly known from bogs and wet meadows. 3-1395 m.	None

Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
<i>Carex lyngbyei</i>	Lyngbye's sedge	Cyperaceae	None	None	G5	S3	2B.2	April-August	Marsh & swamp (brackish or freshwater).	0-200 m.	None
<i>Carex praticola</i>	northern meadow sedge	Cyperaceae	None	None	G5	S2	2B.2	May-July	Meadows and seeps.	Moist to wet meadows. 15-3200 m.	None
<i>Castilleja ambigua</i> var. <i>humboldtiensis</i>	Humboldt Bay owl's-clover	Orobanchaceae	None	None	G4T2	S2	1B.2	April-August	Marshes and swamps.	Coastal salt marsh with <i>Spartina</i> , <i>Distichlis</i> , <i>Salicornia</i> , <i>Jaumea</i> . 0-20 m.	None
<i>Castilleja litoralis</i>	Oregon coast paintbrush	Orobanchaceae	None	None	G3	S3	2B.2	June	Coastal bluff scrub, coastal dunes, coastal scrub.	Sandy sites. 5-255 m.	None
<i>Chloropyron maritimum</i> ssp. <i>palustre</i>	Point Reyes salty bird's-beak	Orobanchaceae	None	None	G4?T2	S2	1B.2	June-Oct.	Coastal salt marsh.	Usually in coastal salt marsh with <i>Salicornia</i> , <i>Distichlis</i> , <i>Jaumea</i> , <i>Spartina</i> , etc. 0-10 m.	None
<i>Chrysosplenium glechomifolium</i>	Pacific golden saxifrage	Saxifragaceae	None	None	G5	S3	4.3	Feb.-June	North Coast coniferous forest, riparian forest	Streambanks, sometimes seeps, sometimes roadsides. 10-220 m.	Present
<i>Collinsia corymbosa</i>	round-headed Chinese-houses	Plantaginaceae	None	None	G1	S1	1B.2	April-June	Coastal Dunes	Coastal dunes from 10-30 m	None
<i>Eleocharis parvula</i>	small spikerush	Cyperaceae	None	None	G5	S4	4.3	July-August	Marsh & swamp, salt marsh, wetland	In coastal salt marshes. 1-3020 m.	None
<i>Erysimum menziesii</i>	Menzies' wallflower	Brassicaceae	E	E	G1	S1	1B.1	March-Sept.	Coastal dunes.	Localized on dunes and coastal strand. 0-35 m.	None
<i>Erythronium revolutum</i>	coast fawn lily	Liliaceae	None	None	G4G5	S3	2B.2	March-August	Bogs & fens, broadleaf upland forest, north coast conifer forest.	Mesic sites; streambanks. 60-1405 m.	Moderate
<i>Fissidens pauperculus</i>	minute pocket moss	Fissidentaceae	None	None	G3?	S2	1B.2	Lichen	North coast coniferous forest, Redwood.	Grows on damp soil along the coast. In dry streambeds & on stream banks. 10-1024 m.	Moderate

Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
<i>Gilia capitata</i> ssp. <i>pacifica</i>	Pacific gilia	Polemoniaceae	None	None	G5T3	S2	1B.2	April-August	Coastal bluff scrub, chaparral, coastal prairie, valley & foothill grassland.	5-1345 m.	Low
<i>Gilia millefoliata</i>	dark-eyed gilia	Polemoniaceae	None	None	G2	S2	1B.2	April-July	Coastal dunes.	1-60 m.	None
<i>Glehnia littoralis</i> ssp. <i>leiocarpa</i>	American glehnia	Apiaceae	None	None	G5T5	S3	4.2	May-August	Coastal Dunes	0-20 m.	None
<i>Hesperevax sparsiflora</i> var. <i>brevifolia</i>	short-leaved evax	Asteraceae	None	None	G4T3	S2	1B.2	March-June	Coastal bluff scrub, coastal dunes, coastal prairie.	Sandy bluffs and flats. 0-215 m.	None
<i>Hosackia gracilis</i>	harlequin lotus	Fabaceae	None	None	G4	S3	4.2	March-July	Broadleaf upland forest, coast bluff scrub, coast prairie, coast scrub, closed-cone conifer forest, meadow, seep, marsh & swamp, N. coast conifer forest, valley & foothill grassland.	Wetlands and roadsides. 0-700 m.	Low
<i>Lasthenia californica</i> ssp. <i>macrantha</i>	perennial goldfields	Asteraceae	None	None	G3T2	S2	1B.2	Jan.-Nov.	Coastal bluff scrub, coastal dunes, coastal scrub.	5-185 m.	None
<i>Lathyrus glandulosus</i>	sticky pea	Fabaceae	None	None	G3	S3	4.3	April-June	Cismontane woodland.	In oak woodlands upland from the coast redwood forests & along roadsides. 300-800 m.	None
<i>Lathyrus japonicus</i>	seaside pea	Fabaceae	None	None	G5	S2	2B.1	May-August	Coastal dunes.	3-65 m.	None
<i>Lathyrus palustris</i>	marsh pea	Fabaceae	None	None	G5	S2	2B.2	March-August	Bogs, fens, low montane & N. coast conifer forest, marsh & swamp, coast prairie, coast scrub.	Moist coastal areas. 2-140 m.	None
<i>Layia carnosa</i>	beach layia	Asteraceae	E	E	G2	S2	1B.1	March-July	Coastal dunes, coastal scrub.	On sparsely vegetated, semi-stabilized dunes, usually behind foredunes. 0-30 m.	None

Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
<i>Lilium kelloggii</i>	Kellogg's lily	Liliaceae	None	None	G3	S3	4.3	May-August	Lower montane conifer forest, N. coast conifer forest.	Gaps and roadsides in conifer forest. 3-1300 m.	None
<i>Lilium occidentale</i>	western lily	Liliaceae	E	E	G1	S1	1B.1	June-July	Coastal scrub, freshwater marsh, bogs & fens, coastal bluff scrub, coast prairie, N. coast conifer forest, marshes and swamps.	Well-drained, old beach washes overlain with wind-blown alluvium and organic topsoil; usually near margins of Sitka spruce. 3-110 m.	None
<i>Listera cordata</i>	heart-leaved twayblade	Orchidaceae	None	None	G5	S4	4.2	Feb.-July	Lower montane conifer forest, north coast conifer forest.	Bogs and fens, 5-1370 m.	Moderate
<i>Lycopodium clavatum</i>	running-pine	Lycopodiaceae	None	None	G5	S3	4.1	June-Sept.	Lower montane conifer forest, north coast conifer forest, marsh & swamp.	Forest understory, edges, openings, roadsides; mesic sites with partial shade and light. 45-1225 m.	Moderate
<i>Mitellastraca caulescens</i>	leafy-stemmed mitrewort	Saxifragaceae	None	None	G5	S4	4.2	March-Oct.	Broadleaf upland forest, lower montane conifer forest, meadow & seep, N. coast conifer forest.	Mesic sites. 5-1700 m.	Moderate
<i>Monotropa uniflora</i>	ghost-pipe	Ericaceae	None	None	G5	S2	2B.2	June-Sept.	Broadleaved upland forest, north coast conifer forest.	Often under redwoods or west hemlock. 15-855 m.	Moderate
<i>Montia howellii</i>	Howell's montia	Montiaceae	None	None	G3G4	S2	2B.2	Feb.-May	Meadows and seeps, north coast coniferous forest, vernal pools.	Vernally wet sites; often on compacted soil. 10-1005 m.	High
<i>Oenothera wolfii</i>	Wolf's evening-primrose	Onagraceae	None	None	G2	S1	1B.1	May-Oct.	Coastal bluff scrub, coastal dunes, coastal prairie, low montane conifer forest.	Sandy substrates; usually mesic sites. 0-125 m.	None
<i>Pityopus californicus</i>	California pinefoot	Ericaceae	None	None	G4G5	S4	4.2	March-August	Broadleaf upland forest, upper montane and, N. coast conifer forest, low montane conifer forest.	Deep shade with few understory species, often under layer of duff, in rocky to clay loam soil. 15-2225 m.	Low

Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
<i>Pleuropogon refractus</i>	nodding semaphore grass	Poaceae	None	None	G4	S4	4.2	March-August	Meadow & seep, low montane conifer forest, N. coast conifer forest, riparian forest.	Mesic sites along streams, grassy flats in shaded redwood groves. 0-1600 m.	High
<i>Puccinellia pumila</i>	dwarf alkali grass	Poaceae	None	None	G4?	SH	2B.2	July	Marshes and swamps.	Mineral spring meadows and coastal salt marshes. 1-10 m.	None
<i>Ribes laxiflorum</i>	trailing black currant	Grossulariaceae	None	None	G5	S4	4.3	March-August	N. coast conifer forest, Redwood forests.	Grows over logs and stumps in moist, wet places. 5-1395 m.	Low
<i>Sidalcea malachroides</i>	maple-leaved checkerbloom	Malvaceae	None	None	G3	S3	4.2	March-August	Broadleaf upland forest, coast prairie, coast scrub, N. coast conifer forest, riparian.	Woodlands and clearings near coast; often in disturbed areas. 0-730 m.	Low
<i>Sidalcea malviflora</i> ssp. <i>patula</i>	Siskiyou checkerbloom	Malvaceae	None	None	G5T2	S2	1B.2	May-August	Coastal bluff scrub, coastal prairie, north coast conifer forest.	Open coastal forest; roadcuts. 5-1255 m.	None
<i>Sidalcea oregana</i> ssp. <i>eximia</i>	coast checkerbloom	Malvaceae	None	None	G5T1	S1	1B.2	June-August	Meadow & seep, N. coast & low montane conifer forest.	Near meadows, in gravelly soil. 5-1805 m.	None
<i>Spergularia canadensis</i> var. <i>occidentalis</i>	western sand-spurrey	Caryophyllaceae	None	None	G5T4	S1	2B.1	June-August	Marshes and swamps (coastal salt marshes).	0-3 m.	None
<i>Trichodon cylindricus</i>	cylindrical trichodon	Ditrichaceae	None	None	G4	S2	2B.2	Moss	Broadleaf upland forest, upper montane coniferous forest.	In openings on sandy or clay soils on roadsides, stream banks, trails or in fields. 50-1500 m.	Low
<i>Usnea longissima</i>	Methuselah's beard lichen	Parmeliaceae	None	None	G4	S4	4.2	Lichen	North coast coniferous forest, broadleaf upland forest.	In the "redwood zone" on tree branches of a variety of trees, incl. big leaf maple, oaks, ash, Douglas-fir, and bay. 45-1465 m in California.	Moderate
<i>Viola palustris</i>	alpine marsh violet	Violaceae	None	None	G5	S1S2	2B.2	March-August	Coastal scrub, bogs and fens.	Swampy, shrubby places in coastal scrub or coastal bogs. 0-150 m.	None

1. Species indicator status as assigned by Federal Endangered Species Act (FESA), California Endangered Species Act (CESA), and California Department of Fish and Wildlife (CDFW)

C: candidate	FP: fully protected
CT: candidate threatened	PT: proposed threatened
D: delisted	SSC: species of special concern
DPS: distinct population segment	T: threatened
E: endangered	WL: watch list
ESU: evolutionarily significant unit	

2. Species Heritage rank as assigned by California Department of Fish and Wildlife (CDFW)

G1/S1: critically imperiled
G2/S2: imperiled
G3/S3: vulnerable
G4/S4: apparently secure
G5/S5: secure

Table A-2
Regionally Occurring Special Status Animal Species Scoping List CNDDDB, IPaC
Sequoia Park Zoo Expansion Project
Eureka and Surrounding 7.5 min Quadrangles

Scientific Name	Common Name	FedList	CalList	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
Amphibians									
<i>Ascaphus truei</i>	Pacific tailed frog	None	None, SSC		S3S4	Aquatic, Klamath/ N. coast flowing waters, Lower montane conifer, N. coast conifer, Redwood, and Riparian forests	Occurs in montane hardwood-conifer, redwood, Douglas-fir & ponderosa pine habitats.	Restricted to perennial montane streams. Tadpoles require water below 15 degrees C.	None
<i>Rana aurora</i>	northern red-legged frog	None	None, SSC	G4	S3	Klamath/N. coast flowing waters, riparian forest, riparian woodland	Humid forests, woodlands, grasslands, & streamsides in NW California, usually near dense riparian cover.	Generally near permanent water, but can be found far from water, in damp woods and meadows, during non-breeding season.	High
<i>Rana boylei</i>	foothill yellow-legged frog	None	None, SSC	G3	S3	Aquatic, Chaparral, Cismontane woodland, coast scrub, Klamath/N. coast flowing waters, lower montane conifer forest, meadow & seep, riparian forest and woodland	Partly-shaded, shallow streams & riffles with a rocky substrate in a variety of habitats.	Need at least some cobble-sized substrate for egg-laying. Need at least 15 weeks to attain metamorphosis.	Low
<i>Rhyacotriton variegatus</i>	southern torrent salamander	None	None, SSC	G3G4	S2S3	Lower montane conifer forest, old-growth, redwood forest, riparian forest.	Coastal redwood, Douglas-fir, mixed conifer, montane riparian and montane hardwood-conifer habitats. Old growth forest.	Cold, well-shaded, permanent streams and seepages, or within splash zone or on moss-covered rock within trickling water.	Moderate
Birds									
<i>Accipiter cooperii</i>	Cooper's hawk	None	None, WL	G5	S4	Cismontane woodland Riparian forest Riparian woodland Upper montane conifer forest	Woodland, chiefly of open, interrupted or marginal type.	Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also, live oaks.	High
<i>Accipiter striatus</i>	sharp-shinned hawk	None	None, WL	G5	S4	Cismontane woodland, lower montane conifer forest, riparian forest, riparian woodland	Ponderosa pine, black oak, riparian deciduous, mixed conifer & Jeffrey pine habitat. Prefers riparian.	North-facing slopes, with plucking perches are critical requirements. Nests usually within 275 ft of water.	High
<i>Ardea alba</i>	great egret	None	None	G5	S4	Brackish marsh, estuary, freshwater marsh, marsh & swamp, riparian forest, wetland	Colonial nester in large trees.	Rookery sites located near marshes, tide-flats, irrigated pastures, and margins of rivers and lakes.	Low

Scientific Name	Common Name	FedList	CalList	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
<i>Ardea herodias</i>	great blue heron	None	None	G5	S4	Brackish marsh, estuary, freshwater marsh, marsh & swamp, riparian forest, wetland	Colonial nester in tall trees, cliffsides, and sequestered spots on marshes.	Rookery sites in close proximity to foraging areas: marshes, lake margins, tide-flats, rivers and streams, wet meadows.	Low
<i>Brachyramphus marmoratus</i>	marbled murrelet	Threatnd	Endngrd	G3G4	S1	Lower montane conifer forest, Oldgrowth Redwood	Feeds near-shore; nests inland along coast from Eureka to Oregon border.	Nests in old-growth redwood-dominated forests, up to 6 mi. inland, often in Douglas-fir.	Low
<i>Charadrius alexandrinus nivosus</i>	western snowy plover	T	None, SSC	G3T3	S2S3	Great Basin standing waters, Sand shore, Wetland	Sandy beaches, salt pond levees & shores of large alkali lakes.	Needs sandy, gravelly or friable soils for nesting.	None
<i>Charadrius montanus</i>	mountain plover	None	None, SSC	G3	S2S3	Chenopod scrub Valley & foothill grassland	Short grasslands, freshly plowed fields, newly sprouting grain fields, & sometimes sod farms.	Short vegetation, bare ground & flat topography. Prefers grazed areas & areas with burrowing rodents.	None
<i>Circus cyaneus</i>	northern harrier	None	None, SSC	G5	S3	Coastal scrub, Great Basin grassland, Marsh & swamp, Riparian scrub	Coastal salt & fresh-water marsh. Nest & forage in grasslands, from salt grass in desert sink to mountain cienagas.	Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas.	Low
<i>Coccyzus americanus occidentalis</i>	western yellow-billed cuckoo	T	E	G5T2T3	S1	Riparian forest	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems.	Nests in riparian jungles of willow, often mixed with cottonwoods, w/ lower story of blackberry, nettles, or wild grape.	None
<i>Egretta thula</i>	snowy egret	None	None	G5	S4	Marsh & swamp, meadow & seep, riparian forest, riparian woodland, wetland	Colonial nester, with nest sites situated in protected beds of dense tules.	Rookery sites situated close to foraging areas: marshes, tidal-flats, streams, wet meadows, and borders of lakes.	Low
<i>Elanus leucurus</i>	white-tailed kite	None	None, FP	G5	S3S4	Cismontane woodland, marsh & swamp, riparian woodland, valley & foothill grassland, wetland	Rolling foothills and valley margins w/scattered oaks & river bottomlands or marshes next to deciduous woodland.	Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	Low
<i>Falco columbarius</i>	merlin	None	None, WL	G5	S3S4	Estuary, Great Basin grassland, Valley & foothill grassland	Seacoast, tidal estuaries, open woodlands, savannahs, edges of grasslands & deserts, farms & ranches.	Clumps of trees or windbreaks are required for roosting in open country.	Low

Scientific Name	Common Name	FedList	CalList	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
<i>Falco peregrinus anatum</i>	American peregrine falcon	Delisted	Delisted, FP	G4T4	S3S4	Many open habitats, however, more likely along coastlines, lake edges, mountain edges.	Near wetlands, lakes, rivers, or other water; on cliffs, banks, dunes, mounds; also human-made structures.	Nest consists of a scrape or a depression or ledge in an open site.	Moderate
<i>Haliaeetus leucocephalus</i>	bald eagle	Delisted	Endngrd, FP	G5	S3	Lower montane conifer forest, Oldgrowth	Ocean shore, lake margins, & rivers for both nesting & wintering. Most nests within 1 mi of water.	Nests in large, old-growth, or dominant live tree w/open branches, especially ponderosa pine. Roosts communally in winter.	Low
<i>Icteria virens</i>	yellow-breasted chat	None	None, SSC	G5	S3	Riparian forest, Riparian scrub, Riparian woodland	Summer resident; inhabits riparian thickets of willow & other brushy tangles near watercourses.	Nests in low, dense riparian, consisting of willow, blackberry, wild grape; forages and nests w/i 10 ft of ground.	None
<i>Numenius americanus</i>	long-billed curlew	None	None, WL	G5	S2	Great Basin grassland Meadow & seep	Breeds in upland shortgrass prairies & wet meadows in northeastern California.	Habitats on gravelly soils and gently rolling terrain are favored over others.	None
<i>Nycticorax nycticorax</i>	black-crowned night heron	None	None	G5	S4	Marsh & swamp, riparian forest, riparian woodland, wetland	Colonial nester, usually in trees, occasionally in tule patches.	Rookery sites located adjacent to foraging areas: lake margins, mud-bordered bays, marshy spots.	None
<i>Pandion haliaetus</i>	osprey	None	None, WL	G5	S4	Riparian forest	Ocean shore, bays, fresh-water lakes, and larger streams.	Large nests built in tree-tops within 15 miles of a good fish-producing body of water.	Present
<i>Pelecanus occidentalis californicus</i>	California brown pelican	Delisted	Delisted, FP	G4T3	S3	Estuaries and coastal marine habitat.	Colonial nester on coastal islands just outside the surf line.	Nests on coastal islands of small to moderate size which afford immunity from attack by ground-dwelling predators. Roosts communally.	None
<i>Phalacrocorax auritus</i>	double-crested cormorant	None	None	G5	S4	Riparian forest, Riparian scrub, Riparian woodland	Colonial nester on coastal cliffs, offshore islands, & along lake margins in the interior of the state.	Nests along coast on sequestered islets, usually on ground with sloping surface, or in tall trees along lake margins.	None
<i>Poecile atricapillus</i>	black-capped chickadee	None	None, WL	G5	S3	Riparian woodland	Inhabits riparian woodlands in Del Norte and northern Humboldt counties.	Mainly found in deciduous tree-types, especially willows and alders, along large or small watercourses.	Low
<i>Rallus longirostris obsoletus</i>	California clapper rail	Endngrd	Endngrd, FP	G5T1	S1	Brackish marsh Marsh & swamp Salt marsh Wetland	Salt-water & brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay.	Assoc. with abundant growths of pickleweed, but feeds away from cover on invertebrates from mud-bottomed sloughs.	None

Scientific Name	Common Name	FedList	CalList	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
<i>Riparia riparia</i>	bank swallow	None	T	G5	S2	Riparian scrub, Riparian woodland	Colonial nester; nests primarily in riparian and other lowland habitats west of the desert.	Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole.	None
<i>Setophaga petechia</i>	yellow warbler	None	None, SSC	G5	S3S4	Riparian forest, Riparian scrub, Riparian woodland Also nests in montane shrubbery in open conifer forests in Cascades and Sierra Nevada.	Riparian plant associations in close proximity to water.	Frequently found nesting and foraging in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alders.	Low
<i>Strix nebulosa</i>	great gray owl	None	Endngrd	G5	S1	Lower montane conifer forest, oldgrowth, subalpine conifer forest, upper montane conifer forest.	Resident of mixed conifer or red fir forest habitat, in or on edge of meadows.	Requires large diameter snags in a forest with high canopy closure, which provide a cool sub-canopy microclimate.	Low
<i>Strix occidentalis caurina</i>	northern spotted owl	Threatnd	SSC	G3T3	S2S3	North coast conifer forest, Oldgrowth Redwood	Old-growth forests or mixed stands of old-growth & mature trees. Occasional in younger forests w/ patches of big trees.	High, multistory canopy dominated by big trees, many trees w/ cavities or broken tops, woody debris & space under canopy.	Moderate
Fish									
<i>Acipenser medirostris</i>	green sturgeon	T	None, SSC	G3	S1S2	Aquatic, Klamath/N. coast flowing waters, Sacramento/ San Joaquin flowing waters	The most marine species of sturgeon. Abundance increases northward of Point Conception. Spawns in the Sacramento, Klamath, & Trinity Rivers.	Spawns at temps between 8-14 C. Preferred spawning substrate is large cobble, but can range from clean sand to bedrock.	None
<i>Entosphenus tridentatus</i>	Pacific lamprey	None	None, SSC	G4	S4	Aquatic, Klamath/N. coast flowing waters, Sacramento/ San Joaquin flowing waters, South coast flowing waters	Found in Pacific Coast streams north of San Luis Obispo Co., however regular runs in Santa Clara River. Size of runs is declining.	Swift-current gravel-bottomed areas for spawning with water temps between 12-18 C. Ammocoetes need soft sand or mud.	None
<i>Eucyclogobius newberryi</i>	tidewater goby	E	None, SSC	G3	S3	Aquatic, Klamath/North coast flowing waters, Sacramento/ San Joaquin flowing waters, South coast flowing waters	Brackish water habitats along the Calif coast from Agua Hedionda Lagoon, San Diego Co. to the mouth of the Smith River.	Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water & high oxygen levels.	None

Scientific Name	Common Name	FedList	CalList	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
<i>Oncorhynchus clarkii clarkii</i>	coast cutthroat trout	None	None, SSC	G4T4	S3	Aquatic Klamath/North coast flowing waters	Small coastal streams from the Eel River to the Oregon border.	Small, low gradient coastal streams & estuaries. Need shaded streams with water temps <18C, & small gravel for spawning	None
<i>Oncorhynchus kisutch</i>	Coho salmon (S. Oregon/N. California ESU)	Threatnd	Threatnd	G4T2Q	S2?	Aquatic, Klamath/North coast flowing waters, Sacramento/San Joaquin flowing waters	Fed listing refers to populations between Cape Blanco, Oregon & Punta Gorda, Humboldt County, California.	State listing refers to populations between the Oregon border & Punta Gorda, California.	None
<i>Oncorhynchus mykiss irideus</i>	summer run steelhead trout	None	None, SSC	G5T4Q	S2	Aquatic Klamath/North coast flowing waters Sacramento/San Joaquin flowing waters	No. Calif coastal streams south to Middle Fork Eel River. Within range of Klamath Mtns province DPS & No. Calif DPS.	Cool, swift, shallow water & clean loose gravel for spawning, & suitably large pools in which to spend the summer.	None
<i>Oncorhynchus tshawytscha</i>	Chinook salmon (California coast ESU)	Threatnd	None	G5	S1	Aquatic Sacramento/San Joaquin flowing waters	Federal listing refers to wild spawned, coastal, spring & fall runs between Redwood Cr, Humboldt Co & Russian R., Sonoma Co	Major limiting factor for juvenile chinook salmon is temperature, which strongly effects growth & survival.	None
<i>Spirinchus thaleichthys</i>	longfin smelt	C	T, SSC	G5	S1	Aquatic Estuary	Euryhaline, nektonic & anadromous. Open waters of estuaries, mostly mid to bottom of water column.	Prefer salinities of 15-30 ppt, but can be found in completely freshwater to almost pure seawater.	None
<i>Thaleichthys pacificus</i>	Eulachon	Threatnd	None	G5	S3	Aquatic Klamath/North coast flowing waters	Found in Klamath River, Mad River, Redwood Creek & in small numbers in Smith River & Humboldt Bay tributaries.	Spawn in lower reaches of coastal rivers w/ moderate water velocities & bottom of pea-sized gravel, sand & woody debris	None
Insects									
<i>Bombus caliginosus</i>	obscure bumble bee	None	None	G4?	S1S2	Nests underground or above ground in abandoned bird nests.	Coastal areas from Santa Barbara county to north to Washington state.	Food plant genera include Baccharis, Cirsium, Lupinus, Lotus, Grindelia and Phacelia.	Low
<i>Bombus occidentalis</i>	western bumble bee	None	None	G2G3	S1	Pollinates a wide variety of flowers. Will gnaw through flowers to obtain nectar their tongues are too short to reach.	Once common & widespread, species has declined precipitously from central CA to southern B.C., perhaps from disease.	Nest in cavities or abandoned burrows.	Moderate

Scientific Name	Common Name	FedList	CalList	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
<i>Cicindela hirticollis gravida</i>	sandy beach tiger beetle	None	None	G5T2	S2	Coastal dunes	Inhabits areas adjacent to non-brackish water along the coast of California from San Francisco Bay to northern Mexico.	Clean, dry, light-colored sand in the upper zone. Subterranean larvae prefer moist sand not affected by wave action.	None
Mammals									
<i>Arborimus albipes</i>	white footed vole	None	None, SSC	G3G4	S2	North coast coniferous forest, Redwood, Riparian forest	Mature coastal forests in Humboldt & Del Norte cos. Prefers areas near small, clear streams with dense alder & shrubs.	Occupies the habitat from the ground surface to the canopy. Feeds in all layers & nests on the ground under logs or rock	None
<i>Arborimus pomo</i>	Sonoma tree vole	None	None, SSC	G3	S3	North coast conifer forest, old-growth, redwood forest	N. coast fog belt from Oregon border to Sonoma Co. In Douglas-fir, redwood & montane hardwood-conifer forests.	Feeds almost exclusively on Douglas-fir needles. Will occasionally take needles of grand fir, hemlock or spruce.	Low
<i>Corynorhinus townsendii</i>	Townsend's big-eared bat	None	None, SSC	G3G4	S2	Broadleaf upland forest, chaparral, low montane conifer forest, meadow & seep, riparian forest and wood-land, montane conifer forest, valley & foothill grassland	Throughout California in a wide variety of habitats. Most common in mesic sites.	Roosts in the open, hanging from walls & ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	Low
<i>Martes caurina humboldtensis</i>	Humboldt marten	None	CE, SSC	G5T1	S1	North coast conifer forest, old-growth, Redwood forest	Occurs only in the coastal redwood zone from the Oregon border south to Sonoma County.	Associated with late-successional coniferous forests, prefer forests with low, overhead cover.	None
<i>Myotis evotis</i>	long-eared myotis	None	None	G5	S3	Roosts in a wide range of substrate.	Found in all brush, woodland & forest habitats from sea level to about 9000 ft. prefers coniferous woodlands & forests.	Nursery colonies in buildings, crevices, spaces under bark, & snags. Caves used primarily as night roosts.	Low
<i>Pekania pennanti</i>	fisher (west coast DPS)	Prop. Threatnd	Cand. Threat, SSC	G5T2-T3Q	S2S3	North coast conifer forest, old-growth, riparian forest	Intermediate to large-tree stages of conifer forests & deciduous-riparian areas w/ high % canopy closure.	Uses cavities, snags, logs & rocky areas for cover & denning. Needs large areas of mature, dense forest.	None
<i>Taxidea taxus</i>	American badger	None	SSC	G5	S3	Many varied habitats, from coastal to alpine, riparian to open upland.	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils.	Needs sufficient food, friable soils & open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	Low

**Table A-3
Botanical Species Observed 4/18/17, 7/28/2017
Sequoia Park Zoo Expansion**

Scientific Name	Common Name	Family	Native?
Trees			
<i>Abies grandis</i>	grand fir	Pinaceae	Y
<i>Acer macrophyllum</i>	bigleaf maple	Aceraceae	Y
<i>Alnus rubra</i>	red alder	Betulaceae	Y
<i>Fragula purshiana</i>	casara	Rhamnaceae	Y
<i>Ilex aquifolium</i>	English holly	Aquifoliaceae	N
<i>Picea sitchensis</i>	Sitka spruce	Pinaceae	Y
<i>Pittosporum tenuifolium</i>	tawhiwhi	Pittosporaceae	N
<i>Prunus avium</i>	cherry cultivar	Rosaceae	N
<i>Prunus cerasifera</i>	wild plum	Rosaceae	N
<i>Prunus laurocerasus</i>	English laurel	Rosaceae	N
<i>Pseudotsuga menziesii</i>	Douglas fir	Pinaceae	Y
<i>Sequoia sempervirens</i>	coast redwood	Cupressaceae	Y
<i>Tsuga heterophylla</i>	western hemlock	Pinaceae	Y
Shrubs			
<i>Berberis nervosa</i>	Oregon grape	Berberidaceae	Y
<i>Cordyline australis</i>	cabbage tree	Laxmanniaceae	N
<i>Cotoneaster franchetii</i>	Franchett's cotoneaster	Rosaceae	N
<i>Fuchsia magellanica</i>	small leaf fuchsia	Onagraceae	N
<i>Gaultheria shallon</i>	salal	Ericaceae	Y
<i>Morella californica</i>	California wax myrtle	Myricaceae	Y
<i>Rhododendron macrophyllum</i>	coast rhododendron	Ericaceae	Y
<i>Ribes menziesii</i>	canyon gooseberry	Grossulariaceae	Y
<i>Rubus armeniacus</i>	Himalayan blackberry	Rosaceae	N
<i>Rubus parviflorus</i>	thimbleberry	Rosaceae	Y
<i>Rubus spectabilis</i>	salmonberry	Rosaceae	Y
<i>Rubus ursinus</i>	California blackberry	Rosaceae	Y
<i>Sambucus racemosa</i>	red elderberry	Adoxaceae	Y
<i>Vaccinium ovatum</i>	evergreen huckleberry	Ericaceae	Y
<i>Vaccinium parvifolium</i>	red huckleberry	Ericaceae	Y
Ferns and Allies			
<i>Athyrium filix-femina</i>	lady fern	Woodsiaceae	Y
<i>Blechnum spicant</i>	deer fern	Blechnaceae	Y
<i>Equisetum arvense</i>	horsetail	Equisetaceae	Y
<i>Polypodium glycyrrhiza</i>	licorice fern	Polypodiaceae	Y
<i>Polypodium scolieri</i>	leatherleaf fern	Polypodiaceae	Y
<i>Polystichum munitum</i>	sword fern	Dryopteridaceae	Y
<i>Pteridium aquilinum</i>	bracken fern	Dennstaedtiaceae	Y
Sedges and Rushes			
<i>Carex hendersonii</i>	Henderson's sedge	Cyperaceae	Y
<i>Carex leptopoda</i>	slender footed sedge	Cyperaceae	Y
<i>Carex obnupta</i>	slough sedge	Cyperaceae	Y
<i>Juncus sp.</i>		Juncaceae	Y
<i>Luzula comosa</i>	pacific woodrush	Juncaceae	Y
Grasses			
<i>Anthoxanthum occidentale</i>	vanilla grass	Poaceae	Y

**Table A-3
Botanical Species Observed 4/18/17, 7/28/2017
Sequoia Park Zoo Expansion**

Scientific Name	Common Name	Family	Native?
<i>Bromus carinatus</i>	California brome grass	Poaceae	Y
<i>Cortaderia jubata</i>	pampas grass	Poaceae	N
<i>Dactylis glomerata</i>	orchard grass	Poaceae	N
<i>Festuca perennis</i>	wildrye	Poaceae	N
<i>Holcus lanatus</i>	velvet grass	Poaceae	N
<i>Pleuropogon refractus</i>	nodding semaphore grass	Poaceae	Y
<i>Poa annua</i>	annual grass	Poaceae	N
<i>Poa pratensis</i>	Kentucky bluegrass	Poaceae	N
<i>Trisetum cernuum</i>	nodding trisetum	Poaceae	Y
Herbs			
<i>Acanthus mollis</i>	bear's breech	Acanthaceae	N
<i>Allium triquetrum</i>	three cornered leek	Alliaceae	N
<i>Anthriscus caulcalis</i>	bur chervil	Apiaceae	N
<i>Bellis perenne</i>	English daisy	Asteraceae	N
<i>Cardamine californica</i>	milkmaids	Brassicaceae	Y
<i>Cardamine oligosperma</i>	bittercress	Brassicaceae	Y
<i>Cerastium glomeratum</i>	mouseear chickweed	Caryophyllaceae	N
<i>Chrysosplenium glechomifolium</i>	pacific golden saxifrage	Saxifragaceae	Y
<i>Cirsium vulgare</i>	bullthistle	Asteraceae	N
<i>Claytonia perfoliata</i>	miner's lettuce	Montiaceae	Y
<i>Crocsmia x crocosmiiflora</i>	montebretia	Iridaceae	N
<i>Epilobium ciliatum</i>	fringed willowherb	Onagraceae	Y
<i>Euphorbia peplus</i>	petty spurge	Euphorbaceae	N
<i>Galium aparine</i>	cleaver plant	Rubiaceae	Y
<i>Galium triflorum</i>	sweet bedstraw	Rubiaceae	Y
<i>Geranium dissectum</i>	cutleaf geranium	Geraniaceae	N
<i>Iris douglasiana</i>	Douglas iris	Iridaceae	Y
<i>Lapsana communis</i>	common nipplewort	Asteraceae	N
<i>Ligusticum apiifolium (C.F.)</i>	celeryleaf licorice	Apiaceae	Y
<i>Lysichiton americanus</i>	skunk cabbage	Araceae	Y
<i>Lysimachia latifolia</i>	pacific starflower	Myrsinaceae	Y
<i>Maianthemum dilatatum</i>	false lily of the valley	Ruscaceae	Y
<i>Mimulus guttatus</i>	seep monkey flower	Phrymaceae	Y
<i>Oenanthe sarmentosa</i>	water parsley	Apiaceae	Y
<i>Osmorhiza berteroi</i>	sweet cicely	Apiaceae	Y
<i>Oxalis incarnata</i>	crimson woodsorrel	Oxalidaceae	N
<i>Oxalis oregana</i>	redwood sorrel	Oxalidaceae	Y
<i>Pectiantia ovalis</i>	coastal mitrewort	Saxifragaceae	Y
<i>Plantago lanceolata</i>	English plantain	Plantaginaceae	N
<i>Plantago major</i>	common plantain	Plantaginaceae	N
<i>Prosartes smithii</i>	large fairy bell	Liliaceae	Y
<i>Ranunculus repens</i>	creeping buttercup	Ranunculaceae	N
<i>Rumex crispus</i>	curly dock	Polygonaceae	N
<i>Sanicula crassicaulis</i>	pacific sanicle	Apiaceae	Y
<i>Scrophularia californica</i>	bee plant	Scrophulariaceae	Y
<i>Stachys ajugoides</i>	bugle hedgenettle	Lamiaceae	Y
<i>Stellaria media</i>	chickweed	Caryophyllaceae	N
<i>Taraxicum officinale</i>	dandelion	Asteraceae	N
<i>Trifolium pratense</i>	red clover	Fabaceae	N

**Table A-3
Botanical Species Observed 4/18/17, 7/28/2017
Sequoia Park Zoo Expansion**

Scientific Name	Common Name	Family	Native?
<i>Trifolium repens</i>	white clover	Fabaceae	N
<i>Trillium ovatum</i>	pacific trillium	Melanthiaceae	Y
<i>Vancouveria planipetala</i>	inside-out-flower	Berberidaceae	Y
<i>Veronica americanus</i>	American speedwell	Plantaginaceae	Y
<i>Veronica serpyllifolia</i>	thymeleaf speedwell	Plantaginaceae	Y
<i>Vicia sativa</i>	spring vetch	Fabaceae	N
<i>Viola sempervirens</i>	redwood violet	Violaceae	Y
Vines			
<i>Hedera helix</i>	English ivy	Araliaceae	N
<i>Lonicera hispidula</i>	pink honeysuckle	Caprifoliaceae	Y
98 Species			64% Native

**Table A-4
Animal Species Observed 4/18/17, 7/28/2017
Sequoia Park Zoo Expansion**

Scientific Name	Common Name	Family	Nesting Habit	Listed?
Amphibians				
<i>Pseudacris regilla</i>	chorus frog	Hylidae	N/A	NL
Birds				
<i>Calypte anna</i>	Anna's hummingbird	Trochilidae	Horizontal branches, open woodlands	NL
<i>Cardellina pusilla</i>	Wilson's warbler	Parulidae	small depression on ground, base of tree/object	NL
<i>Corvus brachyrhynchos</i>	American crow	Corvidae	In tree canopy, March-July	NL
<i>Corvus corax</i>	raven	Corvidae	Cliffs, trees, and structures	NL
<i>Cyanocitta stelleri</i>	stellar jay	Corvidae	Nests in conifers, near the top of trees	NL
<i>Empidonax difficilis</i>	pacific-slope flycatcher	Tyrannidae	Cavity nester.	NL
<i>Pandion haliaetus</i>	osprey	Pandionidae	In open areas on a wide sturdy support.	WL
<i>Passer domesticus</i>	house sparrow	Passeridae	In holes of buildings and structures.	NL
<i>Poecile rufescens</i>	chestnut backed chickadee	Paridae	Cavity nester, variety of woodland sites	NL
<i>Regulus satrapa</i>	golden crowned kinglet	Regulidae	60 ft above ground close to the trunk of a conifer	NL
<i>Troglodytes pacificus</i>	pacific wren	Troglodytidae	Domed nest often near streams,	NL
<i>Turdus migratorius</i>	American robin	Turdidae	Within lower canopy, April-July	NL
<i>Strix varia</i>	barred owl	Strigidae	In natural cavities	NL
<i>Zonotrichia leucophrys</i>	white crowned sparrow	Emberizidae	Within shrubs, 1.5-10 feet high.	NL
Insects				
<i>Culcidae sp.</i>	mosquitos	Culcidae	N/A	NL
<i>Philaenus spumarius</i>	spittlebug	Aphrophoridae	N/A	NL
<i>Vespula pensylvanica</i>	western yellow-jacket	Vespidae	ground burrow	NL
Mollusks				
<i>Ariolimax columbianus</i>	banana slug	Arionidae	N/A	NL

B **Site Photographs**

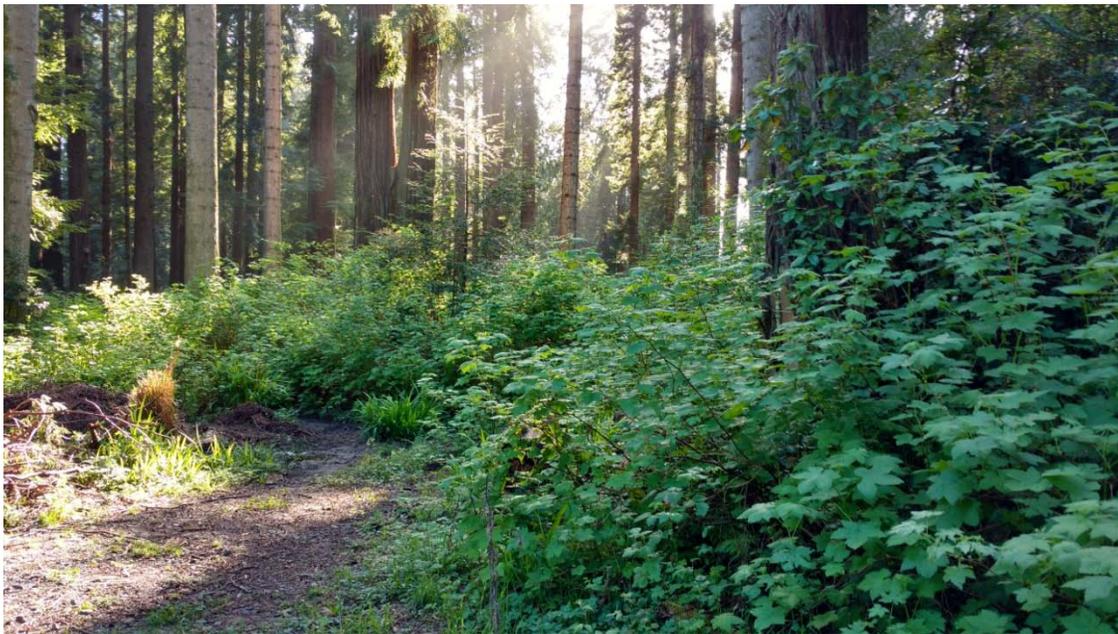


Photo B-1. Looking southwest toward area of proposed Zoo expansion. Note Coastal Brambles vegetation community. Many grand firs in photo infected with Armellaria.

Photo taken April 18, 2017.

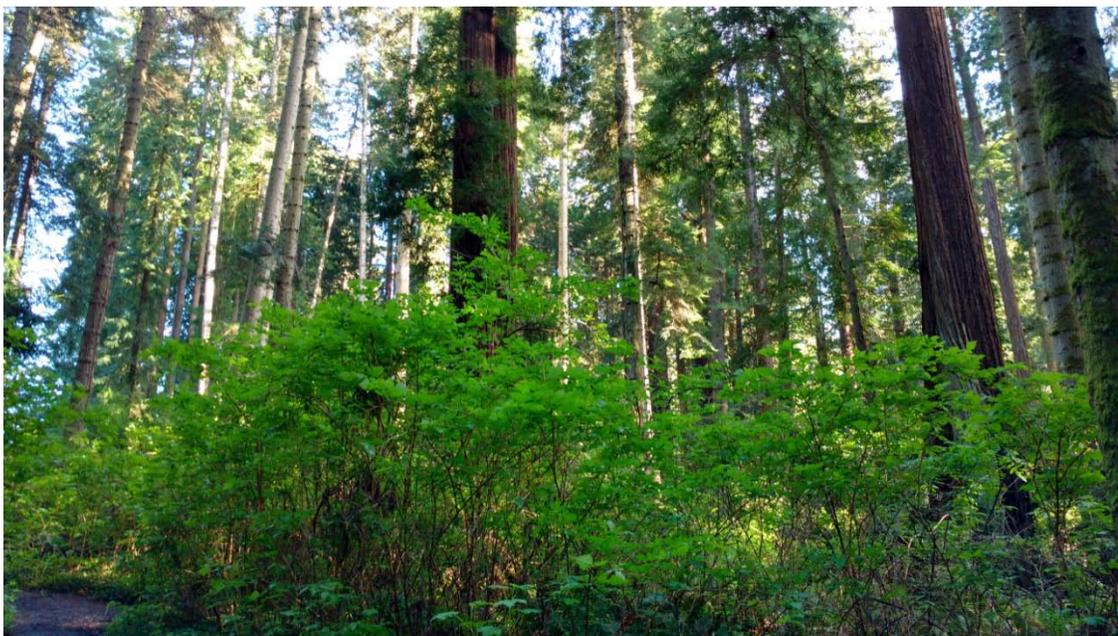


Photo B-2. Looking south through area of proposed expansion. Note grand fir in background proposed for removal, as well as coastal brambles in understory.

Photo taken April 18, 2017.



Photo B-3. One of the Pacific golden saxifrage populations being overwhelmed by invasive English ivy. Invasive species removal would be included as part of the project.

Photo taken April 18, 2017.



Photo B-4. Forest conditions surrounding the project area. Note second-growth trees and encroaching English ivy. Invasive ivy would be removed as part of the project.

Photo taken April 18, 2017.



Photo B-5. Eroded gully containing seasonal waterway. Note native vegetation cover. Project to maintain a 50-foot buffer from the edge of wetland and will not encroach into these areas. Photo taken July 28, 2017.

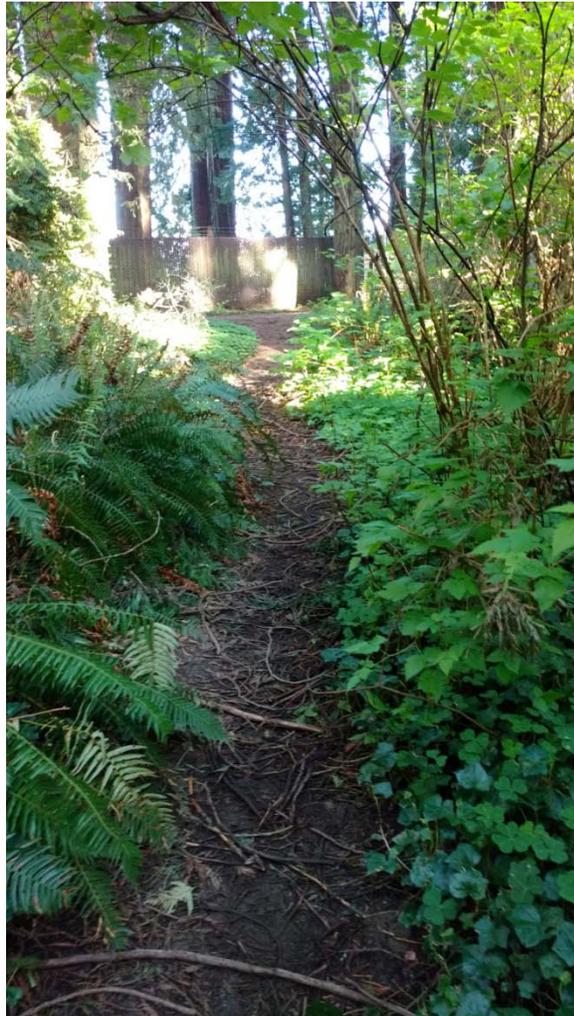


Photo B-6. Unsanctioned trail, looking east toward Zoo and expansion area. Photo taken July 28, 2017.

C

National Wetlands Inventory



September 22, 2017

Wetlands

- | | | | | | |
|---|---|---|-----------------------------------|---|----------|
|  | Estuarine and Marine Deepwater |  | Freshwater Emergent Wetland |  | Lake |
|  | Estuarine and Marine Wetland |  | Freshwater Forested/Shrub Wetland |  | Other |
| | Sequoia Park Zoo Expansion and Renovation |  | Freshwater Pond |  | Riverine |

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

D

Northern Spotted Owl Survey Results



Reference: 017073

August 17, 2017

Miles Slattery, Director
City of Eureka
Parks & Recreation Department
1011 Waterfront Drive
Eureka, CA 95501

Robert Dumouchel, Assistant Planner
City of Eureka
Parks & Recreation Department
1011 Waterfront Drive
Eureka, CA 95501

Subject: Eureka Sequoia Park Zoo Project - Northern Spotted Owl Survey Report

Dear Mr. Slattery and Mr. Dumouchel:

This report presents SHN Engineers & Geologists (SHN) Northern Spotted Owl (NSO) survey for NSO habitat at the Eureka Sequoia Zoo on W. Street in Eureka, CA.

Introduction

The Eureka Sequoia Zoo plans the removal of approximately 3 acres of second growth redwood and grand firs at their facility. The small size and metropolitan setting of the proposed project raised a question regarding the necessity to conduct the full 2 year / 6 Survey NSO Protocol for such a project. John Hunter of the United States Fish and Wildlife Service (USFWS), Arcata Office, was contacted by SHN to confirm that no standard exemption exists for conducting a truncated NSO Survey based on the size and/or location of a project, if potential NSO habitat is nearby.

Mr. Hunter suggested conducting a couple of NSO surveys of project and its surrounding area and if NO NSO's were detected, then contact the USFWS and request "technical assistance" to review the area to determine if a full Protocol level survey would be necessary, or if an exemption could be provided.

Survey Method

Call Stations were established around the "island" of suitable habitat located adjacent to the Zoo and at key habitat corridor connection points where this island connects to other tree-dominated habitats which meander throughout the city and may serve as travel corridors by NSO's (See Appendix A). These tree-dominated habitats typically offer poor habitat conditions due to their young, even-age stand growth which is comprised of a very thick understory, no decent flight paths or vertical thermal refugia. In areas where the habitat has not been managed for timber use, the remaining habitat is interspersed with residential housing, streets, schools, ballparks or other human activities that are not conducive to NSO occupation or use.

Two NSO surveys were conducted on (May 25th & June 1st) that resulted in no NSO response or detection. It was noted at almost every Call Station during those surveys, ambient road/traffic noise, dogs barking, people talking and other assorted human related disturbances and activities associated with an urban setting. Kathleen Brubaker of the USFWS was contacted to discuss the project area, Call Station locations, CNDDDB database results (See Appendix B) and results of the

first two surveys. Ms. Brubaker recommended conducting one more survey and if no NSO detections occurred, the USFWS would make a determination on the activities being proposed by the Eureka Sequoia Park Zoo.

A third NSO Survey Visit was conducted on July 1, 2017. No NSO's were observed or detected. The results of the third NSO Survey were e-mailed to Katherine Seidel of the USFWS for review on July 3, 2017. On July 5, 2017 Katherine Seidel e-mailed her concurrence that "the operations proposed on the Eureka Sequoia Park Zoo are not likely to result in take of a NSO, provided operations are completed prior to Feb. 1.

Survey Results

Three protocol level Surveys were conducted between May 25 and July 1, 2017 at the locations identified in Appendix B and resulted in no NSO responses. (See Appendix C).

A query of the California Dept. of Fish & Wildlife CNDDDB for NSO locations was conducted in the immediate vicinity of the Sequoia Park Zoo (Appendix B) which also indicates that there are no NSO Activity Centers, or detections near the project site being proposed by the Zoo.

Conclusions

Due to the proposed project's location in a populated area of Eureka which is surrounded by residential neighborhoods, fragmented stands of timber interspersed with residential homes, poor quality habitat associated with young, even-aged stands of timber, numerous roads and associated traffic noise, and other urban activities, development of the proposed project should have no effect on the Northern Spotted Owl.

If you have any questions, please feel free to call and discuss.

Sincerely,

SHN Engineers & Geologists



Warren Mitchell
Sr. Wildlife Biologist

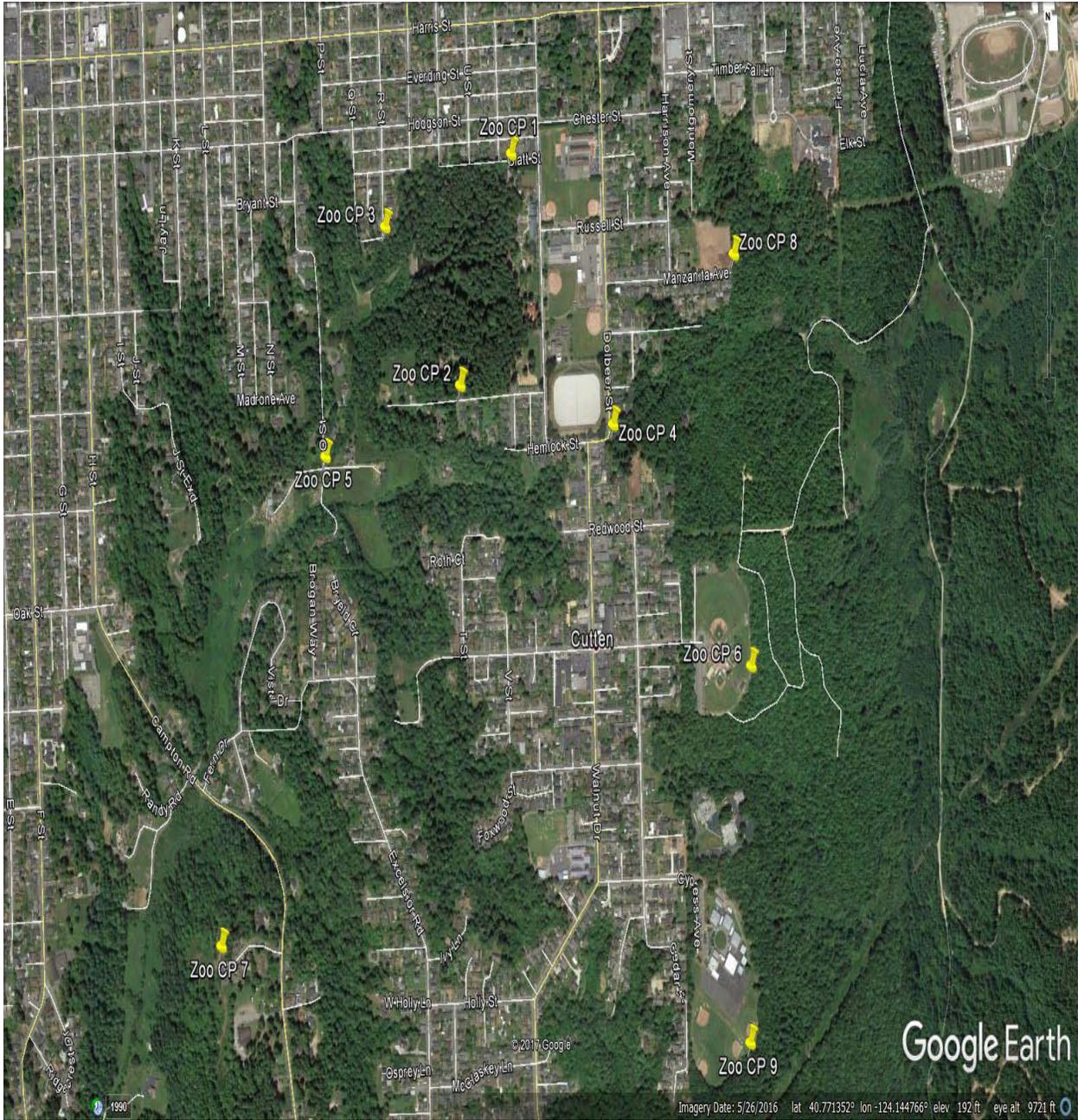
WSM:alh

Appendices

- A. Call Point Locations
- B. CNDDDB NSO Map
- C. NSO Surveys 1, 2 & 3

A

Call Point Locations



B

CNDDDB NSO Map

C

NSO Surveys 1, 2 & 3



Northern Spotted Owl Field Survey Monitoring Form

PROJECT NO.:	017073.100	DATE:	5/25/2017	VISIT:	# 1 of 3
GENERAL LOCATION:	Eureka - Cutten	County:	Mendocino	State:	CA
PROJECT TITLE:	Sequoia Park Zoo	T- 4 & 5N R-1 W Sec(s) – 1, 2, 3, 34, 35 & 36.			
SURVEY TIME:	Start: 20:15	End: 22:40	Total Time:	2 Hrs. 25 Min.	
TYPE OF SURVEY:	ACS <input checked="" type="checkbox"/> CC FO RV AV OPP	Complete Visit:	(Y/N):	Y	

WEATHER:	(EST. % Cloud): 0 %	WIND (est. mph): 0	AIR TEMP (° F): 56 °
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Time	Location	Calling Type	Species	Comments
(2400 clock)	(Call pt. #, milea legal desc)	(Lpfrog: LF, Point: P, Cruise: C)	(Sex, Vocal (V) or Observed (O))	Legal location of owl(s), compass & distance to owl(s) from observers location, misc. owl info or other sighting or changes in weather conditions
2015 2025	CP 1	P		No NSO Response. (Lots of road noise and people walking)
2033 2043	CP 2	P		No NSO Response (Dogs barking and Ravens vocal.)
2048 2058	CP 3	P		No NSO Response (Traffic noise)
2101 2111	CP 4	P		No NSO Response (Traffic noise)
2115 2125	CP 5	P		No NSO Response (Traffic noise, people and dogs barking)
2128 2138	CP 6	P		No NSO Response (Barking dogs and traffic noise)
2145 2155	CP 7	P		No NSO Response (Houses nearby)

1. Office	OBSERVER(s):	Warren Mitchell <i>WM</i>	DATE:	5/25/2017
2. Contractor	OBSERVER(s):		DATE:	





Northern Spotted Owl Field Survey Monitoring Form

PROJECT NO.:	017073.100	DATE:	6/01/2017	VISIT:	# 2 of 3
GENERAL LOCATION:	Eureka - Cutten	County:	Mendocino	State:	CA
PROJECT TITLE:	Sequoia Park Zoo	T- 4 & 5N R-1 W Sec(s) – 1, 2, 3, 34, 35 & 36.			
SURVEY TIME:	Start: 21:00	End: 2320	Total Time:	2 Hrs. 20 Min.	
TYPE OF SURVEY:	ACS <input checked="" type="checkbox"/> CC FO RV AV OPP	Complete Visit:	(Y/N):	Y	

WEATHER:	(EST. % Cloud): 10 %	WIND (est. mph): 1-3	AIR TEMP (° F): 61	°
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Time	Location	Calling Type	Species	Comments
(2400 clock)	(Call pt. #, milea legal desc)	(Lpfrog: LF, Point: P, Cruise: C)	(Sex, Vocal (V) or Observed (O))	Legal location of owl(s), compass & distance to owl(s) from observers location, misc. owl info or other sighting or changes in weather conditions
2100	CP 3	P		No NSO Response. (Traffic noise)
2112				
2115	CP 1	P		No NSO Response (Traffic noise and Ravens vocal.)
2125				
2131	CP 8	P		No NSO Response (Traffic noise)
2141				
2146	CP 4	P		No NSO Response (Traffic noise)
2156				
2159	CP 2	P		No NSO Response (Traffic noise and dogs barking)
2209				
2214	CP 5	P		No NSO Response (Traffic noise and dogs barking)
2224				
2231	CP 6	P		No NSO Response (Traffic noise and dogs barking)
2241				

DISTRIBUTION	1. Office 2. Contractor	OBSERVER(s):	Warren Mitchell <i>WM</i>	DATE:	6/01/2017
		OBSERVER(s):		DATE:	



**Northern Spotted Owl Field
 Survey Monitoring Form**

PROJECT NO.:	017073.100	DATE:	7/01/2017	VISIT:	# 3 of 3				
GENERAL LOCATION:	Eureka - Cutten	County:	Mendocino	State:	CA				
PROJECT TITLE:	Sequoia Park Zoo	T- 4 & 5N R-1 W Sec(s) - 1, 2, 3, 34, 35 & 36.							
SURVEY TIME:	Start: 21:00	End: 2307	Total Time:	2 Hrs.	07 Min.				
TYPE OF SURVEY:	ACS <input checked="" type="checkbox"/> SC	CC	FO	RV	AV	OPP	Complete Visit:	(Y/N):	Y

WEATHER:	(EST. % Cloud):	Fog 100	%	WIND (est. mph):	1-3	AIR TEMP (° F)	58	°
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Time	Location	Calling Type	Species	Comments
(2400 clock)	(Call pt. #, mile legal desc)	(Lpfrog: LF, Point: P, Cruise: C)	(Sex, Vocal (V) or Observed (O))	Legal location of owl(s), compass & distance to owl(s) from observers location, misc. owl info or other sighting or changes in weather conditions
2130	CP 8	P		No Response. (Traffic noise)
2140				
2145	CP 4	P		No NSO Response (Traffic noise)
2155				
2207	CP 6	P		No NSO Response (Traffic noise)
2217				
2225	CP 9	P		No NSO Response
2236				
2250	CP 7	P		No NSO Response (Traffic noise and dogs barking)
2300				
2314	CP 5	P		No NSO Response (Traffic noise)
2324				
2230	CP 3	P		No NSO Response (Traffic noise)
2241				

DISTRIBUTION	1. Office 2. Contractor	OBSERVER(s):	Warren Mitchell <i>WM</i>	DATE:	7/01/2017
		OBSERVER(s):		DATE:	

Appendix C

Canopy Walk Expert Letters

Sequoia Park Zoo Redwood Canopy Walk

Cable-Suspended Canopy Walkways

Specific technologies and components

Choker cables or tree collars will not be allowed in the final design. To keep the loads on the walkway inline with the design parameters for the tree attachments I recommend that the number of visitors be restricted to no more than 4 visitors on a span at any given time. This can be accomplished with good signage, a release of liability that is part of the ticket purchase process, and minimal supervision. The supervisor can also be used to facilitate educational goals and guide the visitor into a more reflective experience as opposed to an adventure experience.

We have found that limiting the number of persons on a walkway also keeps visitors from interacting with each other as much as they might. Also limiting the width of the walkway (18" – 24") and making it a one way circuit allows visitors to focus on the redwoods environment and not the other visitors.

The TAB (tree attachment bolts) described earlier, will be used primarily for supporting the platforms. The cable suspended walkway will require a suspension cable truss (SCT) to be attached to the tree. The loads of the suspension bridge will be supported by attaching the SCT to the trees using structural all thread and through bolting. The structural all thread will allow spacers to be placed between the tree and truss, allowing for tree growth.

The Suspension cables will pass over the SCT and terminate at ground level. The cables will attach to Chance Helical Anchors with a turnbuckle that allow for tensioning the suspension cables. The Chance anchors are screwed into the ground using a portable auger. To determine the depth of the anchors a soil analysis and boring are required by geotechnical specialist. A helical anchor engineer will take the analysis and determine the size and depth using load calculations for the suspension bridges. The distance away from the tree's base the anchors are placed are also determined by the load calculations for each bridge.

The tread-way will made of fiberglass grating allowing for rain to pass through while giving excellent support and traction to the visitor. The fiberglass tread-way will be supported by wooden 4x6 inch bridge stringers and bridge girts. The sides of the bridge will have stainless steel netting 4ft tall and a wooden grab-rail at 36" above the bridge.

The platforms will be attached to the trees using TABs with two different types of interfacing brackets connecting to the wood components. The main girders and the platform bracing will utilize the different types of brackets. Wood framing will support fiberglass grating for the flooring. Wood frames with 2x4 galvanized fencing will be attached to 4x4 post creating secure railings.

A 4x6 wooden doorway or portal will be used to connect the hand cables of the walkways to the edge of the platforms. This portal will be tied back to the trees with 4x4 braces at 7' above the platform with TABs.

Materials Specifications

All materials used in the walkways and platforms will be chosen for strength, durability, and light weight . All cable will be domestically manufactured. All hardware will be hot dipped galvanized, stainless steel, or ceramic coated. All wood will be pressure treated or redwood.

Bridge Cables: 1/2" - 6x26 galvanized aircraft cable (GAC)

Suspender Cables: 3/8" - 7x19(GAC)

Railing Cables: 3/8" - 7x19(GAC) nylon coated

Back up Cables: 3/8" - 7x19(GAC)

Bridge Treads: 1-1/2" thick fiberglass grating

Bridge Railing Netting: Stainless steel AISI304 wire netting

Cable diameter:1.6mm(7x7) Mesh Aperture: 60 mm x 60 mm

Platform Flooring: 1" thick fiberglass grating

Bridge Anchors: Chance Helical Anchors

Construction Logistics

The site where the Cable Suspended Canopy Walkways will be located has two small valleys that create steep and unstable slopes. These slopes will not permit the use of heavy machinery without considerable disturbance to the soil.

The choice to attach the bridges to the trees helps to protect these unstable slopes. Materials can be delivered and positioned along the existing road with construction forklifts. From there it can be distributed to the trees where needed by hand, small crane, or cable hoist systems that can me temporarily attached to the tress.

As the bridges and platforms are being built, temporary overhead cable systems will be installed and rigged for raising materials and personnel.

The bridge anchors will installed with a portable auger that can be broken down into components and carried to each location and assembled on site.

Estimated cost

Bridges - \$500/linear foot

Tree Platforms - \$25,000 - \$35,000 each

Bridge Anchors - \$5,000 per bridge

Design and Engineering – 10% of project

ADA Accessible Canopy Walkway

Specific technologies and components

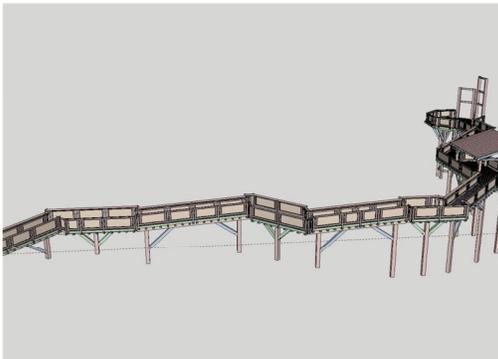
The Accessible Canopy Walkway will allow universal access to the canopy. I recommend a design we used very successfully at the Holden Arboretum. We want to minimize impact to the roots system of the trees by minimizing the number of holes drilled for the foundation post.

To accomplish this we used 10" x 10" and 12" x 12' pressure treated wood post. The larger diameter post were used once the ramps and platforms were 16' or higher. The post were impeded 4' to 8' in the ground and backfilled with crushed mixed size grave and compacted by tamping. Ramps had 2 post per run and the platforms had 1.

The ramps and platforms were then supported 6" x 12" pressure treated glulams girders that attached to the embedded post and were further supported by knee braces the same size as the post.

On top of the girders, 6" x 6" beams were bolted and cantilevered out past the glulams to the width of the ramp or platform. 2" x 10" joist were attached to the 6" x 6"s and 2" x 6" made the decking.

The railings were 4" x 6" frames with 2" x 4" welded galvanized fencing in between, attached to 6" x 6" post. Grab rails were added on each ramp.



Construction Logistics

The area where accessible canopy walkway is located is mostly flat and accessible by an existing service road. The walkway can be built with minimal disturbance. A small skid steer loader is used to drill the holes for the foundation post and bring in gravel to back fill. A small boom truck can be used to set post, girders, and other prefabricated components.

Estimated cost

\$\$1,250 per linear foot.

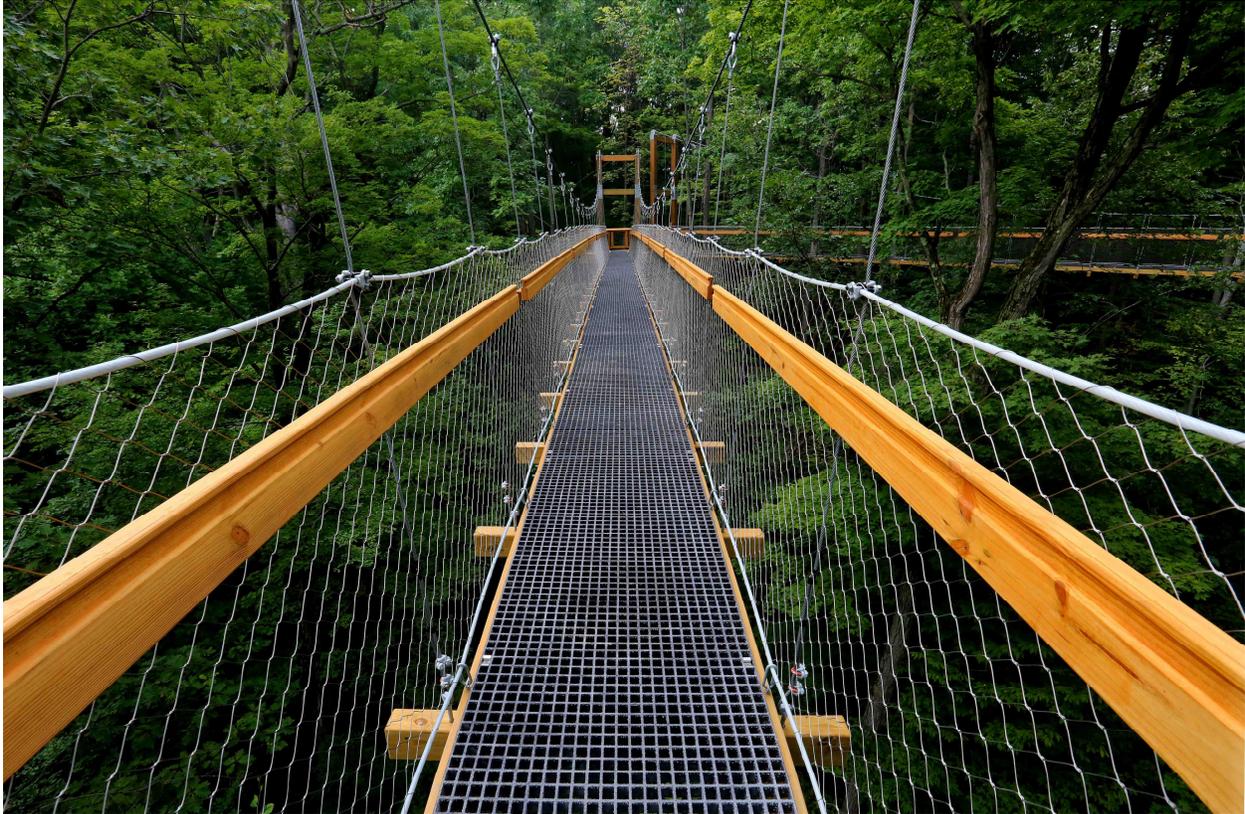


Figure 1 Cable-Suspended Walkway



Figure 2 Cable-Suspended Walkway



Figure 3 ADA Bridge Intersects with Cable-Suspended Walkway



Figure 4 Rigid Bridge

Memorandum

TO: Steve Salzman, Greenway Partners
SITE: Sequoia Park Zoo, Eureka CA
RE: Feasibility and Impacts For Proposed Canopy Access Feature
DATE: September 11, 2017
PROJECT ARBORIST: Scott Baker , ASCA Registered Consulting Arborist #414
ISA Qualified Tree Risk Assessor



REVIEWED BY: Katherine Taylor
ISA Certified Arborist PN-8022A
ISA Qualified Tree Risk Assessor

I visited the Sequoia Park Zoo on August 18th to participate in a design charrette for a proposed canopy access walkway to be constructed on property adjacent to the existing zoo.

We met and reviewed plans on site for the proposed canopy walkway addition to the zoo. This new feature will be part of an expansion of the zoo including new animal exhibits and access to the nearby forest.

My background as an arborist and ecologist has equipped me with an understanding of the redwood forest above and below ground. I have participated in the inspection and maintenance of redwood trees that have structures built using the trees for support. I am also familiar with various environmental regulations as I encounter these in my work. This project will have to be approved under the State of California CEQA regulations along with the local jurisdiction's requirements.

The forest surrounding the zoo is composed of second growth redwood (*Sequoia sempervirens*), white fir (*Abies grandis*), Douglas-fir (*Pseudotsuga menziesii*), and other native species. In this forest there are also several dozen big old-growth redwoods that are a notable feature of the park. The big trees have typical form for old redwoods with shortened crowns and reiterated growth. Large parts are present high above the forest floor. Armillaria root disease is present in the white fir population and dead and declining trees are present.

Presently the forest area behind the zoo is managed as a city park. The condition of the forest floor beneath trees is heavily degraded by many pathways that are not defined. These trails are resulting in

bare soil and heavy compaction which limits the growth of surrounding forest plants. There is a main trail that winds close to some of the largest trees many of which have commemorative plaques attached to the basal trunks.

There is extensive presence of English ivy (*Hedera helix*), an invasive species, which I recommend managing as part of the project. We also observed a few rare native plants including knotting semaphore grass (*Pleuropogon hooverianus*) and pacific golden saxifrage (*Chrysosplenium glechomifolium*).

Forest stand and individual tree management would be part of the project. Some tree removal and pruning is anticipated for safety reasons.

The proposed canopy walk will be integrated with expansion of the zoo into a portion of the city park forest. Currently, the plan includes the use of viewing platforms supported on posts and connected by rigid bridges, along with suspension bridge components that will be attached to living trees using modern hardware developed for this purpose. The height of the trees, which have crowns over 200 feet tall, will limit the walkway to the lower trunk sections of the trees. The walkway may reach 80 feet in height using terrain to attain that level. Some of the walkway will be universally accessible.

I have been party to many discussions regarding the use of living trees to support structures. Currently, there is a lot of innovation and experimental design underway driven by the popularity of Zip Lines, Challenge Courses (Ropes Courses), and Treehouses. The proposed hardware for attaching structures to the trees is installed directly into the live tree. The hardware is designed to leave space between the tree and structure allowing for continued growth. In my experience, when done correctly in a well thought out manner, this method of attachment is minimally invasive and superior to wrapping or compressing the tree which interrupts its vascular system and causes growth defects.

People who are not familiar with tree biology are, understandably, often concerned about the impacts from drilling holes and inserting hardware into a living tree. There are a large number of variables in play that differ on each site including: tree species, site and ecosystem conditions, and the type of structure planned.

Long-lived trees such as *Sequoia sempervirens* are adapted to resist the spread of decay caused by fungi. As they age, most old trees will have many holes and wounds resulting from the loss of limbs or other damage. They do not heal these injuries as people want to say, but rather seal them by growing new layers outside of the injured tissue. To attach the type of tree supported platforms envisioned for this facility, minimal penetration of the trees will be required. Additionally, all the trees on this site both young and old are very large, and the percentage of the tree's vascular system that would be compromised would be minimal.

Impacts can be diminished if the number of penetrations of the tree's vascular system are limited and intentionally placed, and if the species of tree in use is appropriate, i.e. long lived and decay resistant. Also important is the fact that when using well designed hardware, the growth of the tree can be accommodated, allowing for a long lifetime for the structure without conflicting with tree growth. Another interesting fact supporting use of tree attachment technology is that as trees must grow in

circumference every year, the percentage of the tree's vascular system that is interrupted by a hole and hardware is reduced with every year of continued growth.

My experience gained teaching and working with builders on these types of projects for over 20 years supports that if properly designed and installed, this method of attachment is the least invasive to many tree species. Attempts to avoid penetrating the tree with a bolt or other attachment by wrapping or compressing against often leads to problems for the trees as those methods interrupt its basic biology.

Some of the potential impacts that are anticipated with this project include removal of trees that may produce hazard to the facility and strategic pruning of branches, impacts to tree trunks and bark from attachment hardware and potential human contact, impacts to tree roots from foundations for posts or platforms, impacts to long-term stability of trees in the forest, aesthetic impacts to visitors impressions of the forest from the ground, disturbance or displacement of birds and animals using the canopy; new pavement for access roads and fencing.

Mitigation for the removal of any trees required for the new exhibits and safety of the canopy walkway can be accomplished by new planting as part of the construction. Also the project will reclaim damaged forest soils, adding biomass to the forest. Some of the diseased trees that pose risk to the new facility will be left as snags and most of the debris can be used on site as wood chip or logs left to decay naturally.

Mitigation for the impacts to the trees due to attachment hardware and potential pruning can be accomplished by decommissioning all of the social trails now present in the forest, repairing severely eroded areas, and improving and delineating trails for park users. This work would substantially improve the soil conditions for tree roots in the forest beneath the canopy walkway. I recommend that this work be started as soon as possible.

Tree stability will not likely be impacted by the installation of the walkway or any towers and associated foundations as long as they are properly designed. Based on my initial assessment, it appears that attachments are proposed at levels in the tree where the size of the trunk parts can accommodate the structure without leading to issues with stability. At this level the trees are not moving substantially during windy weather so it is unlikely that any dynamic changes in the forest would be caused by the attachments.

The use of guy cables to assure the stability of the trees supporting bridge loads will be considered during the engineering of the final design. If cables are needed they can be installed without compromising the tree. Also included in the final engineering will be the design loads for the facility when people are present. The maximum number of people the system can safely support will be established.

Disturbance from installation of poles or other supports can be carried out in a manner that will minimize root disturbance and not adversely impact the trees. If roots over two inches diameter are encountered the project arborist should be involved in the decision about what to do.

Aesthetic impacts for park users on the ground or not entering through the zoo ticket gate can be addressed by good design of the new trail system, and the use of interpretive signs. I recommend that old trees are reflected on the site plans and marked on site with a basal tag.

In summary, I support the concepts currently included in the zoo's plans. This site is ideal and I think that the project could be built without significant impact to the site. I believe that this project can be used to improve the condition of the redwood forest trees while offering a unique educational opportunity to visitors and the citizens of the city of Eureka. Additionally, the focus on trees and forest health can be used to improve tree management on the existing zoo campus.

Traffic Impact Study

Sequoia Park Zoo Expansion

Prepared for:

Eureka Parks & Recreation Department

SH Engineers & Geologists

812 W. Wabash Ave.
Eureka, CA 95501-2138
707-441-8855

November 2017
016008.400



Reference: 016008.400

November 28, 2017

Miles Slattery
Eureka Parks & Recreation Department
1011 K Street
Eureka, CA 95503

Subject: Traffic Impact Study, Sequoia Park Zoo Expansion, Eureka, California

Dear Mr. Slattery

SHN Engineers & Geologists has prepared this traffic impact study for the City of Eureka's proposed Sequoia Park Zoo Expansion. This report is a part of the California Environmental Quality Act (CEQA) document being prepared for the project.

The report also incorporates comments from the City of Eureka Traffic Project Manager dated November 3, 2017. The final bullet point requested to include the Harris and S Street and Harris and Harrison Street intersections in the study. It was agreed upon with the City that these intersections can be omitted due to the minimal impact expected by the expansion, and the off peak nature of the traffic.

SHN teamed with Spack Consulting, a firm that specializes in traffic studies, to help with the analysis and provide quality control. SHN conducted traffic counts and a parking analysis; used VISTRO™ software to model existing and future traffic conditions under build and no-build scenarios; and prepared a report for the Eureka Parks & Recreation Department's review. Spack Consulting reviewed the traffic modeling and assumptions that were made for trip generation rates.

Thank you for the opportunity to help with the expansion of the Sequoia Park Zoo. We look forward to seeing this project progress. If you have any questions please call me at 441-8855.

Sincerely,

SHN Engineers & Geologists

Cody Long, PE
Civil Engineer

CJL:lms

Enclosure: Traffic Impact Study

Traffic Impact Study

Sequoia Park Zoo Expansion

Prepared for:

Eureka Parks & Recreation Department

1011 K Street
Eureka, CA 95501



Prepared by:



Engineers & Geologists
812 W. Wabash Ave.
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October 2017

QA/QC: JOB__

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Abbreviations and Acronyms

mph	miles per hour
Caltrans	California Department of Transportation
CS	city street roadway designation
DUI	driving under the influence
ITE	Institute of Transportation Engineers
LOS	level of service
NR	no reference
OTS	California Office of Traffic Safety
SHN	SHN Engineers & Geologists

1.0 Introduction

1.1 Purpose of Report and Study Objectives

The City of Eureka Parks and Recreation Department is proposing to expand the Sequoia Park Zoo located at the intersection of W Street and Russell Street in Eureka, California. See Figures 1 and 2 in Appendix A for location and study area characteristics. This study was conducted by SHN Engineers & Geologists, to determine the traffic impacts associated with the build out of the proposed expansions on the studied roads and intersections where impact is anticipated. Mitigation measures will be analyzed if traffic operations are expected to be below traffic engineering standards. It should be noted that negligible changes are expected on corridors not analyzed in this study and improvements along those corridors may be needed in the future to accommodate incremental traffic growth from this and other area developments. The study objectives are:

- Document how the Dolbeer Street and W Street intersections with Harris Street and the Walnut/Hemlock Street intersection currently operate.
- Forecast the amount of traffic expected to be generated by the proposed expansion
- Analyze how the Dolbeer/Harris, W/Harris, and Walnut/Hemlock intersections will operate with full build out of the expansion in 2020.
- Analyze how the Dolbeer Street and W Street intersections with Harris Street and the Walnut Drive/Hemlock Street intersection will operate with full build out of the expansion in 2040.
- Forecast the amount of parking to be generated by the proposed expansions and analyze impacts to the existing parking facilities.
- Recommend improvements as needed.

1.2 Proposed Development Plan

The proposed expansion is located within the existing Sequoia Zoo boundaries to the west of W Street. The expansion and improvements will not affect the main entrance location, or how the zoo is accessed by the public. Proposed expansion and improvements include:

- A canopy walk exhibit
- Addition of a native predators exhibit
- Parking lot south of Glatt Street and a parking lot just south of the zoo

Vehicle parking is currently provided by the existing on-street parking along W Street; City-owned parking on Russell Street; and on-street parking on Dolbeer Street, Chester Street, and Madrone Avenue. Additional parking lots are proposed with the zoo expansions as an alternative if additional parking is determined to be required.

For the purposes of this study, the expansion is assumed to be built and fully in use by 2020.

Figure 3 provides an overview of the zoo, showing existing infrastructure and exhibits as well as the proposed expansion and improvements.

2.0 Existing Conditions

2.1 Area Description

The zoo gained its accreditation by the Association of Zoos and Aquariums in 1995, and has been expanding and opening new relevant attractions ever since. The most notable recent projects have been the Watershed Heroes project that offers a River Otter, Salmon Stream, and McLean Foundation Bald Eagle and Spotted Owl Aviary. Some of the animals and exhibits at the zoo include the Red Panda Exhibit, the Hands-On Barnyard, Salmon Tanks and Watershed Play Area, a walk through Aviary, flamingoes, yaks, and many more diverse and exotic animals. The zoo is open from 10 a.m. to 5 p.m. seven days per week in the summer. The winter time hours are the same, except that on Mondays, the zoo is open from 12 p.m. to 4 p.m.

The land currently planned for the expansion is part of an approximately 40-acre parcel owned by the City, that is known as Sequoia Park, and is zoned "Public." The land use description is "Parks and Recreation." The Sequoia Park Zoo is positioned in the northeast corner of this parcel; the expansion will be on the west side of the zoo. To the south of the zoo, in the southeast corner of the parcel is a children's park with swings, playground equipment, and grassy areas mixed into the redwood forest. To the west of the zoo and park, the rest of the parcel is redwood forest. There are trails and a road that wind through the forest, a duck pond is also a point of interest located in the area.

To the east of the park and zoo, across W Street, are two City of Eureka Athletic Fields; Hartman Field and Kennedy Field. They offer four baseball diamonds and enough open field space for up to two soccer fields. Parking for the fields is primarily along W Street, Russell Street, and Dolbeer Street. Also on this same block at the corner of Chester Street and Dolbeer Street is Washington Elementary School.

The Sequoia Park and athletic fields are in the heart of a residential area. These City properties are bordered by neighborhoods in all directions.

2.2 General Corridor Characteristics

Regional access to/from the zoo is primarily provided by Harris Street. Harris Street runs east-west and terminates at the intersection of Highway 101 to the west and the intersection of Myrtle Avenue to the east.

Local access to/from the zoo is provided by W and Dolbeer Streets from the north, and Hemlock Street from the south. W and Dolbeer Streets both connect to Harris; to the south, Hemlock Street connects to Walnut Drive, a minor arterial that provides access to Cutten and other areas outside of City limits.

Table 1 summarizes the study corridor characteristics.

Table 1
Roadway Data for Surrounding Streets at the Proposed Development
Traffic Impact Study, Sequoia Park Zoo Expansion, Eureka, California

Name	Designation ¹	Classification ²	Speed Limit	Lanes	Average Width (feet)	Sidewalks
Harris Street	CS	Principal Arterial	30 mph ³	2 Undivided	40	Both Sides
W Street	CS	Major Collector ⁴	25 mph	2 Undivided	40	Both Sides
Dolbeer Street	CS	Minor Arterial	25 mph	2 Undivided	40	Both Sides
Hemlock Street	CS	Major Collector ⁵	25 mph	2 Undivided	45	Both Sides

1. CS: City Street
2. Source: Caltrans Roadway Systems Maps
3. mph: miles per hour
4. W Street is a local street between Harris Street and Hodgson Street
5. Hemlock Street is a major collector west of Walnut Drive and a minor arterial to the east

Roadway Configuration. The existing roadway configuration is shown on Figure 4, with each study intersection labeled 1, 2, or 3. Each of the study intersections is fairly simple, as described below:

1. The Harris/W Street intersection is a T-intersection with a one-way stop. Harris Street flows openly, and W Street ends at Harris with a stop sign. Northbound W Street vehicles making left turns onto Harris Street cause the queue on W Street to back up to three or four vehicles. Westbound vehicles on Harris Street making a left turn are often passed on the right shoulder by through traffic. However, occasionally traffic does queue behind the vehicle making the left turn.
2. The Harris/Dolbeer Street intersection is a two-way stop where Harris Street flows freely and north and southbound vehicles on Dolbeer Street have stop signs at Harris. Similar conditions exist for left turn movements at this intersection. During traffic counts, it was noted that southbound and northbound vehicles making through or left-turn movements on Dolbeer occasionally experienced confusion as to whose turn it was, due to the delay before acceptable gaps. A flashing pedestrian sign aids users, including elementary students, in crossing Harris Street.
3. The Hemlock/Walnut Drive intersection is a three-way stop. The eastbound direction of Hemlock has an approximately 7-foot wide striped median that separates the right turn lane and the through lane. Westbound Hemlock Street is one lane. Northbound Walnut Drive has two lanes, one for the left turning movement and one for the right.

Pedestrian/Bicycle Conditions. There are existing sidewalks on both sides of Harris Street, Dolbeer Street, W Street, Hemlock Street, and Walnut Drive. The majority of streets connecting to the studied streets also have sidewalks, including Russell Street, Chester Street, Glatt Street, and Hodgson Street.

Harris Street has a crosswalk at Dolbeer Street that is a school crosswalk with flashing crossing signs and in-pavement lights activated by push button. This is the only marked crosswalk on Harris Street in the study area. W Street has crosswalks at Hodgson, Chester, Russell, and Madrone Streets. The W Street/Russell Street crosswalk is directly in front of the zoo. This raised crosswalk also serves as a traffic calming feature. The crosswalk at W and Madrone Streets is also raised.

Dolbeer Street has a raised school crosswalk at Russell Street and a raised crosswalk at Bainbridge Street. There is also an all-way school crosswalk at the all-way stop intersection at Chester/Dolbeer Streets.

Harris is a Class II bikeway from Broadway to S Street, and Class III from S to Harrison Street. W and Dolbeer Streets are proposed Class III facilities. All three streets have “Share the Road” bicycle signs posted, identifying them as bike routes. Harris Street also has bicyclist markings on the shoulders of the road at every intersection.

The *Highway Design Manual* (Caltrans, 2010) divides bicycle facilities into three classifications:

- **Class I** Bikeway (Bike Path) – provides a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross-flow by motorists minimized
- **Class II** Bikeway (Bike Lane) – provides a striped lane for one-way bike travel on a street or highway
- **Class III** Bikeway (Bike Route) – provides for shared use with pedestrian or motor vehicle traffic

During traffic counting, interactions between pedestrians and vehicles appeared to operate well. No confusion or dangerous scenarios were observed.

2.3 Collision History

Collision history for the past five years was provided by the City of Eureka for the Harris and Dolbeer and Harris and W intersections; Humboldt County provided data for the Hemlock and Walnut intersection. Table 2 summarizes the collision data.

There were six broadside collisions, three rear-end collisions, one head-on collision, one sideswipe, and one collision with a fixed object. Out of the 12 total collisions in the last 5 years, 9 of them occurred at the Harris and Dolbeer intersection. None of the collisions resulted in a death.

Table 2
Collision History Summary
Traffic Impact Study, Sequoia Park Zoo Expansion, Eureka, California

Intersection	Date	Type of Collision	Description of Collision	# of People Injured
Harris and Dolbeer	3/14/2012	Broadside	Northbound Dolbeer and westbound Harris	4
	10/20/2012	Broadside	Southbound Dolbeer making left turn and eastbound Harris, R/W Violation	0
	2/25/2013	Broadside	Bicycle/Vehicle Northbound Dolbeer and westbound Harris	1
	4/2/2013	Rear-End	Improper passing, eastbound Harris vehicles	0
	7/7/2013	Head-On	DUI, westbound and eastbound Harris collision	1
	3/12/2014	Sideswipe	Improper Passing, eastbound Harris Vehicles	0
	4/10/2014	Broadside	Northbound Dolbeer and Eastbound Harris, R/W Violation	1
	8/19/2014	Broadside	Southbound Dolbeer making left turn and Eastbound Harris making left turn, R/W Violation	1
	10/18/2014	Broadside	Improper turning, Northbound Dolbeer making left turn and Eastbound Harris	3
Harris and W	4/28/2013	Hit Object	DUI, westbound Harris vehicle hit fixed object passing another vehicle	2
	10/4/2013	Rear-End	Vehicle eastbound on Harris collided with another vehicle stopped in the road	1
Hemlock and Walnut	4/15/2016	Rear-End	Vehicle northbound on Walnut collided with another vehicle at the stop sign	1

3.0 Existing Level of Service Capacity Analyses

3.1 Methodology

Intersection turning movement counts were collected at each study intersection during the p.m. peak hour and the pickup time peak hour during Washington School’s normal dismissal times under weekday conditions. Counts were collected on September 6 and 7, 2017. The zoo does not open until 10 a.m., therefore the morning peak hour of 7 a.m. to 9 a.m. was not studied. Using these counts, the average peak hours for all three intersections is from 3:05 to 4:05 p.m. and 4:45 to 5:45 p.m. The peak hour turning movement volumes at the study intersections are shown in Appendix D under the capacity analysis section for each study scenario. The full turning movement count data including pedestrian counts is contained in Appendix C.

An intersection capacity analysis was conducted for the existing intersections in accordance with the 2010 *Highway Capacity Manual* (Transportation Research Board, 2010). Intersections are assigned a level of service (LOS) letter grade for the peak hour of traffic based on the number of lanes at the intersection, traffic volumes, and traffic control. LOS A represents light traffic flow (free flow conditions); LOS F represents heavy traffic flow (over capacity conditions). LOS C at intersections is typically considered acceptable by the City of Eureka. Individual movements are

also assigned LOS grades. At signalized intersections, one or more individual movement may operate at LOS F when the overall intersection is operating acceptably at LOS C. However, at two-way stop controlled intersections, the LOS of the worst approach sets the LOS for the intersection. All-way stop and round-about controlled intersections LOS is based on the average delay of the whole intersection. All studied intersections for this traffic study were non-signalized intersections.

The traffic model was calibrated to match existing conditions and how users complete movements through the intersections. For example, Harris Street is a two-lane road with no center turning lane; however, the model shows a short left turn lane with storage for approximately 2 vehicles. The model was setup this way due to the fact that when vehicles made left turns from Harris, through vehicles generally went around the right side of the vehicle making the turn. If more than 2 vehicles were making a left turn, they took up more of the road and through vehicles did not have room to go around. Other minor changes were made to the model to try to match modeled delays to what was observed during counts. Calculated delays and LOS results were verified by a field comparison on September 28, 2017. All calibrations for the existing scenarios were carried out through the future scenarios.

The LOS results for the existing study hours are shown in Table 3. These are based on the existing lane configurations and lane usages. The existing turning movement volumes from Appendix C were used in the LOS calculations. The LOS calculations were done in accordance with the *Highway Capacity Manual* (Transportation Research Board, 2010), using VISTRO™ software. The complete LOS calculations, which include grades for individual movements, are included in Appendix D.

Table 3		
Existing Peak Hour Level of Service¹		
Traffic Impact Study, Sequoia Park Zoo Expansion, Eureka, California		
Intersection	LOS	
	School Pickup Time Peak Hour	p.m. Peak Hour
W and Harris ²	C (c)	D (d)
Dolbeer and Harris ²	E (e)	E (e)
Walnut and Hemlock ²	C (c)	C (d)
1. The first letter is the level of service (LOS) for the intersection. The second letter (in parentheses) is the LOS for the worst operating movement. 2. Unsignalized intersection		

LOS capacity analyses results presented the following:

- Walnut/Hemlock is the only intersection that operates at LOS C; the Harris/W Street intersection operates at LOS D; and the Harris/Dolbeer Street intersection operates at LOS E.
- At the Harris/W Streets intersection, the two left turn movements operate at LOS D; all other movements operate at LOS C or better.
- At the Harris/Dolbeer Streets intersection the Dolbeer Street through and left turns for southbound and northbound traffic operate at LOS E; all other movements for the intersection are LOS C or better
- See Appendix D for details on individual movement LOS results for each intersection.

3.2 Site Traffic Forecasting

The Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition was referenced for trip generation rates; however the data provided did not closely apply to the Sequoia Park Zoo.

Therefore, a trip generation analysis was performed for the site based on previous zoo expansion attendance data and average daily attendance from 2014 to 2017 for the summer months of June, July, and August.

From the data provided by the zoo, the average number of daily visitors was 369. The previous two expansions at the zoo saw short-term attendance increases of 49% (Red Panda Exhibit, 2010) and 61% (Watershed Heroes, 2014). For the purpose of this study, it was estimated that there would be a 50% increase in average daily attendance¹ resulting in approximately 570 total visitors. At 3 people per vehicle², the standard vehicle occupancy for entertainment events and similar land uses, the zoo would generate approximately 190 vehicle trips in 2020 and 232 in 2040 (assuming a 1% growth rate). Table 4 shows the anticipated number of visitors in 2020 and 2040 with and without the expansion for comparison. Table 5 summarizes the number of in/out trips during peak hours, a further breakdown of assumptions and calculations can be found in Appendix E.

1. The initial increase in attendance due to the attraction of a new exhibit does not stay at the 50% to 60% range; it instead decreases after time as initial interest in the exhibit fades. The zoo estimates the drop off occurs approximately one year after new exhibits open. For the purpose of this study, the initial increase percentage was not reduced, and therefore, provides a conservative approach to forecasting the impacts of the proposed expansion.
2. ITE Journal “Traffic Study for a Zoo” determined a 3.1 to 3.7 occupancy rate and a study of the San Diego area where an occupancy rates were analyzed at museums, zoos, and other social gatherings determined an occupancy rate between 3.05 and 3.27.

Table 4 Trip Generation Summary for p.m. Peak Hour Traffic Impact Study, Sequoia Park Zoo Expansion, Eureka, California						
Year	Without Expansion		With Expansion		Increase in Visitors	Increase in Vehicle Trips
	# of Visitors	# of Daily ² Vehicle Trips	# of Visitors	# of Daily Vehicle Trips		
2020 ¹	380	127	570	190	190	63
2040	464	155	696	232	232	77

1. Assumes 1% annual growth rate in the number of visitors during the summer months
 2. Assumes 3 visitors per vehicle

Table 5 Trip Generation in 2040 with Expansion Traffic Impact Study, Sequoia Park Zoo Expansion, Eureka, California							
ITE Land Use Code	Description	Daily		Pickup Time Peak Hour ³		p.m. Peak Hour	
		In	Out	In	Out	In	Out
481 ¹	Zoo	232	232	10	25	7	28

1. ITE: Institute of Transportation Engineers
 2. ITE trip generation data was irrelevant to the Sequoia Park Zoo and, therefore, was not used in this analysis. Trip generation assumptions and calculations are shown in Appendix E.

To distribute the generated traffic, it is necessary to determine where visitors are coming from and what path they may take to get to the zoo. This orientation was determined by using the collected turning movement counts as well as taking into account site access and access to the regional transportation system. Visitors coming from areas north of Eureka (such as, Arcata, McKinleyville, and Blue Lake) are likely to arrive at the zoo using westbound Harris primarily, but also may use eastbound Harris. Visitors from areas south of Eureka (such as, Fortuna and farther south) are likely to come through Cutten and Walnut Drive, but it is also likely some will use eastbound Harris. The zoo is situated on the eastern side of Eureka, and therefore most visitors coming from within Eureka will use eastbound Harris Street or Walnut Drive. The traffic generated by the development was assigned to the area roadways according to the distribution pattern and then added to the study roadways.

- The Harris and W Street intersection is assumed to receive 40% of incoming and outgoing traffic.
- The Harris and Dolbeer Street intersection is assumed to receive 35% of incoming and outgoing traffic.
- The Hemlock and Walnut Drive intersection is assumed to receive 25% of incoming and outgoing traffic.

The estimated direction orientation of the generated traffic is also shown in Figure 5.

To account for non-site growth in traffic, an annual growth rate was added to the existing traffic volume data to get background, or no-build, traffic for the 2020 and 2040 scenarios. An annual growth rate of 1% was used on all movements.

Traffic forecasts were developed for each study period in the 2020 and 2040 build scenarios by adding the traffic generated by the proposed development to the 2020 and 2040 no-build volumes. The peak hour turning movement volumes at the study intersections are shown in Appendix D under the capacity analysis section for each study scenario.

3.3 Forecasted Level of Service Capacity Analyses

LOS results for the 2020 build peak hour scenarios are shown in Table 6 with LOS results for the 2040 peak hour scenarios shown in Table 7. These are based on the existing traffic control, lane usages, and lane configurations at the study intersection. No improvements were modeled at the existing study intersections.

Table 6 2020 Peak Hour Level of Service¹ Traffic Impact Study, Sequoia Park Zoo Expansion, Eureka, California		
Intersection	Pickup Peak Hour Build	p.m. Peak Hour Build
W and Harris ²	C (c)	D (d)
Dolbeer and Harris ²	E (e)	E (e)
Walnut and Hemlock ³	C (c)	C (d)
1. The first letter is the level of service (LOS) for the intersection. The second letter (in parentheses) is the LOS for the worst operating movement. 2. 2-way stop intersection 3. All-way stop intersection		

Table 7 2040 Peak Hour Level of Service ¹ Traffic Impact Study, Sequoia Park Zoo Expansion, Eureka, California				
Intersection	Pickup Time Peak Hour		p.m. Peak Hour	
	No-Build	Build	No-Build	Build
W and Harris ²	C (c)	C (c)	E (E)	E (E)
Dolbeer and Harris ²	F (f)	F (f)	F (f)	F (f)
Walnut and Hemlock ³	C (d)	D (d)	E (f)	E (f)
1. The first letter is the level of service (LOS) for the intersection. The second letter (in parentheses) is the LOS for the worst operating movement. 2. 2-way stop intersection 3. All-way stop intersection				

The forecast turning movement volumes for the no-build and build scenario peak hours as shown in Appendix D were used in the LOS calculations. The LOS calculations were done in accordance with the *Highway Capacity Manual, 2010* using VISTRO™ software. The complete LOS calculations, which include grades for individual movements, are included in Appendix D.

LOS Results:

- There is very little change from existing conditions to the 2020 build scenario and from the 2040 no build scenario to the 2040 build scenario, suggesting that the added traffic from the proposed development would not significantly impact traffic operations.
- In the p.m. peak hour, the W and Harris Streets intersection operates at LOS E due to the northbound W Street left turning movement. The westbound Harris left turn is LOS D. All other turning movements are LOS C or better.
- Turning movements for both directions of Dolbeer traffic operate at LOS F, all other turning movements operate at LOS C or better.
- At the Walnut and Hemlock Drive intersection during the pickup time peak hour, the intersection delay changes from 24.74 seconds in the No-Build Scenario to 25.21 seconds in the Build Scenario. The increase causes the LOS to change from C to D. The increase is caused by an additional six vehicles leaving the zoo and three heading to the zoo through this intersection.
- Issues identified with the existing conditions analysis worsen with additional background traffic into the future.

4.0 Parking Analyses

The proposed expansion will generate additional parking demand; plans to build additional parking lots are included in the expansion. A parking assessment was performed to determine if the existing parking facilities combined with proposed parking have the capacity to meet the demands of the increase in attendance.

“Section 3.2: Site Traffic Forecasting” estimated 190 vehicle trips to the zoo in 2020, after the new expansion. By applying the 1% growth rate, it is possible that the zoo would see approximately 232 daily vehicle trips in 2040, assuming no additional expansion occurs.

Reasonably available parking to the zoo totals 231 spaces, not including accessible spaces.

- The west side of W Street, from Hemlock to Chester Street, offers 1,185 feet of usable on-street parking and the east side has 1,535 feet available. Assuming 22-feet per space provides 123 spaces on W Street.
- On the south side of Glatt Street between W and V Streets, there are approximately 10 on-street parking spaces (240 feet at 22 feet per space).
- Madrone Avenue has 22 angled parking spaces and 12 on-street spaces, for a total of 34.
- The west half of Russell Street has 21 off-street and 4 on-street parking spaces, totaling 25 spaces.
- The Armory, located on Russell Street, also has 39 spaces available to zoo patrons.
- There is currently no dedicated off-street parking exclusively for zoo visitors.

It should be noted that many of these assumed zoo parking spaces also serve other attractions in the area. Washington School has two soccer fields, the City of Eureka has ball fields (the Hartman and Kennedy ball fields) nearby, and the Sequoia Park is immediately south of the zoo. Areas nearby that were not counted in the existing available parking were Chester Street, W Street north of Chester Street, the eastern half of Russell Street, Washington School parking lot, and Dolbeer Street. These areas also serve as parking for all of the nearby parks and fields.

The October 2016 Sequoia Park Zoo Master Plan (Figure 3) includes an additional 9 spaces (adding 19 angled spaces, but removing 10 existing parallel on-street spaces) parking spaces along Glatt Street, an 18-space parking lot to the south of Glatt Street, and a 16-space parking lot along the west side of W Street south of the zoo. Combined, these additional parking facilities provide 43 additional parking spaces. With the proposed parking additions, the zoo would have approximately 274 parking spaces in close proximity.

A visit to the zoo on Sunday, September 9, 2017, was conducted as a check to verify parking conditions. The site visit was from approximately 1 p.m. to 2 p.m. At the time of the site visit, the following observations were made of the activities and conditions that would affect available parking:

- Two (2) youth soccer games were being played at the Washington School Fields.
- Seven (7) vehicles were parked in the Washington School parking lot; there are 31 spaces total.
- Hartman and Kennedy baseball fields were empty.
- There were three separate birthday parties occurring at Sequoia Park.
- Weather was sunny with temperature around 67 degrees.

Below is a summary of the observed parking demands:

- W Street from Hemlock to Chester had 54 vehicles (37 on the west side, 17 on the east side).
- No vehicles were parked on W Street from Hodgson Street to Harris Street.
- Chester Street had five vehicles total
- Russell Street had 38 vehicles (includes both the western and eastern halves).

- The Armory had 20 vehicles.
- Madrone Avenue had 34 vehicles, including 2 in the accessible spaces.
- The number of vehicles parked in the vicinity of the zoo was 159.
- W Street parking was nearest to maximum capacity from Glatt Street to just south of Russell Street, approximately 90% of the on-street spaces were taken.
- On-street parking on Glatt Street was full, with approximately 7 vehicles on each side.

Available parking was also evaluated based on the City of Eureka *Municipal Code 155.117 Schedule of Off-Street Parking Space Requirements, (C)(10)*, although zoos are not specifically addressed. According to the code, public buildings and grounds other than schools and administrative offices require one space for each two employees, plus the number of additional spaces prescribed by the director. Code 155.117 (C)(7) requires land uses of libraries, museums, art galleries, and similar uses to have one space for each 600 square feet of gross floor area, and one space for each two employees. SHN Consulting Engineer's Parking Study/Report for Sequoia Park and Zoo Modification Project (October, 2002) estimated there to be approximately 1.5 acres of publicly accessible areas. With the previous expansions and the proposed expansion 2 acres may be a more realistic area. This would require approximately 145 parking spaces, if the zoo is considered a similar use to libraries, museums and art galleries. See SHN's parking study/report in Appendix F.

The anticipated daily vehicle trips in 2040, for the zoo with the proposed expansion, are 232 trips. Existing conditions appear to supply approximately 231 spaces split between the zoo, the park, surrounding baseball fields, Washington School, and some residences. Additional parking is available on several nearby streets for overflow during high demand scenarios. After the expansion, approximately 274 parking spaces will be available to zoo visitors. Although the spaces are shared by other uses in the area, there is roughly the same amount of on-street parking along Dolbeer as there is on W Street that can be used at times when peak parking demands align.

5.0 Conclusions and Recommendations

As discussed previously in this report, traffic impacts on the study intersections were analyzed under 2020 and 2040 build-out conditions of the Sequoia Park Zoo Expansion. The proposed expansion will not pose any significant impact to existing intersections. Future traffic operations are forecasted to operate at LOS F in 2040, the added zoo traffic is a minimal addition to the projected traffic and does not warrant additional mitigation measures.

Our conclusions are as follows:

- Without the expansion, it is anticipated that the zoo will see approximately 127 total daily vehicle trips in 2020 and 155 daily vehicle trips in 2040.
- The proposed development is expected to generate approximately 63 additional daily vehicle trips in 2020 and 77 additional daily vehicle trips in 2040.
- Overall, existing intersections operate at LOS D or better, except the W/Harris Streets intersection during the p.m. peak hour, and the Harris/Dolbeer intersection.
- Existing conditions at the Harris/Dolbeer intersection function at LOS E during the Washington School pickup time peak hour and the p.m. peak hour.

- Existing conditions for the W/Harris Streets intersection function at LOS C for the pickup time peak hour, but drop to LOS D during the p.m. peak hour.
- The analysis for the proposed expansion for 2020 shows that the proposed development will have little impact on traffic in the nearby area.
- The analysis for the development for 2040 shows that the development will have little impact on the traffic in the nearby area.
- The 2040 pickup time peak hour LOS changes from C to D at the Hemlock and Walnut Drive intersection. This change is due to the intersection delay increasing from 24.74 to 25.21 seconds per vehicle. A delay of 25 seconds is the point at which the LOS changes from C to D for a non-signalized intersection. The addition of nine vehicles during the peak hour (6 entering, 3 leaving) causes the incremental delay change, but does not warrant major alterations to this intersection.
- All intersections in the 2040 no-build scenario have individual movements that function at LOS F during the p.m. peak hour.
- The proposed expansion will add 43 parking spaces to the existing 231 for a total of 274 spaces in the vicinity of the zoo. This will provide sufficient parking capacity to accommodate the increased visits due to the expansion.

Increased traffic from the proposed development will not have a significant enough impact on traffic operations to warrant any major upgrade or change to the existing or future transportation system. Existing parking combined with proposed additional parking spaces appear to provide sufficient capacity to meet the increased attendance to the zoo.

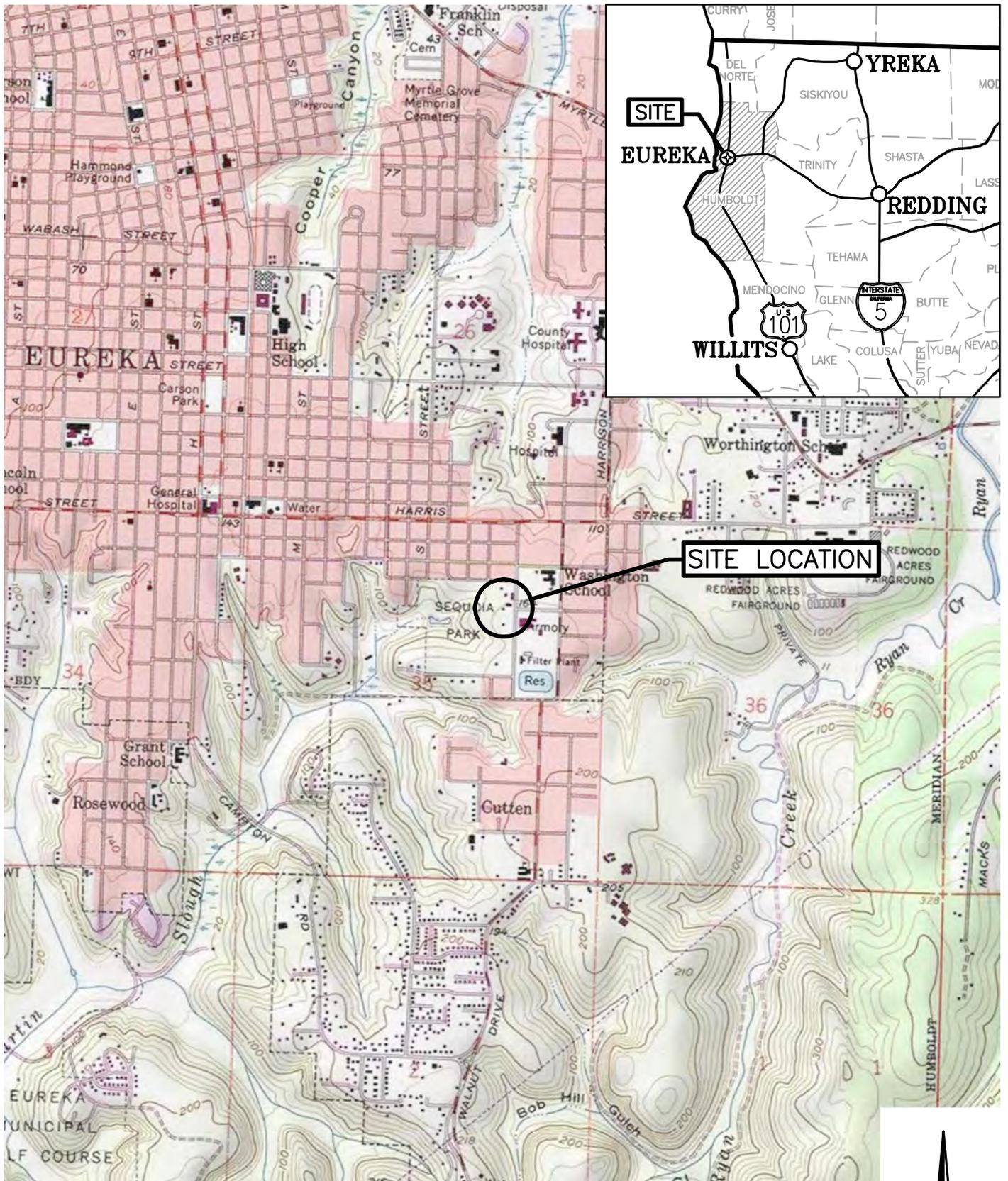
6.0 References

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- . (NR). "Caltrans Road System Maps." Accessed at: http://www.dot.ca.gov/hq/tsip/hseb/crs_maps/
- Transportation Research Board. (2010). *Highway Capacity Manual, 2010*. Washington, DC:The National Academies of Sciences, Engineering, and Medicine.

A

Figures

\\EurekaSVRNew\Projects\2016\016008-EurekaOnCall\400-ZooTrafficStudy\Dwgs_SAVED: 9/27/2017 11:17 AM CNEWELL, PLOTTED: 9/29/2017 10:51 AM, CHRIS D. NEWELL



SOURCE: EUREKA USGS
7.5 MINUTE QUADRANGLE



SHN
Consulting Engineers
& Scientists, Inc.

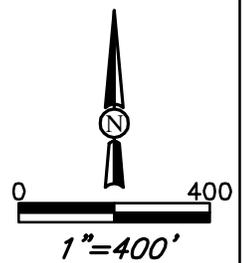
City of Eureka Parks & Recreation
Sequoia Park Zoo Expansion
Eureka, California
Sequoia Park Zoo Expansion and Renovation
September 2017

Site Location Map
SHN 016008.400
Figure 1

\\EurekaSVRNew\Projects\2016\016008-EurekaOnCall\400-ZooTrafficStudy\Dwgs_SAVED: 9/27/2017 11:28 AM CNEWELL, PLOTTED: 9/29/2017 10:52 AM, CHRIS D. NEWELL



SOURCE: ESRI



	City of Eureka Parks & Recreation Sequoia Park Zoo Expansion Eureka, California	Study Area SHN 016008.400
	Sequoia Park Zoo Expansion and Renovation September 2017	016008-400-STUDY-AREA



SEQUOIA PARK ZOO SEQUOIA PARK ZOO - MASTER PLAN
October 2016

SCALE: 1"=30'
N
0 10 20 30 100
Studio Hanson|Roberts
Planning & Design
for Wild Life

NOTE: Site Plan Provided by Greenway Partners

SH
Consulting Engineers
& Geologists, Inc.

City of Eureka, Parks & Recreation Department
Sequoia Park Zoo Expansion
Traffic Impact Study
Eureka, CA

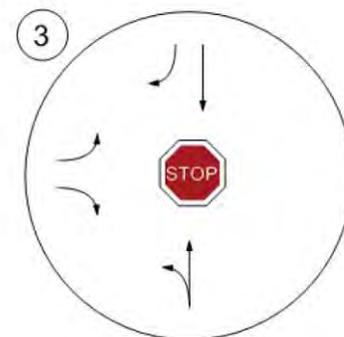
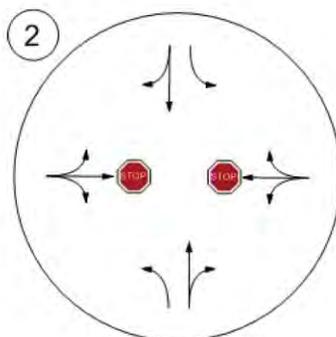
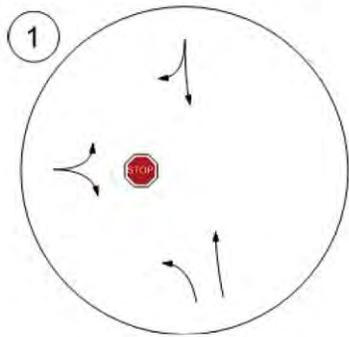
Site Plan

SHN 016008.400

September 2017

\\Eureka\Projects\2016\016008-EurekaOnCall\400-ZooTraffStudy\Rpts\Appendices\AppendixA-Figures\20170928-Fig3-SitePlan.doc

Figure 3



SW
Consulting Engineers
& Geologists, Inc.

City of Eureka, Parks & Recreation Department
Sequoia Park Zoo Expansion
Traffic Impact Study
Eureka, CA

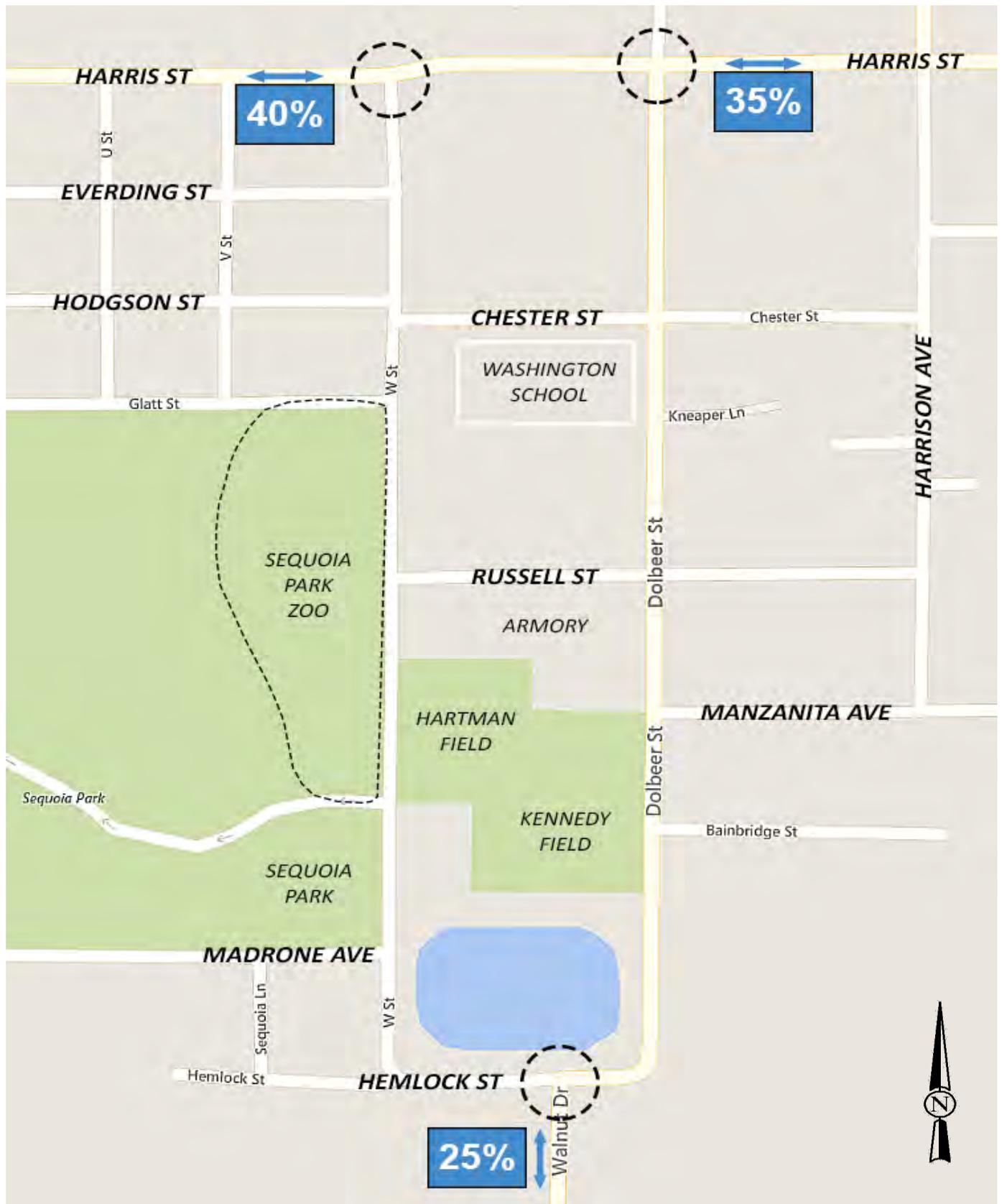
Existing Roadway Configuration

SHN 016008.400

September 2017

\\Eureka\Projects\2016\016008-EurekaOnCall\400-ZooTraffStudy\Rpts\Appendices\AppendixA-Figures\20170928-Fig4-ExistingRoad.doc

Figure 4



 <p>Consulting Engineers & Geologists, Inc.</p>	<p>City of Eureka, Parks & Recreation Department Sequoia Park Zoo Expansion Traffic Impact Study Eureka, CA</p>	<p>Trip Distribution SHN 016008.400</p>	<p>Figure 5</p>
<p>September 2017</p>	<p>\\Eureka\Projects\2016\016008-EurekaOnCall\400-ZooTraffStudy\Rpts\Appendices\AppendixA-Figures\20170928-Fig5-TripDist.doc</p>		

B

Traffic Collision History Reports

**City of Eureka
Police Department**

Traffic Collision History Report

9/27/2017
Page 1

Location: Harris St / Dolbeer St
Date Range Reported: 1/1/2012 - 12/31/2016
Total Number of Collisions: 9

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
3T12-183	3/14/12	8:22	0	In Int.	Broadside	Other Motor Vehicle	North	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	4	0
3T12-711	10/20/12	20:39	0	In Int.	Broadside	Other Motor Vehicle	South	Making Left Turn	East	Proceeding Straight	Auto R/W Violation	0	0
3T13-124	2/25/13	10:25	0	In Int.	Broadside	Bicycle	North	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	1	0
3T13-206	4/2/13	11:13	0	In Int.	Rear-End	Other Motor Vehicle	East	Passing Other Vehicle	East	Stopped In Road	Improper Passing	0	0
3T13-419	7/7/13	19:42	0	In Int.	Head-On	Other Motor Vehicle	East	Making Right Turn	West	Proceeding Straight	Driving Under Influence	1	0
3T14-148	3/12/14	7:56	25	West	Sideswipe	Other Motor Vehicle	East	Proceeding Straight	East	Making Right Turn	Improper Passing	0	0
3T14-217	4/10/14	20:59	0	In Int.	Broadside	Other Motor Vehicle	North	Proceeding Straight	East	Proceeding Straight	Auto R/W Violation	1	0
3T14-460	8/19/14	12:50	0	In Int.	Broadside	Other Motor Vehicle	South	Making Left Turn	East	Making Left Turn	Auto R/W Violation	1	0
3T14-592	10/18/14	14:55	0	In Int.	Broadside	Other Motor Vehicle	North	Making Left Turn	East	Proceeding Straight	Improper Turning	3	0

**City of Eureka
Police Department**

Traffic Collision History Report

9/27/2017
Page 2

Location: Harris St / Dolbeer St
Date Range Reported: 1/1/2012 - 12/31/2016
Total Number of Collisions: 9

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
------------	------	------	-------	------	-------------------	--------------------------	---------------------	------------------------	---------------------	------------------------	-----	------	-----

Total Number of Collisions: 9

Settings Used For Query

<u>Parameter</u>	<u>Setting</u>
Street Name	HARRIS ST
Cross Street	DOLBEER ST
Starting Date	1/1/2012
Ending Date	12/31/2016
Intersection	Intersection Related

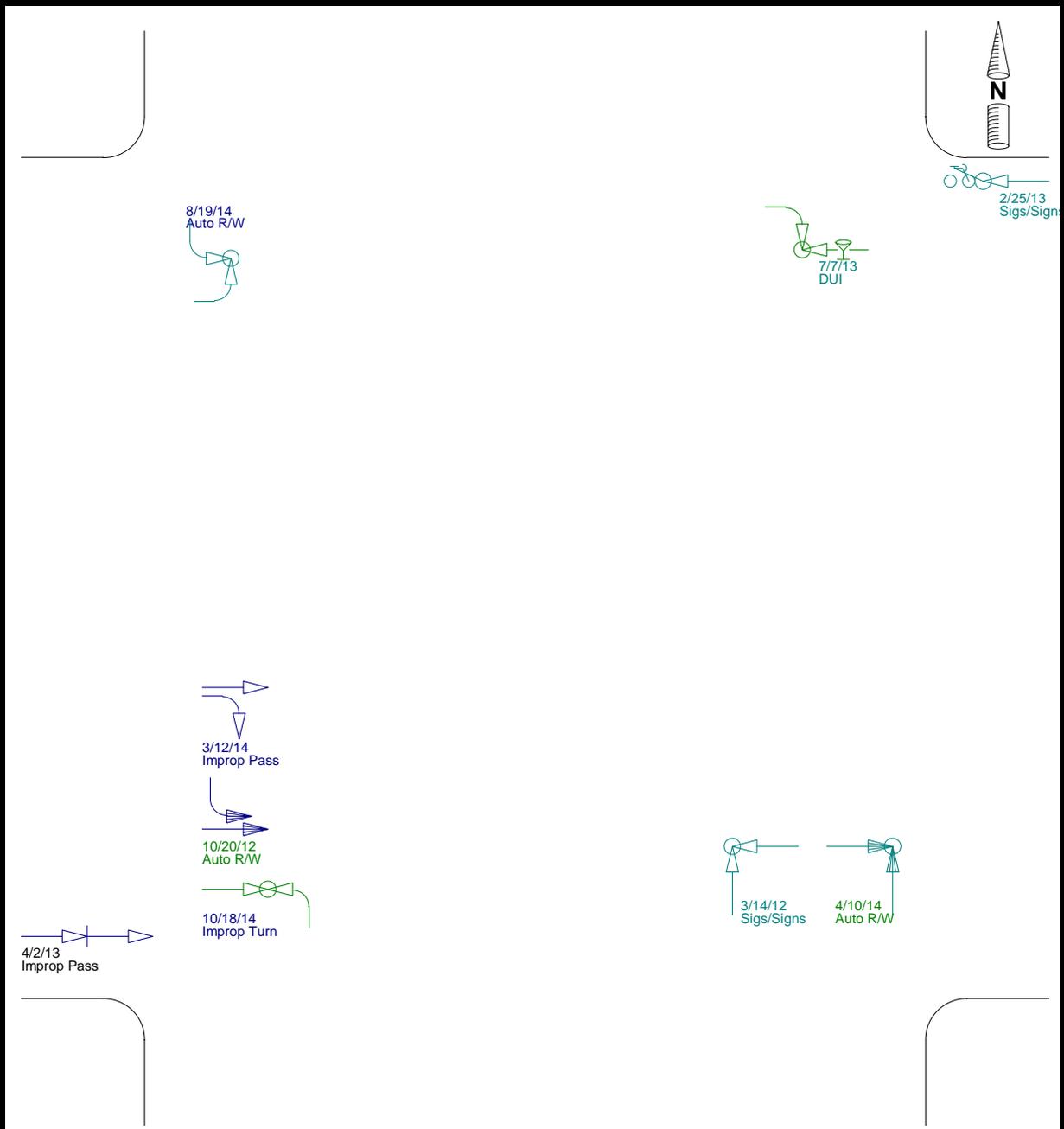
Collision Diagram

Horizontal Street: HARRIS ST

From: 1/1/2012 To: 12/31/2016

Vertical Street: DOLBEER ST

Date Prepared: 9/27/2017



Number of Collisions

- 3** Property Damage Only
- 6** Injury Collisions
- 0** Fatal Collisions
- 9** Total Collisions

Legend

- Moving Vehicle
- Stopped Vehicle
- Backing Vehicle
- Ran Off Road
- Movement Unknown

- Right Turn
- Left Turn
- Sideswipe
- Day
- Night

- Pedestrian
- Fixed Object
- Bicycle
- DUI
- Injury
- Fatal

Color Legend - Highest Degree of Injury

Maroon = Fatal

Purple = Severe Injury

Green = Other Visible Injury

Teal = Complaint of Pain

Dark Blue = Property Damage Only

Settings Used For Query

<u>Parameter</u>	<u>Setting</u>
Street Name	HARRIS ST
Cross Street	DOLBEER ST
Starting Date	1/1/2012
Ending Date	12/31/2016
Intersection	Intersection Related

**City of Eureka
Police Department**

Collisions by Severity / Type / PCF / Lighting

9/27/2017

Date Range Reported: 1/1/2012 - 12/31/2016

HARRIS ST at DOLBEER ST

Total Collisions: 9

Collision Type

Broadside	6
Head-On	1
Hit Object	0
Not Stated	0
Other	0
Overtaken	0
Rear-End	1
Sideswipe	1
Vehicle - Pedestrian	0

Total: 9

Day/Night

Day	7
Night	2
Unknown	0

Total: 9

Highest Degree of Injury

Complaint of Pain	4
Fatal	0
Other Visible Injury	2
Property Damage Only	3
Severe Injury	0

Total: 9

Primary Collision Factor

Auto R/W Violation	3
Brakes	0

Driving Under Influence	1
Fell Asleep	0
Following Too Closely	0
Hazardous Parking	0
Impeding Traffic	0
Improper Passing	2
Improper Turning	1
Lights	0
Not Stated	0
Other	0
Other Equipment	0
Other Hazardous Movement	0
Other Improper Driving	0
Other Than Driver	0
Other Than Driver or Ped	0
Ped or Other Under Influence	0
Ped R/W Violation	0
Pedestrian Violation	0
Traffic Signals and Signs	2
Unknown	0
Unsafe Lane Change	0
Unsafe Speed	0
Unsafe Starting or Backing	0
Wrong Side of Road	0

Total: 9

Settings Used For Query

<u>Parameter</u>	<u>Setting</u>
Street Name	HARRIS ST
Cross Street	DOLBEER ST
Starting Date	1/1/2012
Ending Date	12/31/2016
Intersection	Intersection Related

**City of Eureka
Police Department**

Traffic Collision History Report

9/27/2017
Page 1

Location: Harris St / W St
Date Range Reported: 1/1/2012 - 12/31/2016
Total Number of Collisions: 2

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
3T13-274	4/28/13	18:44	0	In Int.	Hit Object	Fixed Object	West	Passing Other Vehicle			Driving Under Influence	2	0
3T13-609	10/4/13	16:42	100	West	Rear-End	Other Motor Vehicle	East	Proceeding Straight	East	Stopped In Road	Unsafe Speed	1	0

Total Number of Collisions: 2

Settings Used For Query

<u>Parameter</u>	<u>Setting</u>
Street Name	HARRIS ST
Cross Street	W ST
Starting Date	1/1/2012
Ending Date	12/31/2016
Intersection	Intersection Related

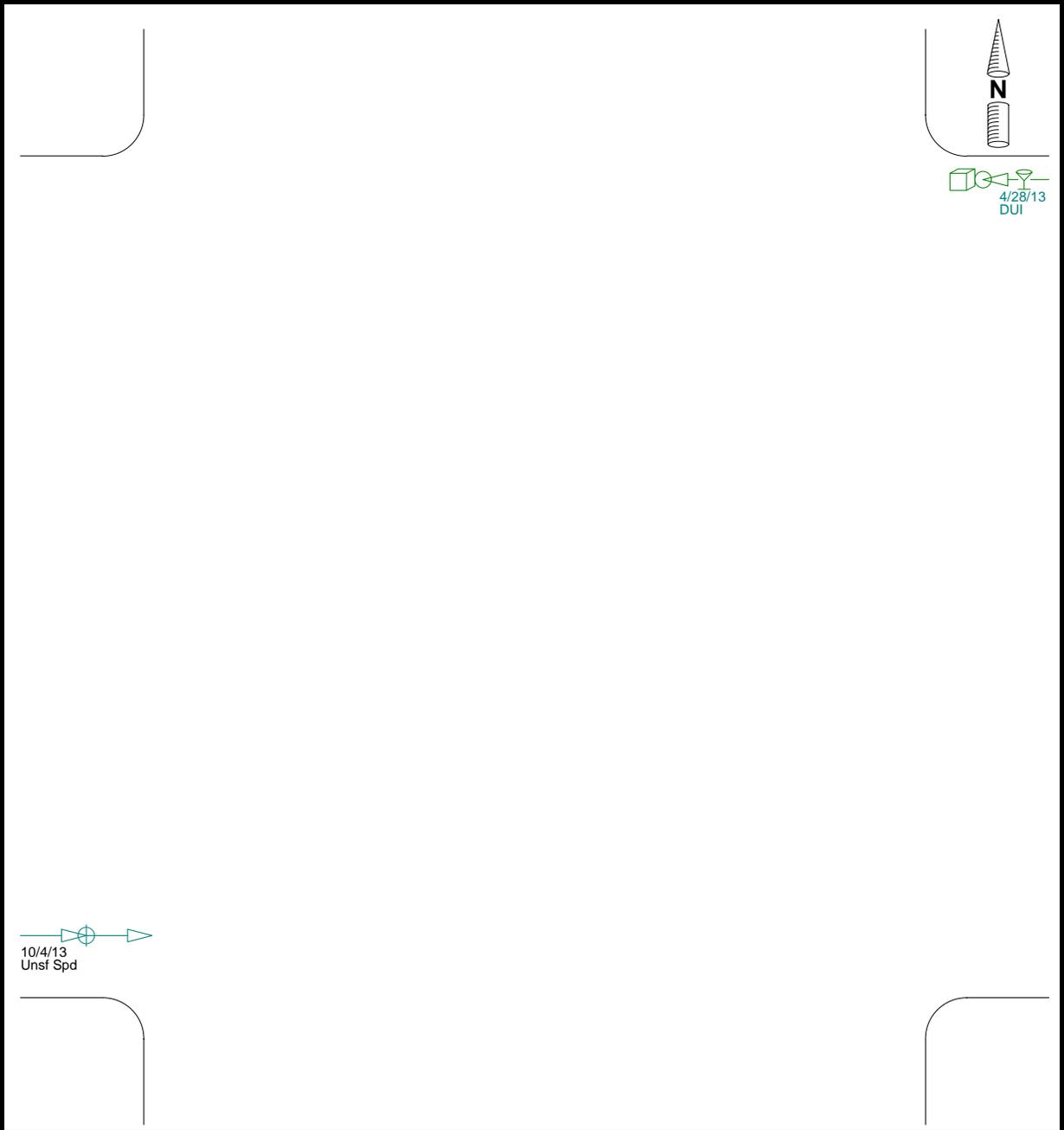
Collision Diagram

Horizontal Street: HARRIS ST

From: 1/1/2012 To: 12/31/2016

Vertical Street: W ST

Date Prepared: 9/27/2017



Number of Collisions

- 0 Property Damage Only
- 2 Injury Collisions
- 0 Fatal Collisions
- 2 Total Collisions

Legend

- | | | |
|--|---|---|
| <ul style="list-style-type: none"> ← Moving Vehicle ← Stopped Vehicle ←→ Backing Vehicle ←~ Ran Off Road ←..... Movement Unknown | <ul style="list-style-type: none"> ↘ Right Turn ↙ Left Turn ←← Sideswipe △ Day ◀ Night | <ul style="list-style-type: none"> 🚶 Pedestrian 📦 Fixed Object 🚲 Bicycle 🍷 DUI ○ Injury ⊙ Fatal |
|--|---|---|

Color Legend - Highest Degree of Injury

- Maroon = Fatal**
- Purple = Severe Injury**
- Green = Other Visible Injury**
- Teal = Complaint of Pain**
- Dark Blue = Property Damage Only**

Settings Used For Query

<u>Parameter</u>	<u>Setting</u>
Street Name	HARRIS ST
Cross Street	W ST
Starting Date	1/1/2012
Ending Date	12/31/2016
Intersection	Intersection Related

**City of Eureka
Police Department**

Collisions by Severity / Type / PCF / Lighting

9/27/2017

Date Range Reported: 1/1/2012 - 12/31/2016

HARRIS ST at W ST

Total Collisions: 2

Collision Type

Broadside	0
Head-On	0
Hit Object	1
Not Stated	0
Other	0
Overtaken	0
Rear-End	1
Sideswipe	0
Vehicle - Pedestrian	0

Total: 2

Day/Night

Day	2
Night	0
Unknown	0

Total: 2

Highest Degree of Injury

Complaint of Pain	1
Fatal	0
Other Visible Injury	1
Property Damage Only	0
Severe Injury	0

Total: 2

Primary Collision Factor

Auto R/W Violation	0
Brakes	0

Driving Under Influence	1
Fell Asleep	0
Following Too Closely	0
Hazardous Parking	0
Impeding Traffic	0
Improper Passing	0
Improper Turning	0
Lights	0
Not Stated	0
Other	0
Other Equipment	0
Other Hazardous Movement	0
Other Improper Driving	0
Other Than Driver	0
Other Than Driver or Ped	0
Ped or Other Under Influence	0
Ped R/W Violation	0
Pedestrian Violation	0
Traffic Signals and Signs	0
Unknown	0
Unsafe Lane Change	0
Unsafe Speed	1
Unsafe Starting or Backing	0
Wrong Side of Road	0

Total: 2

Settings Used For Query

<u>Parameter</u>	<u>Setting</u>
Street Name	HARRIS ST
Cross Street	W ST
Starting Date	1/1/2012
Ending Date	12/31/2016
Intersection	Intersection Related

C

Traffic Counts

	Dolbeer Southbound				Harris Westbound				Dolbeer Northbound				Harris Eastbound			
	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3
	1:40:00 PM	0	2	2	0	1	28	2	0	1	1	8	1	2	56	1
1:45:00 PM	0	1	3	0	3	40	0	0	3	0	6	0	1	44	3	0
1:50:00 PM	1	2	4	0	4	31	3	0	2	1	5	0	6	47	1	0
1:55:00 PM	1	0	5	0	2	37	3	0	0	3	5	0	3	36	3	1
2:00:00 PM	0	3	4	1	3	39	1	0	2	0	5	0	3	42	5	1
2:05:00 PM	0	1	5	0	5	32	0	0	5	1	1	2	3	54	4	0
2:10:00 PM	0	1	8	0	4	37	0	2	1	0	4	0	3	33	7	0
2:15:00 PM	1	1	4	0	1	38	1	0	4	2	7	1	2	32	3	0
2:20:00 PM	0	0	3	0	4	43	1	1	2	1	8	0	1	44	1	0
2:25:00 PM	0	0	7	0	3	48	1	1	1	0	4	0	3	45	0	1
2:30:00 PM	0	0	8	0	2	44	0	2	1	0	5	0	1	52	3	0
2:35:00 PM	0	0	2	0	1	37	0	0	1	2	4	0	6	38	3	2
2:40:00 PM	1	5	3	0	3	31	1	0	4	1	3	1	2	41	4	0
2:45:00 PM	0	0	5	0	6	38	0	0	5	1	3	0	1	48	2	0
2:50:00 PM	0	1	9	0	4	35	2	0	1	0	5	1	4	44	4	1
2:55:00 PM	2	0	4	0	6	34	1	0	0	1	4	1	2	49	2	0
3:00:00 PM	0	0	5	0	6	41	0	0	1	1	6	0	6	52	0	3

Bank 1

Trucks

	Dolbeer Southbound				Harris Westbound				Dolbeer Northbound				Harris Eastbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
	1:40:00 PM	0	0	0		0	0	0		0	0	0		0	0	0
1:45:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
1:50:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
1:55:00 PM	0	0	0		0	0	0		0	0	0		0	1	0	
2:00:00 PM	0	0	0		0	1	0		0	0	0		0	1	0	
2:05:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
2:10:00 PM	0	0	0		0	0	0		0	0	0		0	2	0	
2:15:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
2:20:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
2:25:00 PM	0	0	0		0	2	0		0	0	0		0	1	0	
2:30:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
2:35:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
2:40:00 PM	0	0	0		0	0	0		0	0	0		0	1	0	
2:45:00 PM	0	0	0		0	0	0		0	0	1		0	0	0	
2:50:00 PM	0	0	0		0	1	0		0	0	1		0	1	0	
2:55:00 PM	0	0	0		0	1	0		0	0	0		0	1	0	
3:00:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	

Bank 2

Peds

	Dolbeer Southbound				Harris Westbound				Dolbeer Northbound				Harris Eastbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
	1:40:00 PM	0	0	0		0	0	0		0	0	0		0	0	0
1:45:00 PM	0	0	0		0	1	0		0	0	0		0	0	0	
1:50:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
1:55:00 PM	0	1	0		0	2	0		0	0	0		0	0	0	
2:00:00 PM	0	0	0		0	0	0		0	0	0		0	1	0	
2:05:00 PM	0	0	0		0	0	0		1	0	0		0	0	0	
2:10:00 PM	0	2	0		0	0	0		0	0	0		0	1	0	
2:15:00 PM	0	0	0		0	1	0		0	0	0		0	0	0	
2:20:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
2:25:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
2:30:00 PM	0	0	0		0	1	0		0	0	0		0	0	0	
2:35:00 PM	0	0	0		2	0	0		0	21	0		0	0	0	
2:40:00 PM	0	0	0		0	0	0		0	0	0		0	3	0	
2:45:00 PM	0	0	0		0	3	0		0	0	0		0	0	0	
2:50:00 PM	0	0	0		0	0	0		0	7	0		0	1	0	
2:55:00 PM	0	0	0		0	1	0		0	0	0		0	0	0	
3:00:00 PM	0	0	0		0	1	0		0	0	0		0	0	0	

	Harris				Harris				Dolbeer				Dolbeer			
	Westbound				Eastbound				Southbound				Northbound			
	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3
4:00:00 PM	10	119	1	0	13	130	8	0	1	5	18	0	4	6	10	0
4:15:00 PM	12	139	0	0	8	135	7	0	1	4	18	0	5	3	16	1
4:30:00 PM	7	130	1	0	8	118	4	0	1	5	21	0	2	2	16	0
4:45:00 PM	13	145	3	0	12	127	10	0	0	3	27	0	0	0	1	0
5:00:00 PM	13	157	3	0	15	148	7	0	0	7	23	2	5	3	21	1
5:15:00 PM	11	150	4	0	8	159	9	0	0	2	20	0	4	0	14	0
5:30:00 PM	21	128	3	0	10	145	6	0	0	1	19	0	5	1	8	0
5:45:00 PM	13	93	2	0	14	125	8	0	2	5	16	0	1	5	15	0
6:00:00 PM	13	106	1	0	4	97	5	0	0	2	21	0	2	6	11	0

Bank 1 Trucks

	Harris				Harris				Dolbeer				Dolbeer			
	Westbound				Eastbound				Southbound				Northbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
4:00:00 PM	0	0	0		0	1	0		0	0	0		0	0	0	
4:15:00 PM	0	1	0		0	0	0		0	0	0		0	0	0	
4:30:00 PM	0	0	0		0	1	0		0	0	0		0	0	0	
4:45:00 PM	0	1	0		0	1	0		0	0	0		0	0	0	
5:00:00 PM	0	0	0		0	2	0		0	0	0		0	0	0	
5:15:00 PM	0	2	0		0	1	0		0	0	0		0	0	0	
5:30:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
5:45:00 PM	0	1	0		0	1	0		0	0	0		0	0	0	
6:00:00 PM	0	1	0		0	1	0		0	0	0		0	0	0	

Bank 2 Peds

	Harris				Harris				Dolbeer				Dolbeer			
	Westbound				Eastbound				Southbound				Northbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
4:00:00 PM	0	1	0		0	0	0		0	1	0		0	1	1	
4:15:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
4:30:00 PM	0	2	0		0	1	0		0	2	0		0	1	0	
4:45:00 PM	1	0	0		0	1	0		0	3	0		0	0	0	
5:00:00 PM	0	4	0		0	0	0		0	0	0		0	0	0	
5:15:00 PM	0	1	0		0	1	0		0	0	0		0	1	0	
5:30:00 PM	0	0	0		0	2	0		0	0	0		0	2	0	
5:45:00 PM	0	0	0		0	1	0		0	0	0		0	0	0	
6:00:00 PM	0	0	0		0	1	0		0	0	0		0	2	0	

	W Southbound				Harris Westbound				W Northbound				Harris Eastbound				
	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	
1:35:00 PM					1	26	0	0	0	0	0	2	0	0	61	2	0
1:40:00 PM					3	37	0	0	1	0	0	0	0	0	44	2	0
1:45:00 PM					0	50	0	0	1	0	3	1	0	0	55	4	0
1:50:00 PM					2	32	0	0	1	0	1	0	0	0	45	4	0
1:55:00 PM					3	34	0	0	1	0	0	0	0	0	52	8	0
2:00:00 PM					3	46	0	0	1	0	1	0	0	0	48	3	0
2:05:00 PM					0	44	0	0	0	0	0	0	0	0	56	5	0
2:10:00 PM					3	39	0	0	0	0	3	0	0	0	33	4	0
2:15:00 PM					1	50	0	0	3	0	6	0	0	0	38	10	0
2:20:00 PM					1	53	0	0	2	0	4	0	0	0	41	7	0
2:25:00 PM					2	65	0	0	1	0	1	0	0	0	49	7	0
2:30:00 PM					1	40	0	0	2	0	0	0	0	0	47	6	0
2:35:00 PM					1	26	0	0	1	0	1	0	0	0	49	4	0
2:40:00 PM					1	52	0	0	2	0	5	0	0	0	51	0	0
2:45:00 PM					1	39	0	0	2	0	4	0	0	0	45	3	0
2:50:00 PM					0	43	0	0	2	0	0	0	0	0	52	2	0
2:55:00 PM					1	51	0	0	2	0	1	0	0	0	56	8	0
3:00:00 PM					1	35	0	0	1	0	3	0	0	0	49	4	0
3:05:00 PM					1	53	0	0	0	0	0	0	0	0	43	8	0

Bank 1

Trucks

	W Southbound				Harris Westbound				W Northbound				Harris Eastbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
1:35:00 PM					0	0	0		0	0	0		0	0	0	
1:40:00 PM					0	1	0		0	0	0		0	0	0	
1:45:00 PM					0	0	0		0	0	0		0	0	0	
1:50:00 PM					0	0	0		0	0	0		0	2	1	
1:55:00 PM					0	1	0		0	0	0		0	1	0	
2:00:00 PM					0	0	0		0	0	0		0	0	1	
2:05:00 PM					0	0	0		0	0	0		0	2	0	
2:10:00 PM					0	0	0		0	0	0		0	0	1	
2:15:00 PM					0	0	0		0	0	0		0	0	0	
2:20:00 PM					0	1	0		0	0	0		0	1	0	
2:25:00 PM					0	2	0		0	0	0		0	0	0	
2:30:00 PM					0	0	0		0	0	0		0	0	0	
2:35:00 PM					0	0	0		0	0	0		0	2	1	
2:40:00 PM					0	0	0		0	0	0		0	1	0	
2:45:00 PM					0	2	0		0	0	0		0	1	0	
2:50:00 PM					0	0	0		0	0	0		0	2	0	
2:55:00 PM					0	1	0		0	0	0		0	0	0	
3:00:00 PM					0	0	0		0	0	0		0	0	0	
3:05:00 PM					0	0	0		0	0	0		0	1	0	

Bank 2

Pedestrians

	W Southbound				Harris Westbound				W Northbound				Harris Eastbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
1:35:00 PM					0	0	0		0	0	0		0	0	0	
1:40:00 PM					0	0	0		0	0	0		0	0	0	
1:45:00 PM					0	1	0		0	0	0		0	0	0	
1:50:00 PM					0	1	0		0	0	0		0	1	0	
1:55:00 PM					0	1	0		0	0	0		0	0	0	
2:00:00 PM					0	0	0		0	0	0		0	0	0	
2:05:00 PM					0	1	0		0	0	0		0	1	0	
2:10:00 PM					0	0	0		0	0	0		0	0	0	
2:15:00 PM					0	1	0		0	0	0		0	0	0	
2:20:00 PM					0	0	0		0	0	0		0	0	0	
2:25:00 PM					0	0	0		0	0	0		0	0	0	
2:30:00 PM					0	1	0		0	0	0		0	0	0	
2:35:00 PM					0	0	0		0	0	0		0	0	0	
2:40:00 PM					0	0	0		0	0	0		0	3	0	
2:45:00 PM					0	3	0		0	0	0		0	1	0	
2:50:00 PM					0	0	0		0	0	0		0	0	0	
2:55:00 PM					0	1	0		0	0	0		0	0	0	
3:00:00 PM					0	1	0		0	0	0		0	0	0	
3:05:00 PM					0	0	0		0	0	0		0	0	0	

	Harris				Harris				W				W			
	Westbound				Eastbound				Northbound				Southbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
4:00:00 PM	4	144	0	0	0	0	149	16	0	1	0	4	0			
4:15:00 PM	6	156	0	0	0	0	131	14	0	1	0	3	0			
4:30:00 PM	3	150	0	0	0	0	134	15	0	8	0	6	0			
4:45:00 PM	7	162	0	0	0	0	136	22	0	3	0	4	0			
5:00:00 PM	3	177	0	0	0	0	165	19	0	3	0	4	0			
5:15:00 PM	2	177	0	0	0	0	173	23	0	6	0	3	0			
5:30:00 PM	3	146	0	0	0	0	155	19	0	6	0	5	0			
5:45:00 PM	3	115	0	0	0	0	134	24	0	6	0	7	0			
6:00:00 PM																

bank 1

Trucks

	Harris				Harris				W				W			
	Westbound				Eastbound				Northbound				Southbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
4:00:00 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
4:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30:00 PM	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
4:45:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00:00 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
5:15:00 PM	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5:30:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
6:00:00 PM																

Bank 2

Peds

	Harris				Harris				W				W			
	Westbound				Eastbound				Northbound				Southbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
4:00:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30:00 PM	0	2	0	0	0	0	1	1	0	0	0	0	0	0	0	0
4:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00:00 PM	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0			
6:00:00 PM																

	Walnut Southbound				Hemlock Westbound				Walnut Northbound				Hemlock Eastbound				
	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	
	1:40:00 PM					11	1	0	0	12	0	12	0	0	0	1	12
1:45:00 PM					14	1	0	0	9	0	21	0	0	0	1	21	0
1:50:00 PM					13	0	0	0	13	0	18	0	0	0	1	14	0
1:55:00 PM					11	0	0	0	8	0	13	0	0	0	1	11	0
2:00:00 PM					14	0	0	0	10	0	20	0	0	0	2	13	0
2:05:00 PM					15	0	0	0	9	0	9	0	0	0	1	18	0
2:10:00 PM					11	2	0	0	9	0	18	0	0	0	1	10	0
2:15:00 PM					17	0	0	0	15	0	27	0	0	0	2	19	0
2:20:00 PM					18	2	0	0	17	0	25	0	0	0	1	22	0
2:25:00 PM					16	1	0	0	18	0	25	0	0	0	0	23	0
2:30:00 PM					18	2	0	0	16	0	18	0	0	0	1	19	0
2:35:00 PM					20	0	0	0	10	0	15	0	0	0	3	38	0
2:40:00 PM					22	1	0	0	8	0	17	0	0	0	0	29	2
2:45:00 PM					22	1	0	0	16	0	19	0	0	0	1	24	0
2:50:00 PM					22	0	0	0	26	0	33	1	0	0	2	27	0
2:55:00 PM					23	0	0	0	23	0	27	1	0	0	0	17	0
3:00:00 PM					33	0	0	1	34	0	40	2	0	0	2	27	2
3:05:00 PM					31	0	0	0	27	0	17	0	0	0	1	18	0
3:10:00 PM					33	1	0	1	33	0	22	1	0	0	2	15	1
3:15:00 PM					24	0	0	0	40	0	29	1	0	0	0	11	0

Bank 1

	Walnut Southbound				Hemlock Westbound				Walnut Northbound				Hemlock Eastbound				
	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	
	1:40:00 PM					0	0	0	0	1	0	0	0	0	0	0	0
1:45:00 PM					0	0	0	0	1	0	0	0	0	0	0	0	0
1:50:00 PM					0	0	0	0	0	0	0	0	0	0	0	0	0
1:55:00 PM					0	0	0	0	0	0	0	0	0	0	0	0	0
2:00:00 PM					0	0	0	0	0	0	0	0	0	0	0	1	0
2:05:00 PM					1	0	0	0	0	0	0	0	0	0	0	0	0
2:10:00 PM					0	0	0	0	0	0	0	0	0	0	0	0	0
2:15:00 PM					0	0	0	0	0	0	0	0	0	0	0	0	0
2:20:00 PM					0	0	0	0	0	0	1	0	0	0	0	0	0
2:25:00 PM					0	0	0	0	0	0	1	0	0	0	0	1	0
2:30:00 PM					0	0	0	0	0	0	1	0	0	0	0	2	0
2:35:00 PM					0	0	0	0	1	0	0	0	0	0	0	0	0
2:40:00 PM					0	0	0	0	1	0	0	0	0	0	0	1	0
2:45:00 PM					0	0	0	0	0	0	0	0	0	0	0	0	0
2:50:00 PM					0	0	0	0	0	0	1	0	0	0	0	0	0
2:55:00 PM					0	0	0	0	3	0	0	0	0	0	0	1	0
3:00:00 PM					0	0	0	0	0	0	0	0	0	0	0	0	0
3:05:00 PM					1	0	0	0	0	0	0	0	0	0	0	0	0
3:10:00 PM					0	0	0	0	0	0	0	0	0	0	0	0	0
3:15:00 PM					0	0	0	0	0	0	0	0	0	0	0	0	0

Bank 2

	Walnut Southbound				Hemlock Westbound				Walnut Northbound				Hemlock Eastbound				
	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	
	1:40:00 PM					0	0	0	0	0	0	0	0	0	0	3	0
1:45:00 PM					0	0	0	0	0	0	0	0	0	0	0	0	0
1:50:00 PM					0	0	0	0	0	0	0	0	0	0	0	0	0
1:55:00 PM					0	0	0	0	1	0	0	0	0	0	5	0	0
2:00:00 PM					0	0	0	0	2	0	1	0	0	0	0	0	0
2:05:00 PM					0	0	0	0	0	0	0	0	0	0	0	1	0
2:10:00 PM					0	0	0	0	3	0	0	0	0	0	0	0	0
2:15:00 PM					0	3	0	0	0	0	0	0	0	0	2	0	0
2:20:00 PM					0	0	0	0	0	0	0	0	0	0	0	0	0
2:25:00 PM					12	0	0	0	1	0	0	0	0	0	0	0	0
2:30:00 PM					0	2	0	0	0	0	0	0	0	0	0	0	0
2:35:00 PM					0	0	0	0	2	0	0	0	0	0	1	1	0
2:40:00 PM					1	0	0	0	0	0	1	0	0	0	1	0	0
2:45:00 PM					0	0	0	0	0	0	0	0	0	0	0	2	0
2:50:00 PM					0	1	0	0	0	0	0	0	0	0	0	0	0
2:55:00 PM					0	0	0	0	1	0	0	0	0	0	0	0	0
3:00:00 PM					0	3	0	0	0	0	0	0	0	0	1	0	0
3:05:00 PM					1	1	0	0	0	0	0	0	0	0	0	1	0
3:10:00 PM					1	0	0	0	0	0	0	0	0	0	0	0	0
3:15:00 PM					0	1	0	0	0	0	0	0	0	0	0	0	0

	Walnut				Hemlock				Walnut				Hemlock				
	Southbound				Westbound				Northbound				Eastbound				
	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	
4:00:00 PM					65	2	0	1	39	0	55	0	0	0	2	56	0
4:15:00 PM					77	2	0	0	41	0	59	0	0	0	1	58	1
4:30:00 PM					85	1	0	0	48	0	68	1	0	0	5	67	1
4:45:00 PM					100	0	0	1	44	0	54	0	0	0	3	100	3
5:00:00 PM					87	2	0	3	73	0	70	2	0	0	1	97	4
5:15:00 PM					96	1	0	3	66	0	64	2	0	0	1	111	4
5:30:00 PM					86	0	0	2	55	0	50	0	0	0	3	69	2
5:45:00 PM					92	1	0	0	54	0	55	0	0	0	3	83	1
6:00:00 PM					72	0	0	0	58	0	59	0	0	0	1	67	1

Bank 1 Trucks

	Walnut				Hemlock				Walnut				Hemlock			
	Southbound				Westbound				Northbound				Eastbound			
	Left	Thru	Right		Left	Thru	Right	Peds	Left	Thru	Right		Left	Thru	Right	
4:00:00 PM					1	0	0		0	0	0		0	0	0	
4:15:00 PM					0	0	0		1	0	0		0	0	0	
4:30:00 PM					0	0	0		1	0	0		0	0	0	
4:45:00 PM					0	0	0		0	0	0		0	0	0	
5:00:00 PM					0	0	0		0	0	0		0	0	0	
5:15:00 PM					0	0	0		0	0	0		0	0	0	
5:30:00 PM					0	0	0		1	0	0		0	0	0	
5:45:00 PM					0	0	0		0	0	0		0	0	0	
6:00:00 PM					0	0	0		0	0	0		0	0	0	

Bank 2 Peds

	Walnut				Hemlock				Walnut				Hemlock			
	Southbound				Westbound				Northbound				Eastbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
4:00:00 PM					1	0	0		0	0	1		0	0	0	
4:15:00 PM					0	0	0		0	0	1		0	0	0	
4:30:00 PM					0	0	0		0	0	1		0	0	0	1
4:45:00 PM					2	0	0		1	0	0		0	0	0	
5:00:00 PM					0	0	0		1	0	2		0	0	0	1
5:15:00 PM					0	0	0		1	0	0		0	0	0	0
5:30:00 PM					0	0	0		1	0	1		0	0	0	2
5:45:00 PM					0	0	0		0	0	1		0	0	0	1
6:00:00 PM					0	0	0		0	0	1		0	0	0	2

D

Capacity Analysis Backup Data

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Scenario 1 Existing-PM

Report File: \\...\1.pdf

11/28/2017

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Harris Street & W Street	Two-way stop	HCM 2010	NB Left	0.097	25.5	D
2	Harris Street & Dolbeer Street	Two-way stop	HCM 2010	NB Thru	0.043	46.1	E
3	Walnut Street & Hemlock Street	All-way stop	HCM 2010	WB Left	0.767	21.8	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report
Intersection 1: Harris Street & W Street**

Control Type:	Two-way stop	Delay (sec / veh):	25.5
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.097

Name	W Street		Harris Street		Harris Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	30.00	100.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	-5.00		-8.00		8.00	
Crosswalk	Yes		No		No	

Name	W Street		Harris Street		Harris Street	
Base Volume Input [veh/h]	18	16	629	83	15	662
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	1.00	0.00	0.00	1.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	18	16	629	83	15	662
Peak Hour Factor	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	4	170	22	4	179
Total Analysis Volume [veh/h]	19	17	679	90	16	715
Pedestrian Volume [ped/h]	12		0		0	

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

V/C, Movement V/C Ratio	0.10	0.04	0.01	0.00	0.06	0.01
d_M, Delay for Movement [s/veh]	25.51	14.85	0.00	0.00	18.20	0.00
Movement LOS	D	B	A	A	C	A
95th-Percentile Queue Length [veh]	0.46	0.46	0.00	0.00	0.18	0.00
95th-Percentile Queue Length [ft]	11.44	11.44	0.00	0.00	4.38	0.00
d_A, Approach Delay [s/veh]	20.48		0.00		0.40	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	0.67					
Intersection LOS	D					

**Intersection Level Of Service Report
Intersection 2: Harris Street & Dolbeer Street**

Control Type:	Two-way stop	Delay (sec / veh):	46.1
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.043

Name	Dolbeer Street			Dolbeer Street			Harris Street			Harris Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	30.00	100.00	100.00	30.00	100.00	100.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			5.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Name	Dolbeer Street			Dolbeer Street			Harris Street			Harris Street		
Base Volume Input [veh/h]	14	4	44	1	13	89	45	579	32	58	580	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	14	4	44	1	13	89	45	579	32	58	580	13
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	12	0	4	24	12	159	9	16	159	4
Total Analysis Volume [veh/h]	15	4	48	1	14	98	49	636	35	64	637	14
Pedestrian Volume [ped/h]	3			3			4			6		

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	Yes	Yes		
Storage Area [veh]	1	1	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.16	0.04	0.10	0.01	0.15	0.21	0.13	0.01	0.00	0.17	0.01	0.00
d_M, Delay for Movement [s/veh]	44.90	46.12	15.42	43.14	45.79	14.43	15.91	0.00	0.00	16.47	0.00	0.00
Movement LOS	E	E	C	E	E	B	C	A	A	C	A	A
95th-Percentile Queue Length [veh]	0.73	0.73	0.73	0.78	0.78	0.78	0.44	0.00	0.00	0.60	0.00	0.00
95th-Percentile Queue Length [ft]	18.14	18.14	18.14	19.53	19.53	19.53	11.02	0.00	0.00	15.08	0.00	0.00
d_A, Approach Delay [s/veh]	23.85			18.57			1.08			1.47		
Approach LOS	C			C			A			A		
d_I, Intersection Delay [s/veh]	3.42											
Intersection LOS	E											

**Intersection Level Of Service Report
Intersection 3: Walnut Street & Hemlock Street**

Control Type:	All-way stop	Delay (sec / veh):	21.8
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.767

Name	Walnut Street		Hemlock Street		Hemlock Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration	↵↵		↵		↵	
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	11.00	11.00	10.00	12.00	11.00	11.00
No. of Lanes in Pocket	0	1	0	1	0	0
Pocket Length [ft]	100.00	170.00	100.00	150.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Name	Walnut Street		Hemlock Street		Hemlock Street	
Base Volume Input [veh/h]	231	256	10	375	368	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	231	256	10	375	368	4
Peak Hour Factor	0.9110	0.9110	0.9110	0.9110	0.9110	0.9110
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	63	70	3	103	101	1
Total Analysis Volume [veh/h]	254	281	11	412	404	4
Pedestrian Volume [ped/h]	7		3		2	

Capacity per Entry Lane [veh/h]	483	576	523	584	532
Degree of Utilization, x	0.53	0.49	0.02	0.71	0.77

95th-Percentile Queue Length [veh]	3.02	2.66	0.06	5.69	6.85
95th-Percentile Queue Length [ft]	75.49	66.56	1.61	142.23	171.36
Approach Delay [s/veh]	16.37		21.97		28.68
Approach LOS	C		C		D
Intersection Delay [s/veh]	21.78				
Intersection LOS	C				

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Scenario 1 Existing-PM

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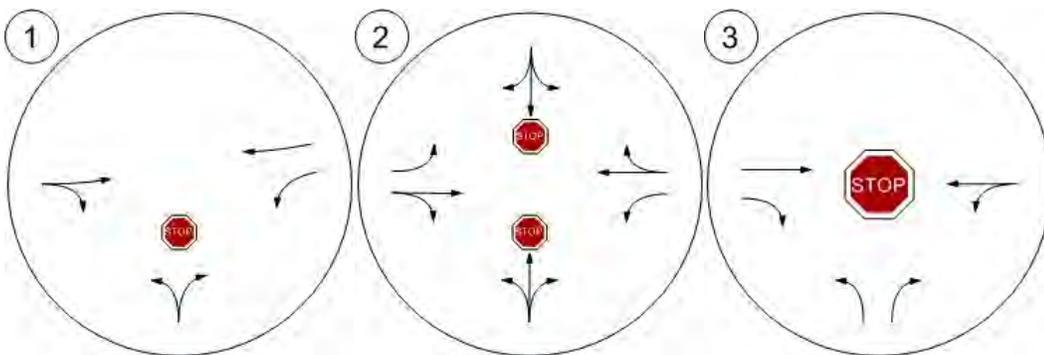
Turning Movement Volume: Summary

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
1	Harris Street & W Street	18	16	629	83	15	662	1423

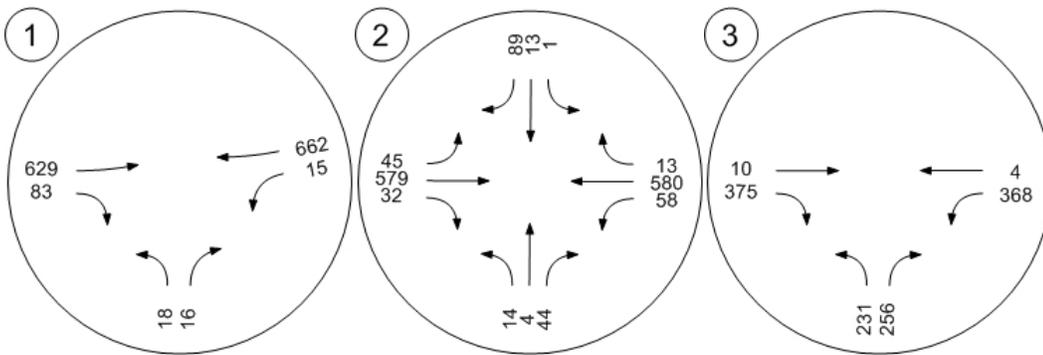
ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2	Harris Street & Dolbeer Street	14	4	44	1	13	89	45	579	32	58	580	13	1472

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
3	Walnut Street & Hemlock Street	231	256	10	375	368	4	1244

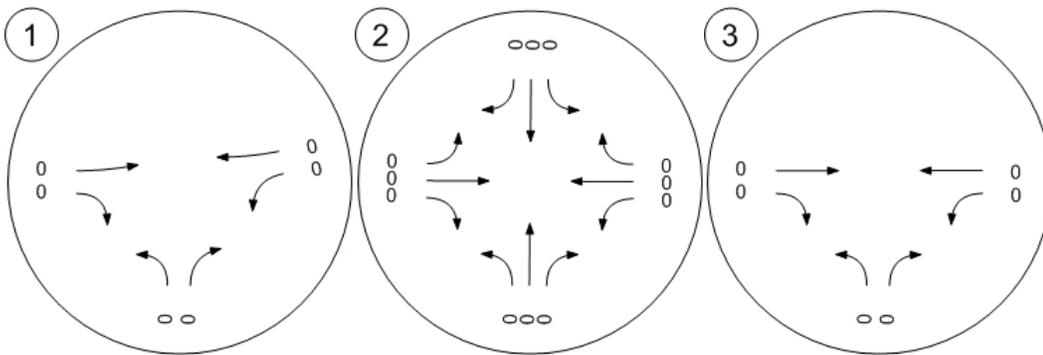
Lane Configuration and Traffic Control



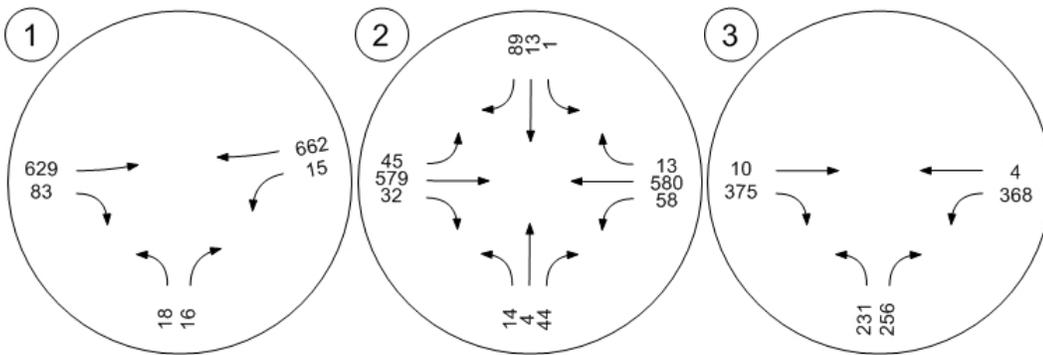
Traffic Volume - Base Volume



Traffic Volume - Net New Site Trips



Traffic Volume - Future Total Volume



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Scenario 2 Existing-Pickup

Report File: \\...\\2.pdf

11/28/2017

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Harris Street & W Street	Two-way stop	HCM 2010	NB Left	0.076	21.0	C
2	Harris Street & Dolbeer Street	Two-way stop	HCM 2010	SB Left	0.042	43.5	E
3	Walnut Street & Hemlock Street	All-way stop	HCM 2010	WB Left	0.584	16.2	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report
Intersection 1: Harris Street & W Street**

Control Type:	Two-way stop	Delay (sec / veh):	21.0
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.076

Name	W Street		Harris Street		Harris Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	30.00	100.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	-5.00		-8.00		8.00	
Crosswalk	Yes		No		No	

Name	W Street		Harris Street		Harris Street	
Base Volume Input [veh/h]	18	26	565	59	15	548
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	1.00	0.00	0.00	1.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	18	26	565	59	15	548
Peak Hour Factor	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	7	153	16	4	148
Total Analysis Volume [veh/h]	19	28	610	64	16	592
Pedestrian Volume [ped/h]	12		0		0	

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

V/C, Movement V/C Ratio	0.08	0.06	0.01	0.00	0.04	0.01
d_M, Delay for Movement [s/veh]	20.98	13.59	0.00	0.00	15.58	0.00
Movement LOS	C	B	A	A	C	A
95th-Percentile Queue Length [veh]	0.45	0.45	0.00	0.00	0.14	0.00
95th-Percentile Queue Length [ft]	11.21	11.21	0.00	0.00	3.51	0.00
d_A, Approach Delay [s/veh]	16.58		0.00		0.41	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	0.77					
Intersection LOS	C					

**Intersection Level Of Service Report
Intersection 2: Harris Street & Dolbeer Street**

Control Type:	Two-way stop	Delay (sec / veh):	43.5
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.042

Name	Dolbeer Street			Dolbeer Street			Harris Street			Harris Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			←↑			←↑		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	30.00	100.00	100.00	30.00	100.00	100.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			5.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Name	Dolbeer Street			Dolbeer Street			Harris Street			Harris Street		
Base Volume Input [veh/h]	26	10	54	4	9	63	34	532	33	45	458	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	10	54	4	9	63	34	532	33	45	458	7
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	3	15	1	2	17	9	146	9	12	126	2
Total Analysis Volume [veh/h]	29	11	59	4	10	69	37	585	36	49	503	8
Pedestrian Volume [ped/h]	3			3			4			6		

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	Yes	Yes		
Storage Area [veh]	1	1	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.24	0.08	0.12	0.04	0.08	0.12	0.07	0.01	0.00	0.10	0.01	0.00
d_M, Delay for Movement [s/veh]	43.26	39.53	20.30	43.48	32.81	12.17	12.48	0.00	0.00	13.15	0.00	0.00
Movement LOS	E	E	C	E	D	B	B	A	A	B	A	A
95th-Percentile Queue Length [veh]	1.67	1.67	1.67	0.42	0.42	0.42	0.23	0.00	0.00	0.33	0.00	0.00
95th-Percentile Queue Length [ft]	41.72	41.72	41.72	10.47	10.47	10.47	5.74	0.00	0.00	8.28	0.00	0.00
d_A, Approach Delay [s/veh]	29.16			16.16			0.70			1.15		
Approach LOS	D			C			A			A		
d_I, Intersection Delay [s/veh]	3.81											
Intersection LOS	E											

**Intersection Level Of Service Report
Intersection 3: Walnut Street & Hemlock Street**

Control Type:	All-way stop	Delay (sec / veh):	16.2
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.584

Name	Walnut Street		Hemlock Street		Hemlock Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration	↵↵		↵		↵	
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	11.00	11.00	10.00	12.00	11.00	11.00
No. of Lanes in Pocket	0	1	0	1	0	0
Pocket Length [ft]	100.00	170.00	100.00	150.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Name	Walnut Street		Hemlock Street		Hemlock Street	
Base Volume Input [veh/h]	268	287	13	270	282	8
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	268	287	13	270	282	8
Peak Hour Factor	0.9110	0.9110	0.9110	0.9110	0.9110	0.9110
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	74	79	4	74	77	2
Total Analysis Volume [veh/h]	294	315	14	296	310	9
Pedestrian Volume [ped/h]	7		3		2	

Capacity per Entry Lane [veh/h]	523	635	531	594	546
Degree of Utilization, x	0.56	0.50	0.03	0.50	0.58

95th-Percentile Queue Length [veh]	3.44	2.77	0.08	2.77	3.73
95th-Percentile Queue Length [ft]	85.98	69.15	2.03	69.34	93.17
Approach Delay [s/veh]	15.87		14.40		18.44
Approach LOS	C		B		C
Intersection Delay [s/veh]	16.17				
Intersection LOS	C				

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Scenario 2 Existing-Pickup

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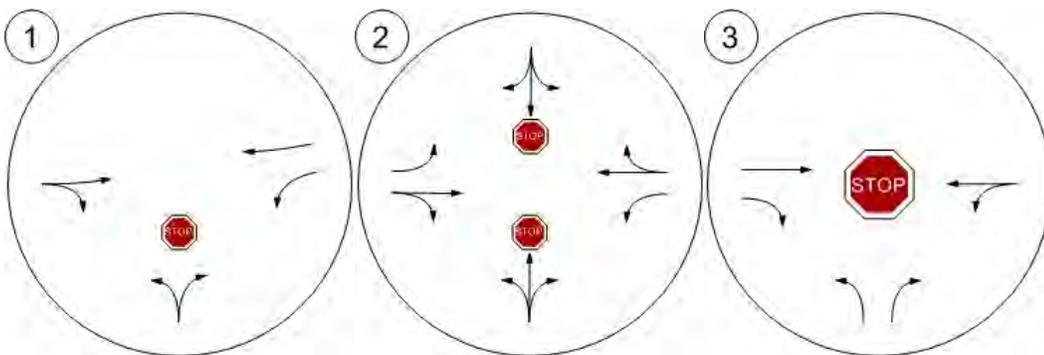
Turning Movement Volume: Summary

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
1	Harris Street & W Street	18	26	565	59	15	548	1231

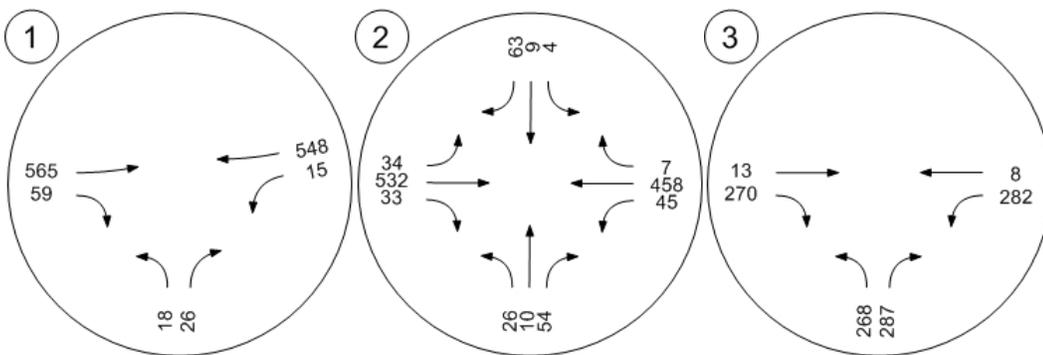
ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2	Harris Street & Dolbeer Street	26	10	54	4	9	63	34	532	33	45	458	7	1275

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
3	Walnut Street & Hemlock Street	268	287	13	270	282	8	1128

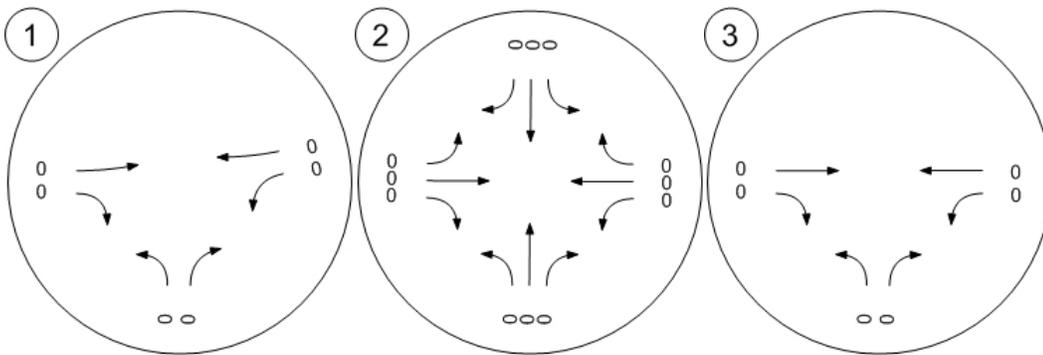
Lane Configuration and Traffic Control



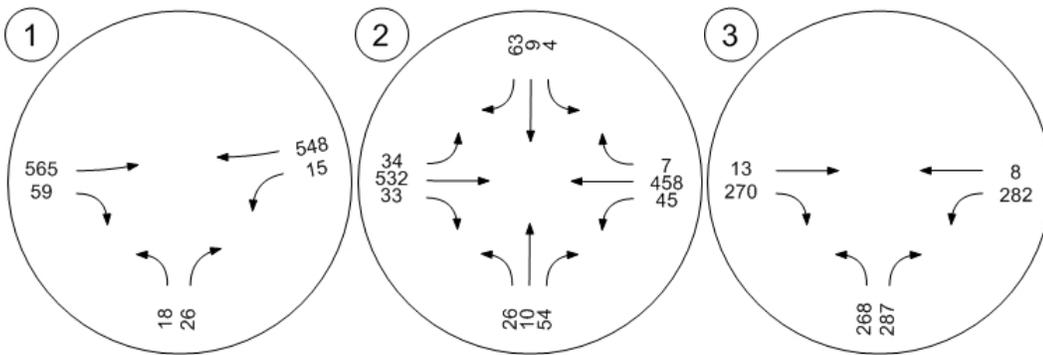
Traffic Volume - Base Volume



Traffic Volume - Net New Site Trips



Traffic Volume - Future Total Volume



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Scenario 3 2020 PM Build

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Harris Street & W Street	Two-way stop	HCM 2010	NB Left	0.151	27.2	D
2	Harris Street & Dolbeer Street	Two-way stop	HCM 2010	NB Thru	0.045	48.5	E
3	Walnut Street & Hemlock Street	All-way stop	HCM 2010	WB Left	0.770	22.1	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report
Intersection 1: Harris Street & W Street**

Control Type:	Two-way stop	Delay (sec / veh):	27.2
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.151

Name	W Street		Harris Street		Harris Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	30.00	100.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	-5.00		-8.00		8.00	
Crosswalk	Yes		No		No	

Name	W Street		Harris Street		Harris Street	
Base Volume Input [veh/h]	18	16	629	83	15	662
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	1.00	0.00	0.00	1.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	9	7	0	2	2	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	23	629	85	17	662
Peak Hour Factor	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	6	170	23	5	179
Total Analysis Volume [veh/h]	29	25	679	92	18	715
Pedestrian Volume [ped/h]	12		0		0	

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

V/C, Movement V/C Ratio	0.15	0.05	0.01	0.00	0.06	0.01
d_M, Delay for Movement [s/veh]	27.19	16.28	0.00	0.00	18.36	0.00
Movement LOS	D	C	A	A	C	A
95th-Percentile Queue Length [veh]	0.75	0.75	0.00	0.00	0.20	0.00
95th-Percentile Queue Length [ft]	18.78	18.78	0.00	0.00	4.98	0.00
d_A, Approach Delay [s/veh]	22.14		0.00		0.45	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	0.98					
Intersection LOS	D					

**Intersection Level Of Service Report
Intersection 2: Harris Street & Dolbeer Street**

Control Type:	Two-way stop	Delay (sec / veh):	48.5
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.045

Name	Dolbeer Street			Dolbeer Street			Harris Street			Harris Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	30.00	100.00	100.00	30.00	100.00	100.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			5.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Name	Dolbeer Street			Dolbeer Street			Harris Street			Harris Street		
Base Volume Input [veh/h]	14	4	44	1	13	89	45	579	32	58	580	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	1	0	0	0	0	7	0	0	2	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	14	4	45	1	13	89	45	586	32	58	582	13
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	12	0	4	24	12	161	9	16	160	4
Total Analysis Volume [veh/h]	15	4	49	1	14	98	49	644	35	64	640	14
Pedestrian Volume [ped/h]	3			3			4			6		

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	Yes	Yes		
Storage Area [veh]	1	1	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.16	0.05	0.11	0.01	0.16	0.21	0.13	0.01	0.00	0.20	0.01	0.00
d_M, Delay for Movement [s/veh]	46.97	48.47	15.76	44.93	47.93	14.47	15.99	0.00	0.00	18.81	0.00	0.00
Movement LOS	E	E	C	E	E	B	C	A	A	C	A	A
95th-Percentile Queue Length [veh]	0.77	0.77	0.77	0.78	0.78	0.78	0.44	0.00	0.00	0.72	0.00	0.00
95th-Percentile Queue Length [ft]	19.24	19.24	19.24	19.62	19.62	19.62	11.10	0.00	0.00	18.04	0.00	0.00
d_A, Approach Delay [s/veh]	24.57			18.89			1.08			1.68		
Approach LOS	C			C			A			A		
d_I, Intersection Delay [s/veh]	3.56											
Intersection LOS	E											

**Intersection Level Of Service Report
Intersection 3: Walnut Street & Hemlock Street**

Control Type:	All-way stop	Delay (sec / veh):	22.1
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.770

Name	Walnut Street		Hemlock Street		Hemlock Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration	↵↵		↵		↵	
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	11.00	11.00	10.00	12.00	11.00	11.00
No. of Lanes in Pocket	0	1	0	1	0	0
Pocket Length [ft]	100.00	170.00	100.00	150.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Name	Walnut Street		Hemlock Street		Hemlock Street	
Base Volume Input [veh/h]	231	256	10	375	368	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	0	0	6	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	233	256	10	381	368	4
Peak Hour Factor	0.9110	0.9110	0.9110	0.9110	0.9110	0.9110
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	64	70	3	105	101	1
Total Analysis Volume [veh/h]	256	281	11	418	404	4
Pedestrian Volume [ped/h]	7		3		2	

Capacity per Entry Lane [veh/h]	480	575	522	583	530
Degree of Utilization, x	0.53	0.49	0.02	0.72	0.77

95th-Percentile Queue Length [veh]	3.08	2.68	0.06	5.92	6.90
95th-Percentile Queue Length [ft]	76.95	66.92	1.61	147.93	172.57
Approach Delay [s/veh]	16.52		22.66		28.94
Approach LOS	C		C		D
Intersection Delay [s/veh]	22.13				
Intersection LOS	C				

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Turning Movement Volume: Summary

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
1	Harris Street & W Street	27	23	629	85	17	662	1443

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2	Harris Street & Dolbeer Street	14	4	45	1	13	89	45	586	32	58	582	13	1482

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
3	Walnut Street & Hemlock Street	233	256	10	381	368	4	1252

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Trip Generation summary

Added Trips

Zone ID: Name	Land Use variables	Code	Ind. Var.	Rate	Quantity	% In	% Out	Trips In	Trips Out	Total Trips	% of Total Trips
1: Sequoia Zoo				1.000	0.000	50.00	50.00	6	23	29	100.00
Added Trips Total								6	23	29	100.00

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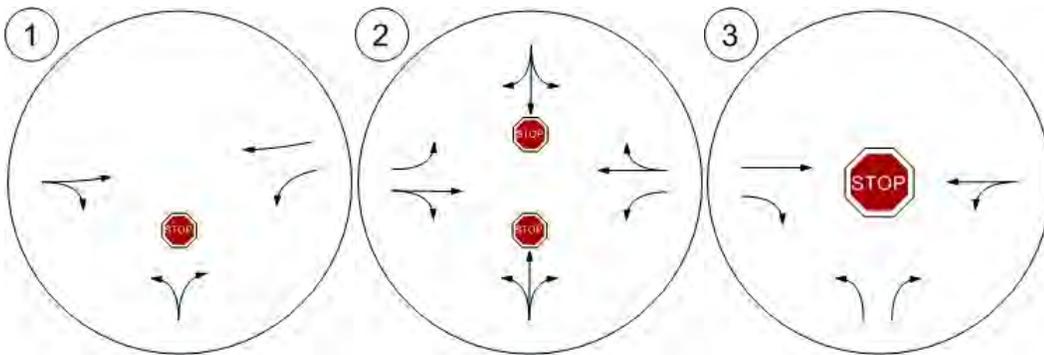
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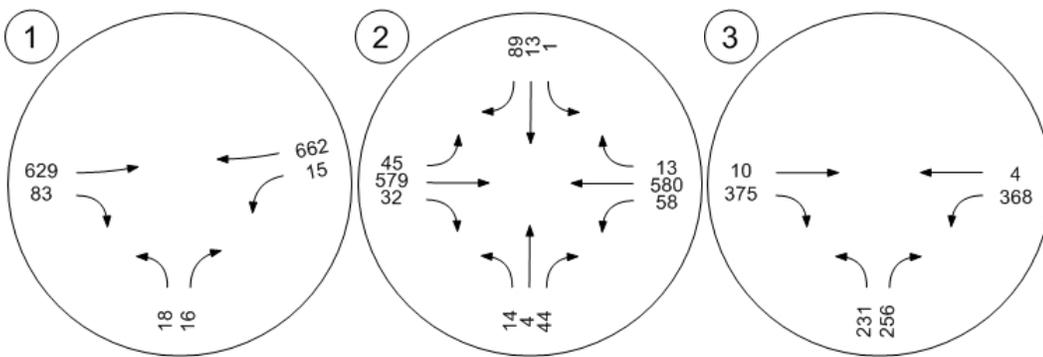
Trip Distribution summary

Zone / Gate	Zone 1: Sequoia Zoo			
	To Sequoia Zoo:		From Sequoia Zoo:	
	Share %	Trips	Share %	Trips
2: Harris Westbound	40.00	2	40.00	9
4: Harris Eastbound	35.00	2	35.00	8
5: Walnut Southbound	25.00	2	25.00	6
Total	100.00	6	100.00	23

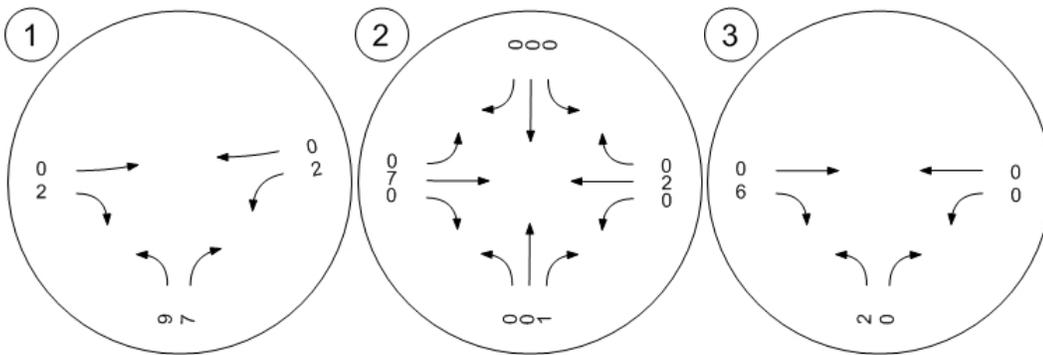
Lane Configuration and Traffic Control



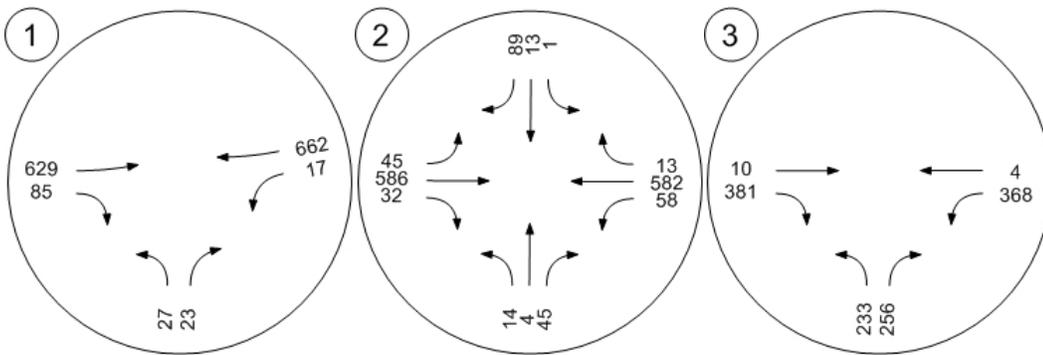
Traffic Volume - Base Volume



Traffic Volume - Net New Site Trips



Traffic Volume - Future Total Volume



Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Harris Street & W Street	Two-way stop	HCM 2010	NB Left	0.115	22.1	C
2	Harris Street & Dolbeer Street	Two-way stop	HCM 2010	NB Left	0.258	46.1	E
3	Walnut Street & Hemlock Street	All-way stop	HCM 2010	WB Left	0.586	16.3	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report
Intersection 1: Harris Street & W Street**

Control Type:	Two-way stop	Delay (sec / veh):	22.1
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.115

Name	W Street		Harris Street		Harris Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	30.00	100.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	-5.00		-8.00		8.00	
Crosswalk	Yes		No		No	

Name	W Street		Harris Street		Harris Street	
Base Volume Input [veh/h]	18	26	565	59	15	548
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	1.00	0.00	0.00	1.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	8	6	0	4	3	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	32	565	63	18	548
Peak Hour Factor	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	9	153	17	5	148
Total Analysis Volume [veh/h]	28	35	610	68	19	592
Pedestrian Volume [ped/h]	12		0		0	

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

V/C, Movement V/C Ratio	0.11	0.07	0.01	0.00	0.05	0.01
d_M, Delay for Movement [s/veh]	22.08	14.43	0.00	0.00	15.77	0.00
Movement LOS	C	B	A	A	C	A
95th-Percentile Queue Length [veh]	0.66	0.66	0.00	0.00	0.17	0.00
95th-Percentile Queue Length [ft]	16.55	16.55	0.00	0.00	4.25	0.00
d_A, Approach Delay [s/veh]	17.83		0.00		0.49	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	1.05					
Intersection LOS	C					

**Intersection Level Of Service Report
Intersection 2: Harris Street & Dolbeer Street**

Control Type:	Two-way stop	Delay (sec / veh):	46.1
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.258

Name	Dolbeer Street			Dolbeer Street			Harris Street			Harris Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	30.00	100.00	100.00	30.00	100.00	100.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			5.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Name	Dolbeer Street			Dolbeer Street			Harris Street			Harris Street		
Base Volume Input [veh/h]	26	10	54	4	9	63	34	532	33	45	458	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	1	0	0	0	0	6	0	0	3	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	10	55	4	9	63	34	538	33	45	461	7
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	3	15	1	2	17	9	148	9	12	127	2
Total Analysis Volume [veh/h]	29	11	60	4	10	69	37	591	36	49	507	8
Pedestrian Volume [ped/h]	3			3			4			6		

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	Yes	Yes		
Storage Area [veh]	1	1	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.26	0.09	0.12	0.04	0.08	0.12	0.07	0.01	0.00	0.14	0.01	0.00
d_M, Delay for Movement [s/veh]	46.07	42.37	21.44	45.88	34.63	12.22	12.55	0.00	0.00	17.14	0.00	0.00
Movement LOS	E	E	C	E	D	B	B	A	A	C	A	A
95th-Percentile Queue Length [veh]	1.80	1.80	1.80	0.43	0.43	0.43	0.23	0.00	0.00	0.49	0.00	0.00
95th-Percentile Queue Length [ft]	45.00	45.00	45.00	10.63	10.63	10.63	5.80	0.00	0.00	12.24	0.00	0.00
d_A, Approach Delay [s/veh]	30.88			16.54			0.70			1.49		
Approach LOS	D			C			A			A		
d_I, Intersection Delay [s/veh]	4.09											
Intersection LOS	E											

**Intersection Level Of Service Report
Intersection 3: Walnut Street & Hemlock Street**

Control Type:	All-way stop	Delay (sec / veh):	16.3
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.586

Name	Walnut Street		Hemlock Street		Hemlock Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration	↵↵		↵		↵	
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	11.00	11.00	10.00	12.00	11.00	11.00
No. of Lanes in Pocket	0	1	0	1	0	0
Pocket Length [ft]	100.00	170.00	100.00	150.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Name	Walnut Street		Hemlock Street		Hemlock Street	
Base Volume Input [veh/h]	268	287	13	270	282	8
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	0	0	5	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	270	287	13	275	282	8
Peak Hour Factor	0.9110	0.9110	0.9110	0.9110	0.9110	0.9110
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	74	79	4	75	77	2
Total Analysis Volume [veh/h]	296	315	14	302	310	9
Pedestrian Volume [ped/h]	7		3		2	

Capacity per Entry Lane [veh/h]	521	632	530	593	544
Degree of Utilization, x	0.57	0.50	0.03	0.51	0.59

95th-Percentile Queue Length [veh]	3.50	2.78	0.08	2.89	3.75
95th-Percentile Queue Length [ft]	87.58	69.56	2.03	72.14	93.70
Approach Delay [s/veh]	16.03		14.67		18.55
Approach LOS	C		B		C
Intersection Delay [s/veh]	16.33				
Intersection LOS	C				

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Scenario 4 2020 Pickup Build

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Turning Movement Volume: Summary

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
1	Harris Street & W Street	26	32	565	63	18	548	1252

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2	Harris Street & Dolbeer Street	26	10	55	4	9	63	34	538	33	45	461	7	1285

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
3	Walnut Street & Hemlock Street	270	287	13	275	282	8	1135

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Scenario 4 2020 Pickup Build

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Trip Generation summary

Added Trips

Zone ID: Name	Land Use variables	Code	Ind. Var.	Rate	Quantity	% In	% Out	Trips In	Trips Out	Total Trips	% of Total Trips
1: Sequoia Zoo				1.000	0.000	50.00	50.00	9	20	29	100.00
Added Trips Total								9	20	29	100.00

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Scenario 4 2020 Pickup Build

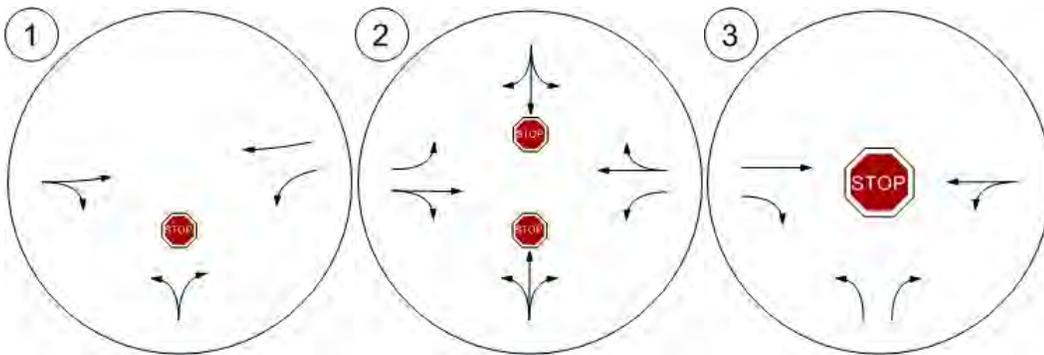
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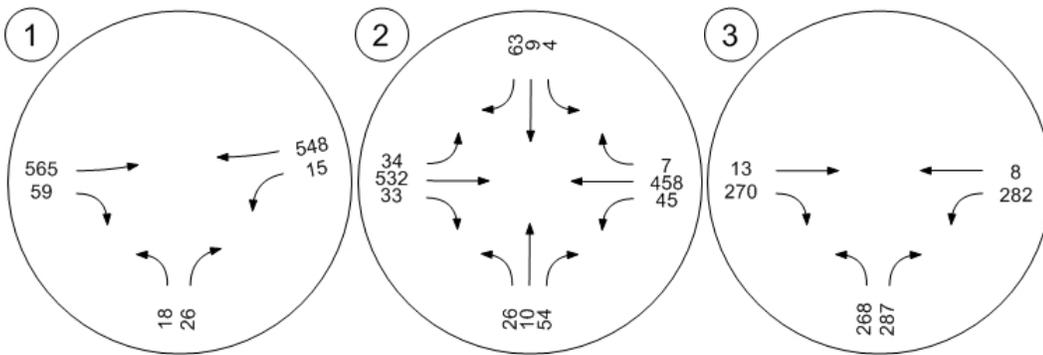
Trip Distribution summary

Zone / Gate	Zone 1: Sequoia Zoo			
	To Sequoia Zoo:		From Sequoia Zoo:	
	Share %	Trips	Share %	Trips
2: Harris Westbound	40.00	4	40.00	8
4: Harris Eastbound	35.00	3	35.00	7
5: Walnut Southbound	25.00	2	25.00	5
Total	100.00	9	100.00	20

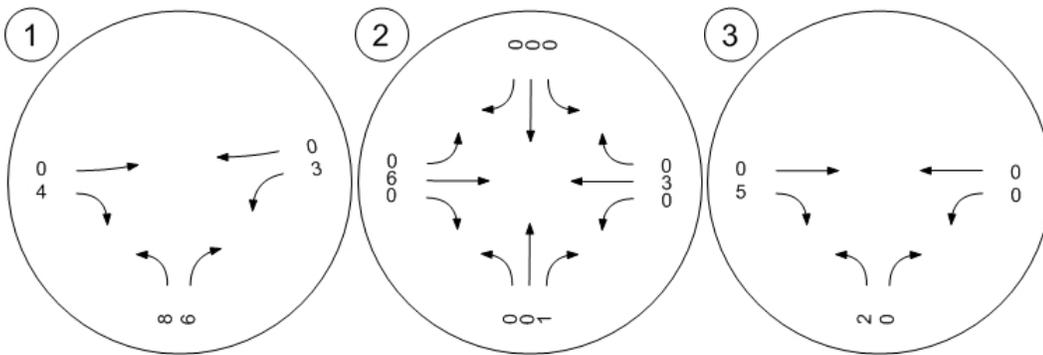
Lane Configuration and Traffic Control



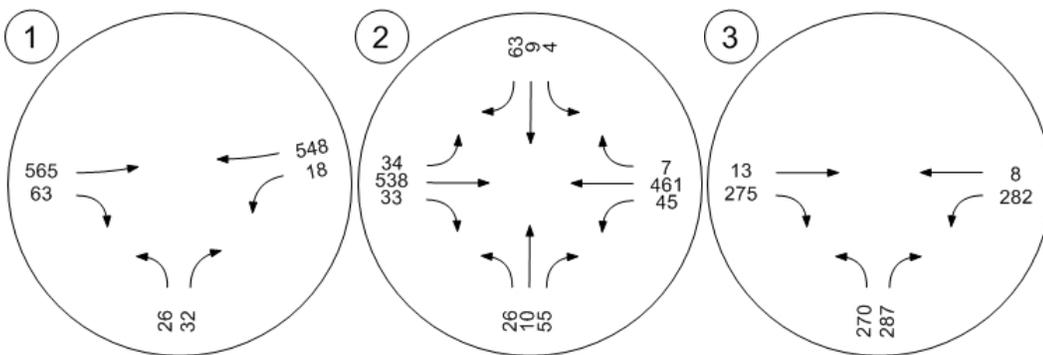
Traffic Volume - Base Volume



Traffic Volume - Net New Site Trips



Traffic Volume - Future Total Volume



Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Harris Street & W Street	Two-way stop	HCM 2010	NB Left	0.289	45.2	E
2	Harris Street & Dolbeer Street	Two-way stop	HCM 2010	NB Left	0.561	180.5	F
3	Walnut Street & Hemlock Street	All-way stop	HCM 2010	WB Left	1.028	47.9	E

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report
Intersection 1: Harris Street & W Street**

Control Type:	Two-way stop	Delay (sec / veh):	45.2
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.289

Name	W Street		Harris Street		Harris Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	30.00	100.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	-5.00		-8.00		8.00	
Crosswalk	Yes		No		No	

Name	W Street		Harris Street		Harris Street	
Base Volume Input [veh/h]	18	16	629	83	15	662
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	1.00	0.00	0.00	1.00
Growth Rate	1.20	1.25	1.22	1.22	1.20	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	11	9	0	3	2	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	29	767	104	20	808
Peak Hour Factor	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	8	207	28	5	218
Total Analysis Volume [veh/h]	36	31	828	112	22	873
Pedestrian Volume [ped/h]	12		0		0	

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

V/C, Movement V/C Ratio	0.29	0.08	0.01	0.00	0.11	0.01
d_M, Delay for Movement [s/veh]	45.20	25.67	0.00	0.00	25.50	0.00
Movement LOS	E	D	A	A	D	A
95th-Percentile Queue Length [veh]	1.59	1.59	0.00	0.00	0.37	0.00
95th-Percentile Queue Length [ft]	39.69	39.69	0.00	0.00	9.25	0.00
d_A, Approach Delay [s/veh]	36.16		0.00		0.63	
Approach LOS	E		A		A	
d_I, Intersection Delay [s/veh]	1.57					
Intersection LOS	E					

**Intersection Level Of Service Report
Intersection 2: Harris Street & Dolbeer Street**

Control Type:	Two-way stop	Delay (sec / veh):	180.5
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.561

Name	Dolbeer Street			Dolbeer Street			Harris Street			Harris Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			←↑			←↑		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	30.00	100.00	100.00	30.00	100.00	100.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			5.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Name	Dolbeer Street			Dolbeer Street			Harris Street			Harris Street		
Base Volume Input [veh/h]	14	4	44	1	13	89	45	579	32	58	580	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Growth Rate	1.21	1.21	1.23	1.20	1.23	1.22	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	1	0	0	0	0	9	0	0	2	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	17	5	55	1	16	109	55	715	39	71	710	16
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	1	15	0	4	30	15	196	11	20	195	4
Total Analysis Volume [veh/h]	19	5	60	1	18	120	60	786	43	78	780	18
Pedestrian Volume [ped/h]	3			3			4			6		

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	Yes	Yes		
Storage Area [veh]	1	1	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.56	0.12	0.16	0.02	0.43	0.31	0.22	0.01	0.00	0.29	0.01	0.00
d_M, Delay for Movement [s/veh]	180.51	159.36	83.71	105.14	109.73	32.36	21.91	0.00	0.00	23.70	0.00	0.00
Movement LOS	F	F	F	F	F	D	C	A	A	C	A	A
95th-Percentile Queue Length [veh]	4.31	4.31	4.31	3.21	3.21	3.21	0.82	0.00	0.00	1.16	0.00	0.00
95th-Percentile Queue Length [ft]	107.81	107.81	107.81	80.30	80.30	80.30	20.55	0.00	0.00	29.12	0.00	0.00
d_A, Approach Delay [s/veh]	110.11			42.90			1.48			2.11		
Approach LOS	F			E			A			A		
d_I, Intersection Delay [s/veh]	9.24											
Intersection LOS	F											

**Intersection Level Of Service Report
Intersection 3: Walnut Street & Hemlock Street**

Control Type:	All-way stop	Delay (sec / veh):	47.9
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.028

Name	Walnut Street		Hemlock Street		Hemlock Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration	↵↵		↵		↵	
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	11.00	11.00	10.00	12.00	11.00	11.00
No. of Lanes in Pocket	0	1	0	1	0	0
Pocket Length [ft]	100.00	170.00	100.00	150.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Name	Walnut Street		Hemlock Street		Hemlock Street	
Base Volume Input [veh/h]	231	256	10	375	368	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	0	0	7	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	284	312	12	465	449	5
Peak Hour Factor	0.9110	0.9110	0.9110	0.9110	0.9110	0.9110
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	78	86	3	128	123	1
Total Analysis Volume [veh/h]	312	342	13	510	493	5
Pedestrian Volume [ped/h]	7		3		2	

Capacity per Entry Lane [veh/h]	450	528	487	538	498
Degree of Utilization, x	0.69	0.65	0.03	0.95	1.03

95th-Percentile Queue Length [veh]	5.22	4.60	0.08	12.19	14.53
95th-Percentile Queue Length [ft]	130.51	114.95	2.05	304.82	363.29
Approach Delay [s/veh]	23.93		51.35		75.62
Approach LOS	C		F		F
Intersection Delay [s/veh]	47.86				
Intersection LOS	E				

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Scenario 5 2040 PM Build

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11/28/2017

Turning Movement Volume: Summary

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
1	Harris Street & W Street	33	29	767	104	20	808	1761

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2	Harris Street & Dolbeer Street	17	5	55	1	16	109	55	715	39	71	710	16	1809

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
3	Walnut Street & Hemlock Street	284	312	12	465	449	5	1527

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Scenario 5 2040 PM Build

Report File: \...\5.pdf

11/28/2017

Trip Generation summary

Added Trips

Zone ID: Name	Land Use variables	Code	Ind. Var.	Rate	Quantity	% In	% Out	Trips In	Trips Out	Total Trips	% of Total Trips
1: Sequoia Zoo				1.000	0.000	50.00	50.00	7	28	35	100.00
Added Trips Total								7	28	35	100.00

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Scenario 5 2040 PM Build

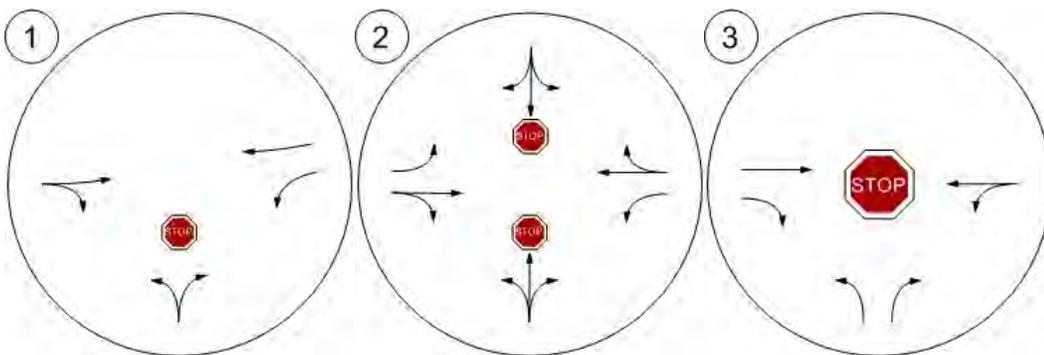
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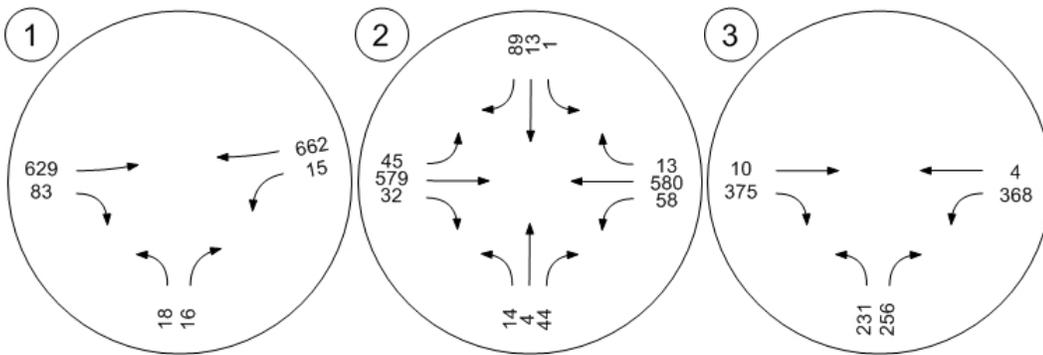
Trip Distribution summary

Zone / Gate	Zone 1: Sequoia Zoo			
	To Sequoia Zoo:		From Sequoia Zoo:	
	Share %	Trips	Share %	Trips
2: Harris Westbound	40.00	3	40.00	11
4: Harris Eastbound	35.00	2	35.00	10
5: Walnut Southbound	25.00	2	25.00	7
Total	100.00	7	100.00	28

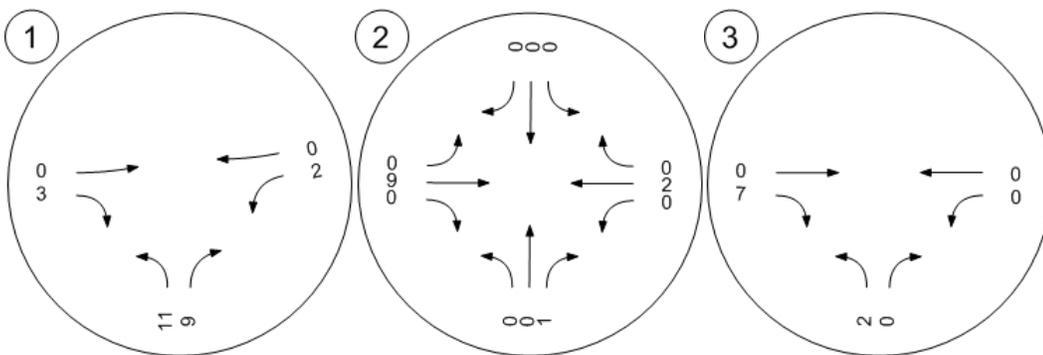
Lane Configuration and Traffic Control



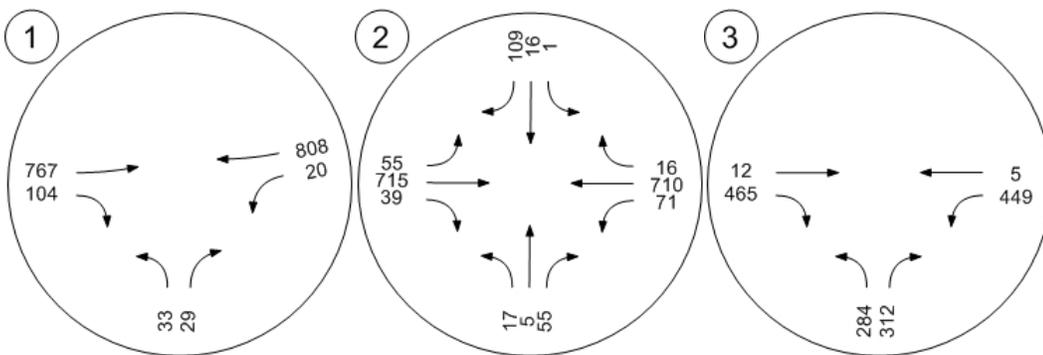
Traffic Volume - Base Volume



Traffic Volume - Net New Site Trips



Traffic Volume - Future Total Volume



Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Harris Street & W Street	Two-way stop	HCM 2010	NB Left	0.124	22.5	C
2	Harris Street & Dolbeer Street	Two-way stop	HCM 2010	NB Left	0.599	146.2	F
3	Walnut Street & Hemlock Street	All-way stop	HCM 2010	WB Left	0.768	25.2	D

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report
Intersection 1: Harris Street & W Street**

Control Type:	Two-way stop	Delay (sec / veh):	22.5
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.124

Name	W Street		Harris Street		Harris Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	30.00	100.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	-5.00		-8.00		8.00	
Crosswalk	Yes		No		No	

Name	W Street		Harris Street		Harris Street	
Base Volume Input [veh/h]	18	26	565	59	15	548
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	1.00	0.00	0.00	1.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	10	8	0	4	4	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	34	565	63	19	548
Peak Hour Factor	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	9	153	17	5	148
Total Analysis Volume [veh/h]	30	37	610	68	21	592
Pedestrian Volume [ped/h]	12		0		0	

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

V/C, Movement V/C Ratio	0.12	0.07	0.01	0.00	0.06	0.01
d_M, Delay for Movement [s/veh]	22.48	14.67	0.00	0.00	15.83	0.00
Movement LOS	C	B	A	A	C	A
95th-Percentile Queue Length [veh]	0.72	0.72	0.00	0.00	0.19	0.00
95th-Percentile Queue Length [ft]	18.02	18.02	0.00	0.00	4.72	0.00
d_A, Approach Delay [s/veh]	18.16		0.00		0.54	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	1.14					
Intersection LOS	C					

**Intersection Level Of Service Report
Intersection 2: Harris Street & Dolbeer Street**

Control Type:	Two-way stop	Delay (sec / veh):	146.2
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.599

Name	Dolbeer Street			Dolbeer Street			Harris Street			Harris Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+T			+T		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	30.00	100.00	100.00	30.00	100.00	100.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			5.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Name	Dolbeer Street			Dolbeer Street			Harris Street			Harris Street		
Base Volume Input [veh/h]	26	10	54	4	9	63	34	532	33	45	458	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Growth Rate	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	1	0	0	0	0	8	0	0	4	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	32	12	67	5	11	77	41	657	40	55	563	9
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	3	18	1	3	21	11	180	11	15	155	2
Total Analysis Volume [veh/h]	35	13	74	5	12	85	45	722	44	60	619	10
Pedestrian Volume [ped/h]	3			3			4			6		

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	Yes	Yes		
Storage Area [veh]	1	1	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.60	0.18	0.18	0.11	0.17	0.18	0.11	0.01	0.00	0.21	0.01	0.00
d_M, Delay for Movement [s/veh]	146.16	133.18	93.38	90.45	58.55	16.26	15.19	0.00	0.00	20.53	0.00	0.00
Movement LOS	F	F	F	F	F	C	C	A	A	C	A	A
95th-Percentile Queue Length [veh]	5.85	5.85	5.85	1.12	1.12	1.12	0.38	0.00	0.00	0.76	0.00	0.00
95th-Percentile Queue Length [ft]	146.32	146.32	146.32	28.11	28.11	28.11	9.48	0.00	0.00	18.95	0.00	0.00
d_A, Approach Delay [s/veh]	112.77			24.87			0.84			1.79		
Approach LOS	F			C			A			A		
d_I, Intersection Delay [s/veh]	10.56											
Intersection LOS	F											

**Intersection Level Of Service Report
Intersection 3: Walnut Street & Hemlock Street**

Control Type:	All-way stop	Delay (sec / veh):	25.2
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.768

Name	Walnut Street		Hemlock Street		Hemlock Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration	↵↵		↵		↵	
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	11.00	11.00	10.00	12.00	11.00	11.00
No. of Lanes in Pocket	0	1	0	1	0	0
Pocket Length [ft]	100.00	170.00	100.00	150.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Name	Walnut Street		Hemlock Street		Hemlock Street	
Base Volume Input [veh/h]	268	287	13	270	282	8
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	3	0	0	6	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	330	350	16	335	344	10
Peak Hour Factor	0.9110	0.9110	0.9110	0.9110	0.9110	0.9110
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	91	96	4	92	94	3
Total Analysis Volume [veh/h]	362	384	18	368	378	11
Pedestrian Volume [ped/h]	7		3		2	

Capacity per Entry Lane [veh/h]	484	579	488	542	507
Degree of Utilization, x	0.75	0.66	0.04	0.68	0.77

95th-Percentile Queue Length [veh]	6.31	4.92	0.11	5.14	6.79
95th-Percentile Queue Length [ft]	157.64	123.12	2.86	128.56	169.66
Approach Delay [s/veh]	24.59		21.73		29.86
Approach LOS	C		C		D
Intersection Delay [s/veh]	25.21				
Intersection LOS	D				

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Scenario 6 2040 Pickup Build

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Turning Movement Volume: Summary

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
1	Harris Street & W Street	28	34	565	63	19	548	1257

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2	Harris Street & Dolbeer Street	32	12	67	5	11	77	41	657	40	55	563	9	1569

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
3	Walnut Street & Hemlock Street	330	350	16	335	344	10	1385

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Scenario 6 2040 Pickup Build

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Trip Generation summary

Added Trips

Zone ID: Name	Land Use variables	Code	Ind. Var.	Rate	Quantity	% In	% Out	Trips In	Trips Out	Total Trips	% of Total Trips
1: Sequoia Zoo				1.000	0.000	50.00	50.00	10	25	35	100.00
Added Trips Total								10	25	35	100.00

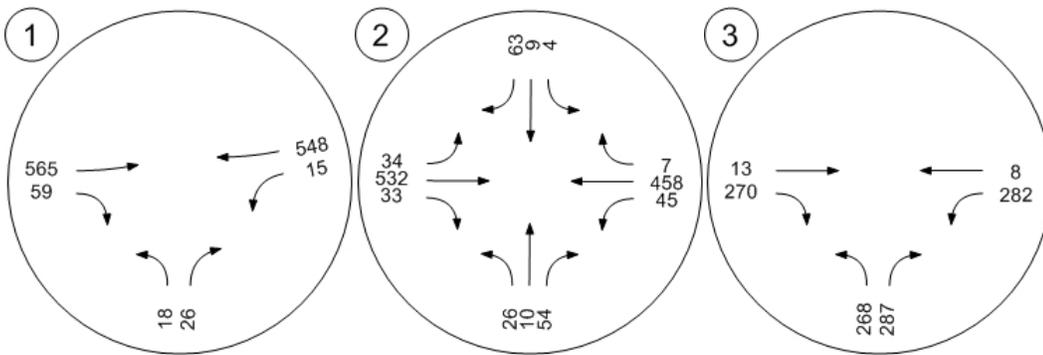
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Scenario 6 2040 Pickup Build
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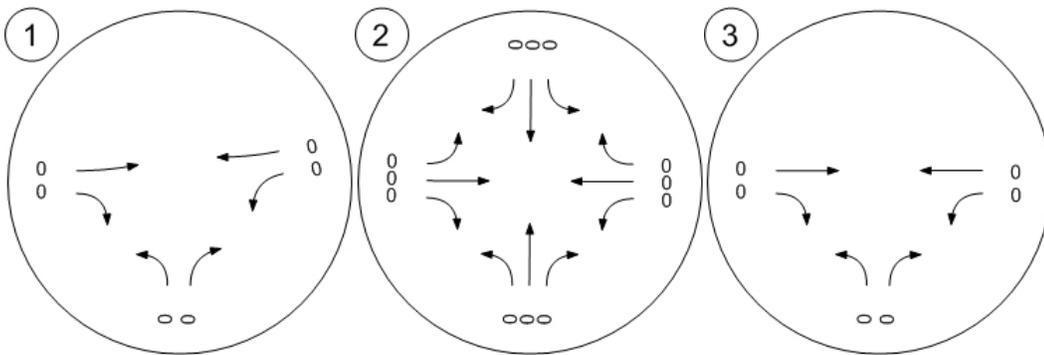
Trip Distribution summary

Zone / Gate	Zone 1: Sequoia Zoo			
	To Sequoia Zoo:		From Sequoia Zoo:	
	Share %	Trips	Share %	Trips
2: Harris Westbound	40.00	4	40.00	10
4: Harris Eastbound	35.00	4	35.00	9
5: Walnut Southbound	25.00	3	25.00	6
Total	100.00	11	100.00	25

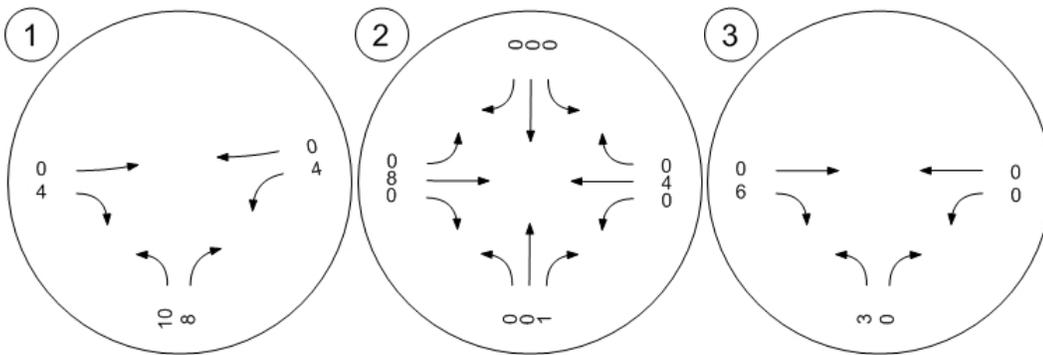
Traffic Volume - Base Volume



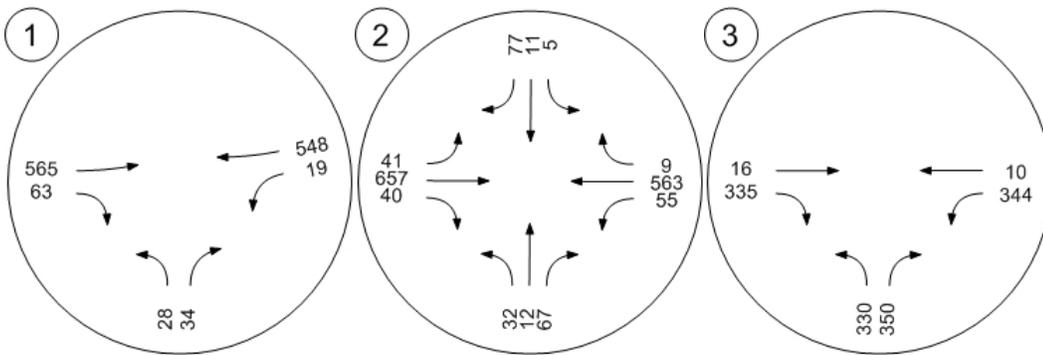
Traffic Volume - In-Process Volume



Traffic Volume - Net New Site Trips



Traffic Volume - Future Total Volume



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Scenario 7 2040 PM No Build

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Harris Street & W Street	Two-way stop	HCM 2010	NB Left	0.187	39.2	E
2	Harris Street & Dolbeer Street	Two-way stop	HCM 2010	NB Left	0.543	165.3	F
3	Walnut Street & Hemlock Street	All-way stop	HCM 2010	WB Left	1.024	46.6	E

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report
Intersection 1: Harris Street & W Street**

Control Type:	Two-way stop	Delay (sec / veh):	39.2
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.187

Name	W Street		Harris Street		Harris Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	30.00	100.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	-5.00		-8.00		8.00	
Crosswalk	Yes		No		No	

Name	W Street		Harris Street		Harris Street	
Base Volume Input [veh/h]	18	16	629	83	15	662
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	1.00	0.00	0.00	1.00
Growth Rate	1.20	1.25	1.22	1.22	1.20	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	22	20	767	101	18	808
Peak Hour Factor	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	5	207	27	5	218
Total Analysis Volume [veh/h]	24	22	828	109	19	873
Pedestrian Volume [ped/h]	12		0		0	

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

V/C, Movement V/C Ratio	0.19	0.06	0.01	0.00	0.10	0.01
d_M, Delay for Movement [s/veh]	39.20	20.49	0.00	0.00	25.01	0.00
Movement LOS	E	C	A	A	D	A
95th-Percentile Queue Length [veh]	0.92	0.92	0.00	0.00	0.31	0.00
95th-Percentile Queue Length [ft]	23.10	23.10	0.00	0.00	7.82	0.00
d_A, Approach Delay [s/veh]	30.25		0.00		0.53	
Approach LOS	D		A		A	
d_I, Intersection Delay [s/veh]	1.00					
Intersection LOS	E					

**Intersection Level Of Service Report
Intersection 2: Harris Street & Dolbeer Street**

Control Type:	Two-way stop	Delay (sec / veh):	165.3
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.543

Name	Dolbeer Street			Dolbeer Street			Harris Street			Harris Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			←↑			←↑		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	30.00	100.00	100.00	30.00	100.00	100.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			5.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Name	Dolbeer Street			Dolbeer Street			Harris Street			Harris Street		
Base Volume Input [veh/h]	14	4	44	1	13	89	45	579	32	58	580	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Growth Rate	1.21	1.21	1.23	1.20	1.23	1.22	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	17	5	54	1	16	109	55	706	39	71	708	16
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	1	15	0	4	30	15	194	11	20	195	4
Total Analysis Volume [veh/h]	19	5	59	1	18	120	60	776	43	78	778	18
Pedestrian Volume [ped/h]	3			3			4			6		

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	Yes	Yes		
Storage Area [veh]	1	1	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.54	0.12	0.15	0.02	0.42	0.31	0.22	0.01	0.00	0.29	0.01	0.00
d_M, Delay for Movement [s/veh]	165.33	145.53	71.87	101.55	106.45	31.20	21.81	0.00	0.00	23.38	0.00	0.00
Movement LOS	F	F	F	F	F	D	C	A	A	C	A	A
95th-Percentile Queue Length [veh]	3.97	3.97	3.97	3.10	3.10	3.10	0.82	0.00	0.00	1.15	0.00	0.00
95th-Percentile Queue Length [ft]	99.15	99.15	99.15	77.59	77.59	77.59	20.44	0.00	0.00	28.66	0.00	0.00
d_A, Approach Delay [s/veh]	97.70			41.45			1.49			2.09		
Approach LOS	F			E			A			A		
d_I, Intersection Delay [s/veh]	8.61											
Intersection LOS	F											

**Intersection Level Of Service Report
Intersection 3: Walnut Street & Hemlock Street**

Control Type:	All-way stop	Delay (sec / veh):	46.6
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.024

Name	Walnut Street		Hemlock Street		Hemlock Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration	↵↵		↵		↵	
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	11.00	11.00	10.00	12.00	11.00	11.00
No. of Lanes in Pocket	0	1	0	1	0	0
Pocket Length [ft]	100.00	170.00	100.00	150.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Name	Walnut Street		Hemlock Street		Hemlock Street	
Base Volume Input [veh/h]	231	256	10	375	368	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	282	312	12	458	449	5
Peak Hour Factor	0.9110	0.9110	0.9110	0.9110	0.9110	0.9110
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	77	86	3	126	123	1
Total Analysis Volume [veh/h]	310	342	13	503	493	5
Pedestrian Volume [ped/h]	7		3		2	

Capacity per Entry Lane [veh/h]	451	530	488	539	498
Degree of Utilization, x	0.69	0.65	0.03	0.93	1.02

95th-Percentile Queue Length [veh]	5.12	4.57	0.08	11.69	14.42
95th-Percentile Queue Length [ft]	128.02	114.28	2.05	292.19	360.38
Approach Delay [s/veh]	23.64		48.57		74.46
Approach LOS	C		E		F
Intersection Delay [s/veh]	46.55				
Intersection LOS	E				

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Scenario 7 2040 PM No Build

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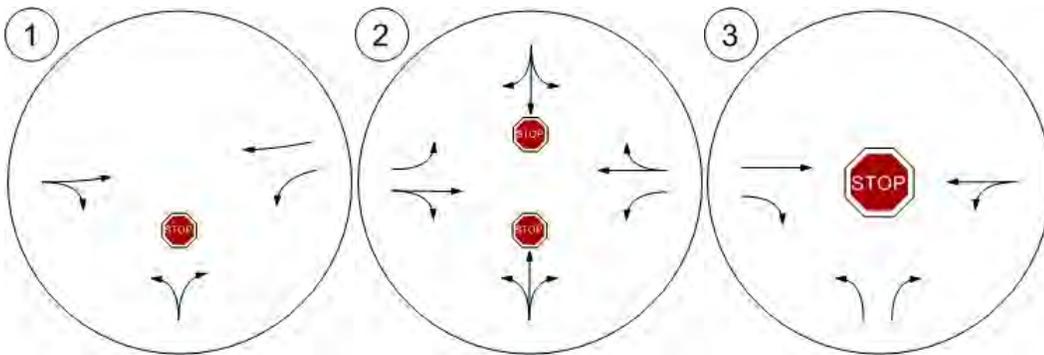
Turning Movement Volume: Summary

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
1	Harris Street & W Street	22	20	767	101	18	808	1736

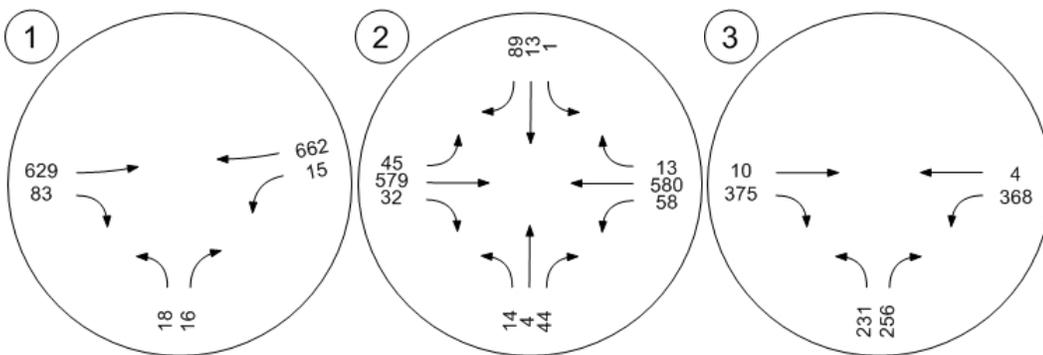
ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2	Harris Street & Dolbeer Street	17	5	54	1	16	109	55	706	39	71	708	16	1797

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
3	Walnut Street & Hemlock Street	282	312	12	458	449	5	1518

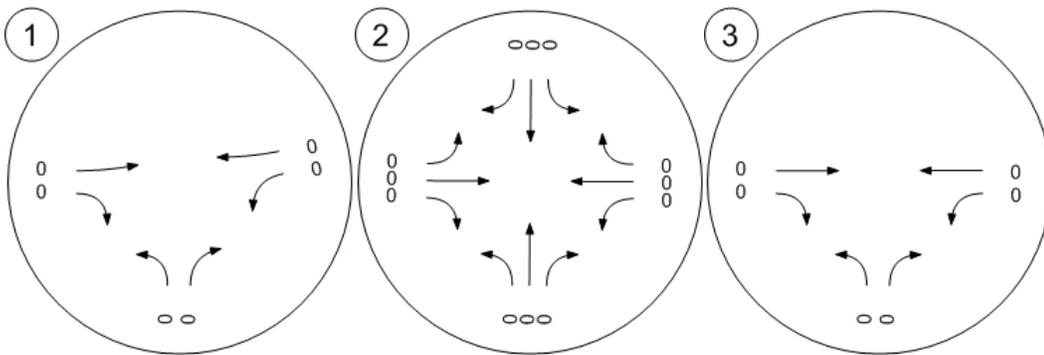
Lane Configuration and Traffic Control



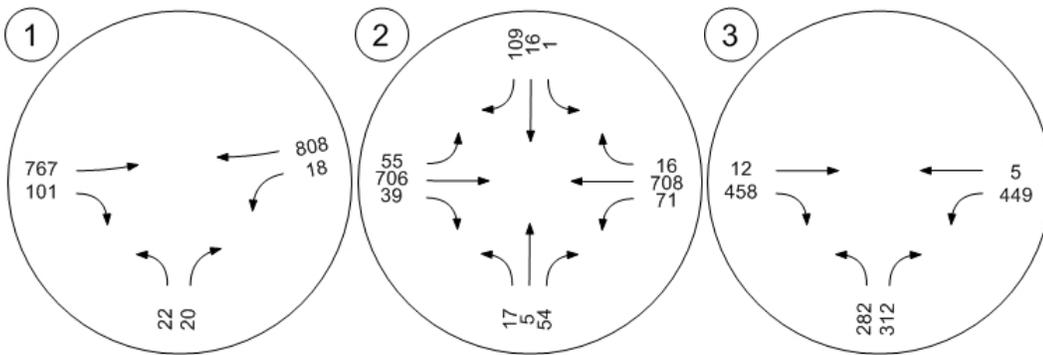
Traffic Volume - Base Volume



Traffic Volume - Net New Site Trips



Traffic Volume - Future Total Volume



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Scenario 8 2040 Pickup No Build

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Harris Street & W Street	Two-way stop	HCM 2010	NB Left	0.076	21.0	C
2	Harris Street & Dolbeer Street	Two-way stop	HCM 2010	NB Left	0.582	138.2	F
3	Walnut Street & Hemlock Street	All-way stop	HCM 2010	WB Left	0.765	24.7	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report
Intersection 1: Harris Street & W Street**

Control Type:	Two-way stop	Delay (sec / veh):	21.0
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.076

Name	W Street		Harris Street		Harris Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	30.00	100.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	-5.00		-8.00		8.00	
Crosswalk	Yes		No		No	

Name	W Street		Harris Street		Harris Street	
Base Volume Input [veh/h]	18	26	565	59	15	548
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	1.00	0.00	0.00	1.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	18	26	565	59	15	548
Peak Hour Factor	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	7	153	16	4	148
Total Analysis Volume [veh/h]	19	28	610	64	16	592
Pedestrian Volume [ped/h]	12		0		0	

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

V/C, Movement V/C Ratio	0.08	0.06	0.01	0.00	0.04	0.01
d_M, Delay for Movement [s/veh]	20.98	13.59	0.00	0.00	15.58	0.00
Movement LOS	C	B	A	A	C	A
95th-Percentile Queue Length [veh]	0.45	0.45	0.00	0.00	0.14	0.00
95th-Percentile Queue Length [ft]	11.21	11.21	0.00	0.00	3.51	0.00
d_A, Approach Delay [s/veh]	16.58		0.00		0.41	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	0.77					
Intersection LOS	C					

**Intersection Level Of Service Report
Intersection 2: Harris Street & Dolbeer Street**

Control Type:	Two-way stop	Delay (sec / veh):	138.2
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.582

Name	Dolbeer Street			Dolbeer Street			Harris Street			Harris Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			←↑			←↑		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	30.00	100.00	100.00	30.00	100.00	100.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			5.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Name	Dolbeer Street			Dolbeer Street			Harris Street			Harris Street		
Base Volume Input [veh/h]	26	10	54	4	9	63	34	532	33	45	458	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Growth Rate	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	32	12	66	5	11	77	41	649	40	55	559	9
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	3	18	1	3	21	11	178	11	15	154	2
Total Analysis Volume [veh/h]	35	13	73	5	12	85	45	713	44	60	614	10
Pedestrian Volume [ped/h]	3			3			4			6		

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	Yes	Yes		
Storage Area [veh]	1	1	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.58	0.17	0.18	0.11	0.16	0.18	0.11	0.01	0.00	0.20	0.01	0.00
d_M, Delay for Movement [s/veh]	138.17	125.73	87.03	87.28	57.06	15.95	15.06	0.00	0.00	20.31	0.00	0.00
Movement LOS	F	F	F	F	F	C	C	A	A	C	A	A
95th-Percentile Queue Length [veh]	5.63	5.63	5.63	1.08	1.08	1.08	0.37	0.00	0.00	0.75	0.00	0.00
95th-Percentile Queue Length [ft]	140.78	140.78	140.78	27.05	27.05	27.05	9.36	0.00	0.00	18.70	0.00	0.00
d_A, Approach Delay [s/veh]	105.98			24.29			0.85			1.78		
Approach LOS	F			C			A			A		
d_I, Intersection Delay [s/veh]	10.06											
Intersection LOS	F											

**Intersection Level Of Service Report
Intersection 3: Walnut Street & Hemlock Street**

Control Type:	All-way stop	Delay (sec / veh):	24.7
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.765

Name	Walnut Street		Hemlock Street		Hemlock Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration	↵↵		↵		↵	
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	11.00	11.00	10.00	12.00	11.00	11.00
No. of Lanes in Pocket	0	1	0	1	0	0
Pocket Length [ft]	100.00	170.00	100.00	150.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Name	Walnut Street		Hemlock Street		Hemlock Street	
Base Volume Input [veh/h]	268	287	13	270	282	8
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.22	1.22	1.22	1.22	1.22	1.22
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	327	350	16	329	344	10
Peak Hour Factor	0.9110	0.9110	0.9110	0.9110	0.9110	0.9110
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	90	96	4	90	94	3
Total Analysis Volume [veh/h]	359	384	18	361	378	11
Pedestrian Volume [ped/h]	7		3		2	

Capacity per Entry Lane [veh/h]	486	581	489	543	509
Degree of Utilization, x	0.74	0.66	0.04	0.67	0.77

95th-Percentile Queue Length [veh]	6.14	4.88	0.11	4.90	6.73
95th-Percentile Queue Length [ft]	153.44	122.12	2.86	122.57	168.35
Approach Delay [s/veh]	24.12		21.00		29.55
Approach LOS	C		C		D
Intersection Delay [s/veh]	24.74				
Intersection LOS	C				

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Scenario 8 2040 Pickup No Build

Report File: \...\8.pdf

11/28/2017

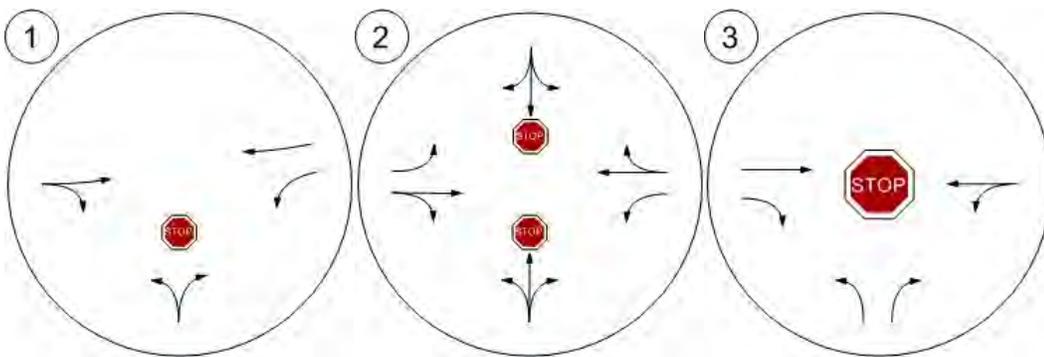
Turning Movement Volume: Summary

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
1	Harris Street & W Street	18	26	565	59	15	548	1231

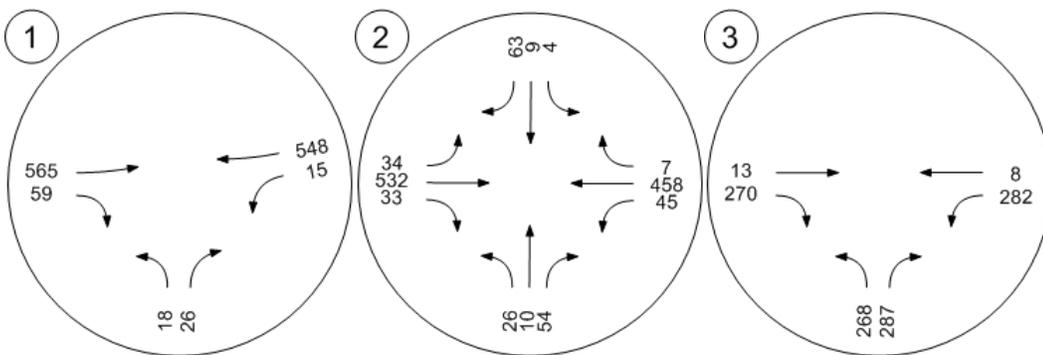
ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2	Harris Street & Dolbeer Street	32	12	66	5	11	77	41	649	40	55	559	9	1556

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
3	Walnut Street & Hemlock Street	327	350	16	329	344	10	1376

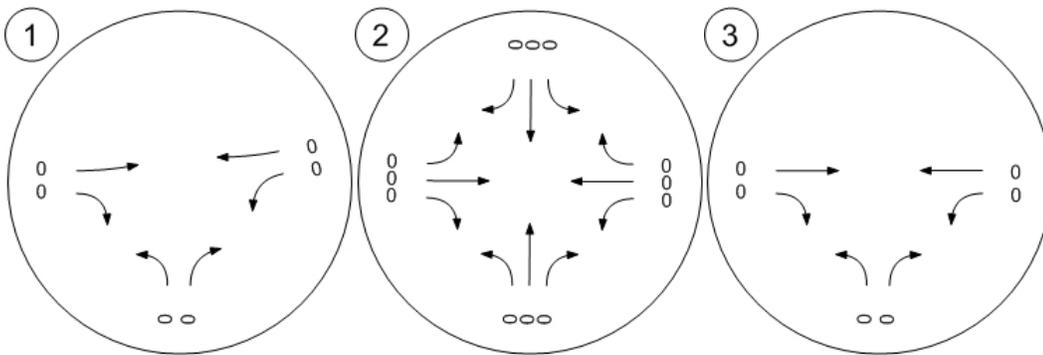
Lane Configuration and Traffic Control



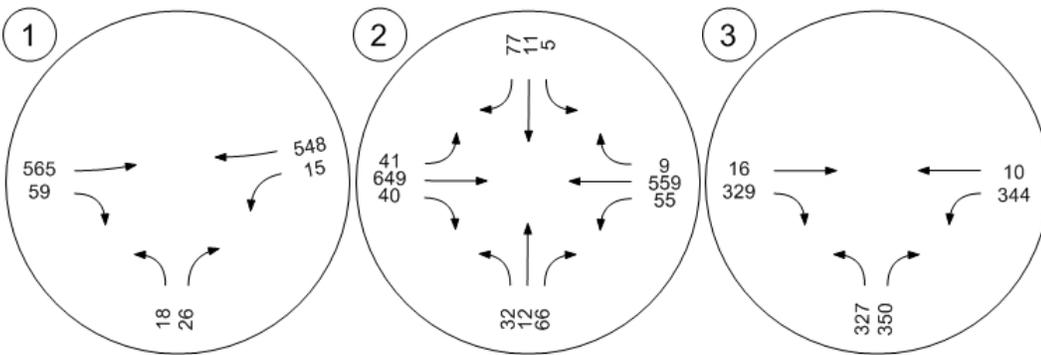
Traffic Volume - Base Volume



Traffic Volume - Net New Site Trips



Traffic Volume - Future Total Volume



E

Trip Generation Rate Calculations

PM Peak Hour Trip Generation

Average daily attendance from June/July/Aug 2014-2017

369

Average attendance increase due to new exhibit

50%

People per vehicle

3

Percentage of total trips during peak hour

15%

Growth Rate

1.0%

Year 2020 with Expansion			Year 2040 with Expansion		
Total number of Daily Visitors		570	Total number of Daily Visitors		696
Total Number of Daily Vehicle Trips		190	Total Number of Daily Vehicle Trips		232
15%	Total Number of Vehicle Trips during peak hour	29	15%	Total Number of Vehicle Trips during peak hour	35
20%	Entry (during peak hour)	6	20%	Entry (during peak hour)	7
80%	Exit (during peak hour)	23	80%	Exit (during peak hour)	28

Year 2020 without Expansion		Year 2040 without Expansion	
Total number of Daily Visitors	380	Total number of Daily Visitors	464
Total Number of Daily Vehicle Trips	127	Total Number of Daily Vehicle Trips	155
Additonal Vehicle Trips due to Expansion		Additonal Vehicle Trips due to Expansion	
	63		77

See Appendix G for Zoo attendance information

Pickup Time Peak Hour Trip Generation

Average daily attendance from June/July/Aug 2014-2017

369

Average attendance increase due to new exhibit

50%

People per vehicle

3

Percentage of total trips during peak hour

15%

Growth Rate

1.0%

Year 2020 with Expansion			Year 2040 with Expansion		
Total number of Daily Visitors		570	Total number of Daily Visitors		696
Total Number of Daily Vehicle Trips		190	Total Number of Daily Vehicle Trips		232
15%	Number of Vehicle Trips occurring during peak hour	29	15%	Number of Vehicle Trips occurring during peak hour	35
30%	Entry (during peak hour)	9	30%	Entry (during peak hour)	10
70%	Exit (during peak hour)	20	70%	Exit (during peak hour)	25

Year 2020 without Expansion		Year 2040 without Expansion	
Total number of Daily Visitors	380	Total number of Daily Visitors	464
Total Number of Daily Vehicle Trips	127	Total Number of Daily Vehicle Trips	155
Additonal Trips due to Expansion		Additonal Trips due to Expansion	
	63		77

See Appendix G for Zoo attendance information



October 2002 Parking Study/Report for Sequoia Park Zoo Modification Project


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MEMORANDUM

DRAFT

Reference:	002011.400
Date:	October 16, 2002.
To:	Larry Henderson, Regional Manager
From:	Don Raffaelli, P.E.
Subject:	Parking Study/Report for Sequoia Park and Zoo Modification Project

Introduction

The purpose of this report is to present the results of our analysis of existing parking conditions and our evaluation of parking needs for the proposed project pursuant to City Code.

The proposed project includes removing several existing buildings and replacing them with updated facilities in a different configuration, but in approximately the same location. The proposed concession stand, gift shop and Zoo staff offices will occupy one building on the north side of the breezeway park entrance. The second proposed building, to be constructed on the south side of the breezeway, will house an interpretive area and a multipurpose room (referred to as the Education Building in the Park Master Plan). This building will also include public restrooms and storage areas. In addition, several other buildings, including the petting zoo, are being relocated to different areas in the Zoo complex.

To accomplish this study, the following tasks were completed:

1. Visited with City Community Development Department staff and collected background information, including the **City of Eureka Off Street Parking Code**, and the Park/Zoo Master Plan;
2. Conducted site visits on April 19, 20 and 21, and May 4, 2002, to survey activities and on-street parking conditions in the area;
3. Collected and reviewed copies of architectural drawings of the full master plan, along with plan views and elevation views of the pavilion project;
4. Reviewed technical sources addressing traffic analysis and on-street/off-street parking as promulgated by the Institute of Transportation Engineers (ITE) and American Association of State Highway and Transportation Officials (AASHTO); and
5. Met with Sequoia Zoo staff.

Area Land Use

The parking study was limited to the area bordered on the north by Glatt Street and on the south by Madrone Avenue for both the west and east side of W Street.

Sequoia Park and Zoo lie on the west side of W Street, from Glatt Street to Madrone Avenue. The Zoo occupies approximately the northern two-thirds of the east side of the W Street frontage. The

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Park frontage on W Street covers the remaining distance from the edge of the Zoo to Madrone Avenue. On the east side W Street toward the northern portion of the study area, Washington School runs from Glatt Street to Russell Street. Although primarily a public educational facility, Washington School allows use of its open space for Little League baseball, soccer and softball. Also on the east side of W Street, from Russell Street south to Glatt, are the National Guard Armory, an adult softball field, and the City of Eureka Water Treatment and Storage Facility. Additional surrounding land use is predominantly single-family residential. All of the above land uses are long standing.

Applicable City Code

Pursuant to Eureka Municipal Code Section 155.115 through 115.141, the City of Eureka requires that "off street parking facilities shall be provided incidental to new uses and major alterations and enlargements of existing uses." Major alteration or enlargement is defined in Section 155.116(a) as "a change of use or addition which would increase the number of parking spaces required by not less than 10% of the total number required." The Code also, in Section 155.116(c), provides that, in the event that the use proposed is not specified in the Code, the Director of Planning shall determine the appropriate number of spaces to be provided. The Code does not specify whether there is any potential for credits for unused curb space that may partially accommodate additional parking associated with the proposed project.

Section 155.117(C)(8), below, addresses public buildings and grounds, and establishes procedure for determining the required number of parking spaces for the proposed project. Zoos, parks and interpretive uses are not specifically included in the Code. Additional elements of Section 155.117 address parking requirements of other public and commercial uses, and may be of use in determining the parking required for the proposed project.

Section 155.117(B)(1). *Retail sales and service.* One space for every 300 square feet of gross floor area.

Section 155.117(B)(3). *Offices and business services such as administrative and business offices, professional offices and services, securities and financial brokerage offices, professional offices and services, securities and financial brokerage services banks and savings and loan offices.* One space for every 300 square feet of gross floor area.

Section 155.117(B)(5). *Restaurants, bars, soda fountains, cafés and other establishments for the sale and consumption on the premises of food or beverages.* One space for every 200 square feet of gross floor area.

Section 155.117(C)(1). *Auditoriums, churches, private clubs, lodge halls, community centers, mortuaries, sports arenas, stadiums, theaters, auction establishments, and other places of public assembly, including church, school, and college auditoriums.* One space for each six seats, or one space for each 60 square feet of floor area usable for seating if seats are not fixed in all facilities in which simultaneous use improbable (verbatim from Code) as determined by the Director of Community Development. Where division (D) of this subchapter requires a greater number of spaces on the site of a church, school, or college auditorium, that section shall apply, and the requirements of this section shall be waived.

Section 155.117(C)(8). *Public buildings and grounds other than schools and administrative offices.* One space for each two employees, plus the number of additional spaces prescribed by the Director of Community Development.

Section 155.117(D)(1). *Schools and colleges, including public, parochial, and private elementary and high schools, kindergartens, and nursery schools.* One space for each employee, including teachers and administrators, and one space for each four students in grade 10 or above. Where subsection (C)(1) of this section requires a greater number of spaces on the site of a school or college, that division shall apply, and the requirements of this section shall be waived.

While Section 155.117(C)(8) is likely to be used in determining the required parking for the project, guidance from other Code Sections above may be useful to decision makers. The Code specifies parking requirements for non-public uses such as restaurants and retail sales. The gift shop, indoor eating area, office space, and Zoo facility classrooms in the Pavilion Project and proposed upgrade to the Zoo facilities may have similar parking needs, and may therefore benefit from use of Section 155.117(B)(1), Section 155.117(B)(5), and other Sections above.

Available On-Street Parking

Parking for Zoo visitors is generally on the street. There is no designated public off-street parking on the west side of W Street within the Zoo. Within the Park, there are several off-street spaces along the Park road. At the south end of the Park on Madrone Avenue, the City has designated 22 diagonal on-street parking spaces, including 2 handicap spaces, adjacent to the playground and picnic area. Nearby off-street parking is available at the Armory parking lot. The Armory off-street parking lot appears to be used for Zoo and Park visitors when the Armory is not in use. There are 25 on-street spaces on the west half of Russell Street.

On the west side of W Street in the project study area there is 1,390 linear feet (L. F.) of curbing. There also is approximately 340 L. F. of restricted curb (driveways and red, yellow and blue curb markings). There is, therefore, approximately 1050 L. F. of available curb parking space. On the east side, an equal or greater amount exists. Therefore, 2,100 (1,050 x 2) L. F. of total W Street on-street parking was assumed for purposes of this study. Reference manuals noted above recommend 20-22 L. F. of curb space/vehicle if vehicles are parked parallel. For this study, 22 L. F. per vehicle was used. This figure yields 95 W Street parking spaces.

In addition to the W Street curb space availability, 25 spaces on the west half of Russell and 22 spaces on the north side of Madrone Avenue are also considered to be on-street parking within the study area. Therefore, viewed conservatively, there are approximately 142 on-street parking spaces in close proximity to Sequoia Park and Zoo. Available Glatt Street parking, the remainder of spaces on the east side of Russell Street (18 spaces), and the Armory parking lot were not considered for this study.

Observed On-Street Parking Conditions

As indicated previously, project area visits were conducted on April 19, 20 and 21, and May 4, 2002. The following is a record of the activities and the on-street parking spaces occupied during the visits:

4/19/02 (1500-1600 hours):

- Little League baseball had not started but a game was to be played as evidenced by field preparation activities.
- No extraordinary activities were present on remainder of Washington School grounds.
- No adult softball games taking place.
- No Armory activity. Parking lot had two vehicles.
- No extraordinary activities at Zoo area or at playground area.

As a result of the above activities, there were 4 vehicles parked on the west side near the Zoo entrance, 3 vehicles on W Street at the playground, and 1 vehicle on the east side. A total of 8 on-street spaces were occupied on W Street.

4/20/02 (1330-1400 hours):

- Soccer games and soccer classes at Washington School.
- Girls' softball practice at Washington School.
- Little League game in progress.
- National Guard or Army Reserve meeting at Armory.
- No extraordinary activity at park playground or at the Zoo.

As a result of the above activities, there were 12 vehicles parked on the west side of W Street near the Zoo entrance and 3 vehicles parked on the east side of W Street across from the Zoo entrance. The diagonal parking on Madrone Avenue had 17 of 22 spaces full. There were 3 empty spaces on Russell Street and the Armory parking lot was full.

4/21/02 (1030-1100 hours):

- Two soccer games were ongoing at Washington School.
- Event taking place at the Armory.
- Earth Day festivities had started at the park/Zoo.

As a result of these activities, there were 12 vehicles parked near the Zoo entrance on the west side of W Street and 9 on the east side of W Street. Russel Street parking spaces and the Armory parking lot were full.

4/21/02 (1300-1400 hours):

- One soccer game was ongoing at Washington School.
- Event taking place at the Armory.
- Earth Day festivities had started at the park/Zoo.

There were 28 vehicles parked on the west side of W Street with 20 parked near the Zoo entrance. The 8 others were scattered near the playground. There were also 8 vehicles parked on the east side of W Street near the Zoo entrance. A total of 36 on-street spaces were occupied on W Street.

5/4/02 (1300 hours):

- National Guard Armory was active.
- No other activities in area.

There were 21 vehicles parked on the west side of W Street and 7 on the east side. A total of 28 on-street spaces were occupied on W Street. The Armory lot was approximately 80% full.

Current and Proposed Zoo Facility Sizes and Uses

The existing Zoo buildings proposed for relocation and/or enlargement, and their "foot print" in square feet (sf.), are: Zookeeper's office and zoo food preparation area (800 sf.), classroom and gift shop (900 sf.), and kitchen (560 sf.). The existing petting zoo building will be reduced from its present 2900 sf. to 900 sf. and its use will be converted to storage.

The proposed Pavilion project includes construction of a Zookeeper's office (300 sf.) and food preparation area (600 sf.), a gift shop (350 sf. of public area, plus 350 sf. of storage space), an indoor snack bar (650 sf. of public area, plus 400 sf. kitchen area), an educational room with offices and a craft room (1,500 sf.), an interpretive room (2,050 sf. public area, plus 800 sf. of public restrooms, janitorial equipment, and supply storage areas). The Zoo's petting area is proposed to add approximately 1,330 sf. of interior public space. The remaining areas are either exterior or non-public space.

Room	Existing Area	Proposed Area	Difference	Public Space Added
Zookeeper's Office and Food Prep Area	800 sf.	900 sf.	+100 sf.	None
Gift Shop	Included in Classroom	700 sf.	+700 sf.	350 sf.
Snack Bar	Kitchen only, outside eating area	650 sf. (storage not included)	+650 sf.	650 sf.
Educational Room	900 sf. (gift shop included)	1,500 sf.	+600 sf.	600 sf.
Interpretive Room	None	2,050 sf.	+2,050 sf.	2,050 sf.
Petting Zoo*	None	1,330 sf.	+1,330 sf.	1,330 sf.
Totals	2,260 sf.	5,750 sf.	+5,430 sf.	4,980 sf.

*The existing petting zoo barn does not include interior public space.

Total Zoo Grounds

The Zoo occupies approximately 5 acres. Approximately 3.5 acres of the Zoo is not accessible to the public except for viewing from established paths. This study assumes 1.5 acres of publicly accessible areas.

Staffing

Present Zoo staff consists of three (3) full time employees. It is proposed to increase staff by one, half-time position in fiscal year 2002/03. Total future employees are equivalent to 3.5 person years (PYs).

Services Presently Provided

The Zoo is open Tuesday through Sunday with winter hours of 10:00 a.m. to 5:00 p.m., October through April; and summer hours of 10:00 a.m. to 7:00 p.m., May through September. Except during severe weather, the Zoo is open for a maximum of 313 days, or approximately 2,500 hours per year.

Presently the Zoo facility provides a recreational, social, and educational function. Recreational and social functions are provided to visitors who come to see the various animal exhibits, or who visit for a family or community outing. Educational services within the Zoo setting are provided in a classroom setting to elementary and high school students. Day trips for school children, generally transported by school bus during school hours, are common throughout the school year. Frequently, 4 to 6 busloads of students are present (personal communication, Jack Bellinger, Zoo Superintendent). During the summer months, a one-week Natural History Museum summer camp is held in August for 8- to 10-year olds, and in July for 11- to 14-year olds. On Saturdays, June through August, at 1:00 p.m., there is a Zookeeper's talk on different animals. During the same months, story times on Sundays at noon are conducted. During July, August, and early September, special educational events for youth (ages 5 to 17) are held on over 28 weekdays. The Zoo also provides space for Zoological Society and City Zoo Advisory meetings. The present classroom is also used for Zoo staff meetings and for HSU Zoo intern program meetings.

Zoo Visitors and Trips Generated

The City of Eureka does not record the number of daily or annual Zoo visitors. Because staffing is limited and there is not a Zoo admission charge, it not possible to conduct a precise visitor count on a regular basis.

However, while not recorded for reference, informal visitor counts have been taken. Based on the most recent informal count, it was estimated that a total of 18,000 people (low) to 30,000 people (high) visited the Zoo during the 11-week period from mid-June to September 1, 2001, when the Zoo's petting area was open (personal communication, Jack Bellinger, Zoo Superintendent).

When the Zoo's petting area is closed, but the rest of the Zoo is open, it is estimated that the average daily number of visitors to the Zoo is approximately 50% of the number when the petting zoo is open.

Hence, although actual numbers of visitors are unavailable, we can estimate the Zoo's typical daily attendance rate during the heaviest visitor periods (when the Zoo's petting area is open) as follows:

- Estimated Zoo visits over 11 week period in 2001 = 18,000 to 30,000 visits
- Projected Zoo visits per week $[1/11 (18,000 \text{ to } 30,000)] = 1,636 \text{ to } 2,727 \text{ visits/week}$
- Projected Zoo visits per day $[1/6 (1,636 \text{ to } 2,727)] = 273 \text{ to } 454 \text{ visits/day}$

Assuming an average of 3.5 visitors per vehicle (or trip-end), the daily projected trip ends would be 78 to 130 trip-ends per each day the Zoo's petting area is open (273 to 454 visitors/day divided by 3.5 visitors/vehicle). The average daily trip-ends would be 104.

The City expects that the project could result in an increase in attendance by up to ten percent (10%). Hence, the daily trip-ends for the proposed project would increase by 8 to 13 trip-ends per day, or an average of ten (10).

The Institute of Transportation Engineers (ITE) "Trip Generation Manual" is a compilation of studies for a variety of land uses, including zoos. Some uses such as shopping centers, apartment complexes and a variety of stores have numerous samples. Data on zoo trip generation is limited to information collected in 1970 at the San Diego Zoo. In that study, it was determined that "trip ends" equated to 23.93 per day per zoo employee, or 114.88 per day per zoo acre. The report cautions that because only one study was conducted that the user be cautious in its use. The Eureka Zoo functions very differently from the San Diego Zoo and public vehicular trends may have changed since 1970. The following calculations use the San Diego data to estimate Eureka Zoo trip generation:

- Eureka Zoo Employees = 3.5
- ITE 23.93 trip-ends/day/employee multiplied by 3.5 employees = 83.8 trip-ends/day
- Eureka Zoo Public Access Acres = 1.5 acres
- ITE 114.88 trip-ends/day/acre multiplied by 1.5 acres = 172.3 trip-ends/day

With this method, if the project results in an increase in attendance by up to ten percent (10%), the daily trip-ends for the proposed project would increase by 8 to 17 trip-ends per day, or an average of 13.

Off-Street Parking Requirements of Proposed Project

Section 155.116 (C) of the City of Eureka's Municipal Code provides that for uses not specified in the Code, the determination of required off-street parking spaces is the responsibility of the Director of Planning. Required off-street parking spaces for zoos is not specified in the Code. Pursuant to Section 155.115 *et seq.*, "...off-street parking facilities shall be provided incidental to new uses and major alterations and enlargement of existing uses." Furthermore, the number of parking spaces "to be prescribed by the Planning Commission shall be in proportion to the need for such facilities created by the particular type of land used."

As described above, it is estimated that the proposed project will result in an increase in daily trip-ends by up to a maximum of 17 vehicular trip-ends per day. Assuming that the typical visit to the Zoo will last no more than two hours, and that the visits to the Zoo will be evenly spaced during hours that the petting zoo is open, then it is reasonable to expect that 8 to 9 additional parking spaces would easily accommodate the additional vehicular traffic.

The proposed project will create additional or improved interior and exterior space in many areas of the Zoo. Much of the additional space created will be predominantly or wholly for the use of the Zoo staff, and such space likely does not require the same increase in parking availability that

would an increase in publicly accessed space. Some of the space -- notably redesigned or added exterior space -- will not significantly increase the demand for parking at the Zoo. These spaces may be capable of handling more visitors, but they do not generate or cause more visitors.

The net increase in interior public access area is 4,980 sf. (see Table 1). Based upon Code Section 155.117(B)(1) and (3), which specifies one parking space for every 300 sf. of added interior "commercial" or "professional" area, the off-street parking required for the added public space would be 17 spaces.

However, the following table shows off-street parking requirements as strictly applied under Code Section 155.117.

Room/Facility	Public Floor Area Added	Parking Spaces	Section 115.117
Gift Shop	350 sf.	2	(B)(1)
Snack Bar	650 sf.	3	(B)(5)
Education Rm.	600 sf.	10	(C)(1)
Interpretive Rm.	2,050 sf.	21	(C)(1)
Petting Zoo	1,330 sf.	14	(C)(1)
Totals	4,980 sf.	50	

Current Parking Requirement Evaluation

There is currently no dedicated off-street parking for Zoo users. As describe previously herein, approximately 147 on-street parking spaces have been located as being reasonably available to Zoo users. With the possible exception of those times when the use of the Armory corresponds with simultaneous use of the softball field and the school's Little League and soccer fields (which generally occurs during 2 or 3 weekends in late June and early July), on-street parking has been sufficient to accommodate all the neighboring users.

During peak weekend activities when the site was visited during this study, 36 vehicles were observed parked on W Street. This represents 38% of the total curb space on W Street.

Although no studies have been conducted to determine the average length of stay at the Eureka Zoo, it is unlikely that the average stay is more than two (2) hours. Parking demand for average zoo use will not likely exceed half of daily demand at any one time. If the average number of the proposed project daily vehicle trip-end visits is 125 (the average between the low estimate of 78, and the high estimate of 172), then 63 vehicles will need parking at one time, and the W Street on-street spaces will be sufficient. This level of Zoo use would consume two-thirds of the available 95 W Street on-street spaces (or less than half of the total available 147 on-street spaces in the vicinity of the Zoo).

Parking Conclusions

Available parking in the vicinity of the Zoo is currently sufficient for the Zoo itself and other nearby facilities. This study found that 60% of on-street parking spaces were vacant and available during

the peak level of observed use of the Zoo and other facilities. However, there likely will be times during which use is higher and parking is less convenient for Zoo users, other facility users, and neighbors.

It is expected that the proposed project will lead to higher attendance to the Zoo. It is not known how great the increase will be, or the seasons and times of day the increase will occur. Because it is likely that the project will cause a 10% or greater increase in Zoo parking, City Code Section 155.117(C)(8): *Public buildings and grounds other than schools and administrative offices*, should be followed. The Section calls for one space for each two employees, plus the number of additional spaces prescribed by the Director of Community Development.

Using a strict application of the Code requirements, we calculated a maximum additional off-street parking space requirement of 50 (See Table 2). However, we believe that this number is not reasonable and is too high.

A more "real" number would be 9. As described above, it is estimated that the proposed project will result in an increase in daily trip-ends by up to a maximum of 17 vehicular trip-ends per day. Assuming that the typical visit to the Zoo will last no more than two hours, and that the visits to the Zoo will be evenly spaced during hours that the petting zoo is open, then it is reasonable to expect that 8 to 9 additional parking spaces would easily accommodate the additional vehicular traffic.

Nine additional off-street parking spaces will help to alleviate peak hour conflicts with nearby uses by providing dedicated Zoo spaces. This level of additional off street parking is also more feasible with the proposed Zoo design.

The need for additional required parking may also be reduced somewhat because significantly more space in the Zoo's new Pavilion and petting area is dedicated for employee workspace, storage, and restrooms for both the public and employees. Although the increased non-public access space could increase the number of visitors at the Zoo, non-public space does not merit the level of increased parking that public space does.

Similarly, while the proposed kitchen and indoor-eating area represent a significant increase in space over the existing outside-eating area, a proportional increase in visitor use is not expected.

The redesigned outdoor space itself should not generate significant additional visitors. Although the proposed Zoo construction will likely attract a greater number of visitors, we expect the increase to be a function of the increased space and amenities of the interior spaces created. Proposed exterior improvements generally either lead to the proposed new and upgraded facilities, are intended to compliment existing facilities, or do not add significant area to attract additional visitors. The proposed exterior space was, therefore, not separately analyzed, and likely will not require additional parking space.

While we included the Zoo's petting area interior area in the calculated increased public space, the space also may not necessarily translate to additional parking needs proportional to the space. This is due to the fact that many activities at the facility will be by groups, including bussed students traveling to the facility together.

In determining the number of additional off-street parking spaces that should be required, the following points should be considered:

- Current parking is adequate for all but worst-case scenario Zoo and nearby use.
- Current parking levels may be adequate for the proposed use, but at some times will be less convenient for Zoo visitors or users of nearby facilities.
- The proposed project will likely increase Zoo attendance. The amount of increase is not known, but is expected to be up to 10%.
- Zoo staffing will not increase significantly as a result of the project.
- Approximately 5,000 sf. of public space will be added by the proposed project. Public areas in the Zoo's petting area, Education Room, Interpretive Center, and Gift Shop/Café represent most of the additional space.
- Zoo visitors are likely to make trips as family or school groups. Parking needed for groups is significantly less than for 1 to 2 passenger-trips common to other commercial destinations.
- If the strict requirement for 50 additional off-street parking spaces is imposed on the project, the project will not be feasible, considering Zoo space limitations.
- Nine additional off-street parking spaces will alleviate some peak hour conflict and are more feasible given the Zoo configurations.



G

Sequoia Zoo Attendance Data

Average Daily Attendance

	2012	2013	2014	2015	2016	2017	AVG
June	257	287	260	383	398	324	318
July	292	317	335	421	418	391	362
Aug	248	258	472	403	316	301	333
AVG	266	287	356	402	377	339	338

2017 Hourly Transactions

10:00	12459	15%	2:00	13178	16%
11:00	14430	18%	3:00	9938	12%
12:00	14428	18%	4:00	3487	4%
1:00	13846	17%			

Total: 81766

2017 Summer Attendance by Day of the Week

June

Tuesday	Vednesda	Thursday	Friday	Saturday	Sunday	Monday
		258	412	398	273	362
278	300	210	374	377	450	285
383	341	344	275	377	353	262
251	400	297	361	292	369	290
308	318	339	291			
1220	1359	1448	1713	1444	1445	1199
305	340	290	343	361	361	300
5	4	7	3	1	1	6

July

Tuesday	Vednesda	Thursday	Friday	Saturday	Sunday	Monday
				374	490	439
185	414	346	381	481	351	243
383	469	326	396	391	376	238
261	401	312	434	481	406	397
377	360	290	340	1076	390	314
1206	1644	1274	1551	2803	2013	1631
302	411	319	388	561	403	326
7	2	6	4	1	3	5

August

Tuesday	Vednesda	Thursday	Friday	Saturday	Sunday	Monday
287	506	382	378	287	378	279
540	396	279	417	358	352	261
273	354	285	325	405	375	154
237	220	201	217	310	267	211
119	139	151				
1456	1615	1298	1337	1360	1372	905
291	323	260	334	340	343	226
5	4	6	3	2	1	7

H

City of Eureka Comments November 3, 2017



MEMORANDUM

To: Cody Long, SHN
From: Scott Ellsmore, Traffic Project Manager
Through: Jesse Willor, Deputy Director of Public Works
Subject: Comments on the Sequoia Park Zoo Expansion Traffic Impact Study
Date: November 3, 2017

The Traffic Engineering Division has reviewed the Traffic Impact Study for the proposed Sequoia Park Zoo Expansion and has the following comments:

- 1.1- "...minor impacts are expected..." If there are expected impacts they should be included
- 1.2/2.0- A more thorough explanation of the existing area should be included (include school, park, description of zoo, neighborhood...)
- Table 1- Hemlock is Major Collector to the west and Minor Arterial to the east, W Street is a local street between Harris and Hodgson
- 2.1 Paragraph 1- Last sentence should say *Westbound* vehicles on Harris...
- 2.1 Ped/Bike Cond, paragraph 2, sentence 2- This is the only *marked* crossing on Harris...
- 2.1 Ped/Bike Cond, paragraph 2, sentence 4- include how this intersection has push button in-pavement lights
- 2.1 Ped/Bike Cond, paragraph 2 throughout- Consider replacing crossing with crosswalk, it might make this paragraph more clear
- 2.1 Ped/Bike Cond, paragraph 3- Consider rewording. Harris is a class II facility from Broadway to S, and Class III from S to Harrison. Neither W or Dolbeer are classified as Class III per the regional plan, both are proposed
- 2.1 Paragraph 4- Walnut *Drive*
- 2.2 Collision History- Consider including how these intersection rate versus expected collision rates for similar sized intersections (California Expected Collision Rates)
- 3.2 Site Traffic Forecasting- Include Zoo data, hours of operation, days of week and related attendance data, attendance distribution throughout the day if available and projected attendance with expansion.
- 3.2 Site Traffic Forecasting- Trip distribution was created in a map format and should be explained or included via a table. See final note below also, Harris and S and Harrison and Harrison are the likely distribution points to the north

Engineering

Construction
 Development
 Transportation

Field Operations

Water Distribution
 Wastewater Collection
 Equipment Operations

Building

Construction Regulation
 Code Enforcement

Utility Operations

Water and Wastewater Treatment
 Stormwater
 Pretreatment

- 3.2 Paragraph 3- 346 daily trips or people attending?
- 3.2 Paragraph 3- Explain how the 346 number was determined. If averaged as appendix E shows, break out per year
- 3.2 Paragraph 3- Watershed heroes 2004 or 2014
- 3.2 Paragraph 3- Provide reference for how 3 people per vehicle was determined
- 3.2 Paragraph 3- A table that shows current trips, current trips with growth factor and projected trips with expansion would be helpful. The additional trips created needs to be specified
- 4.0 Parking Analysis- A clearer explanation of current parking being on street or adjacent and no dedicated off street zoo parking should be included
- 4.0- Madrone Avenue has 22 *angled* parking spaces
- 4.0- Is the armory parking available to zoo patrons?
- 4.0- Should Glatt St be included in this?
- 4.0- Worth noting the parking demand times for each of the potential users, each likely occupy their own niche
- 4.0 Paragraph 5- Additional parking spaces are only 7 due to the removal of existing parallel parking, update totals throughout
- 4.0 Observed parking demands- Sentence 2- *vehicles were...*
- 4.0 Observed parking demands- Sentence 3- remove “three parked at residences” unless this was confirmed.
- 4.0 Observed parking demands- final paragraph- Include totals for proposed zoo parking facilities
- 5.0 Conclusions- Proposed development does not generate 176, 176 is the total with expansion. This section should include trips generated current, 2020 with growth rate, 2020 with expansion and the same for 2040
- 5.0 Bullet point 5- Consider replacing “the build 2020” with the proposed development in 2020
- 5.0 Bullet point 7- Clarify if this is 2020 or 2040
- Figure 3- Site Plan- Consider highlighting the proposed improvements/additions
- Figure 5/General Comment- Harris and S along with Harris and Harrison are the two primary entrance and exits from the north end of the project area for traffic. Harris and S was included in the previous study and both should be included in this study. City has current turning movement counts for both intersections that can be used.

We agree with the findings that there will be a less than significant impact as a result of the proposed project. Let me know if there is anything else we can do to help with the completion of the project. Thank you for allowing us to provide comment.

Sincerely,



Scott Ellsmore
Traffic Project Manager
Public Works – Engineering

Appendix E

Utility Letter



PUBLIC WORKS DEPARTMENT

531 K Street • Eureka, California 95501-1165 • (707) 441-4203

November 29, 2017

RE: Sequoia Park Zoo Master Plan Development

To Whom It May Concern:

The proposed project, the Master Plan Expansion for Sequoia Park Zoo, has been assessed for its impacts to public utilities managed by the City of Eureka. I have made the determination that the project, once implemented will pose no impact to City owned utilities and associated infrastructure.

The Wastewater Treatment Facility for the City of Eureka shall not be impacted by the proposed project as there is a limited increase in the number of Drainage Fixture Units (DFUs) upon the completion of the project. There will be no regional level impacts due to increased zoo attendance and no growth inducing impacts as a result of the project.

The City's water supply, reservoir, and water distribution infrastructure will not be impacted due to the project. Water supply that will serve the developed project will connect to the City water main at W Street, and will be supplied via existing zoo infrastructure.

On site stormwater management will be a requirement of the project and there will be no impact to the City's drainage infrastructure as a result of the project.

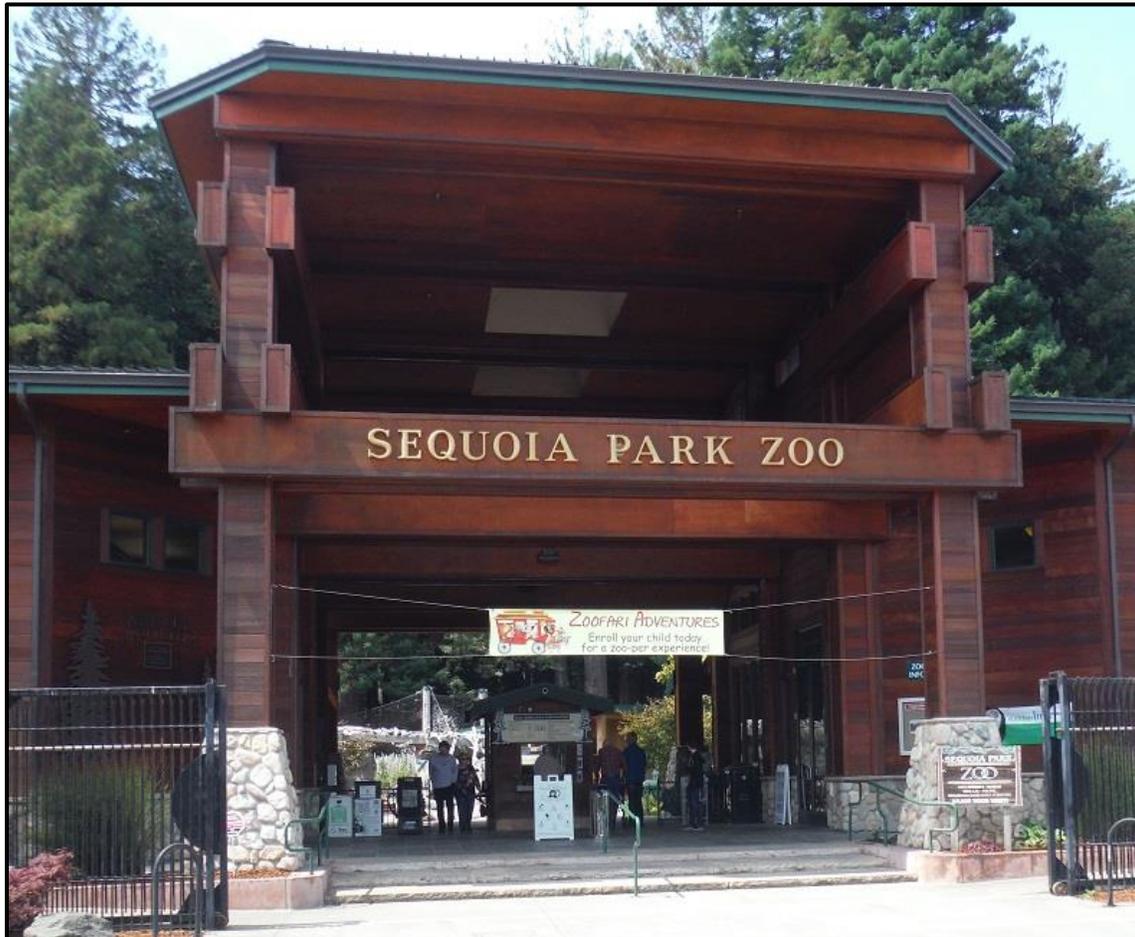
Sincerely,

Brian Gerving
Public Works Director

Appendix F

Cultural Resources Report

**A Cultural Resources Investigation for the Sequoia Park Zoo Master Plan,
Located in Eureka, Humboldt County, California**



Prepared by:
James Roscoe, M.A., Melinda Salisbury B.A.
Historic Research by Ray Hillman
Roscoe and Associates - Cultural Resources Consultants
3781 Brookwood Drive
Bayside, CA 95524

Prepared for:
Miles Slatterly
City of Eureka Parks and Recreation Department
1011 Waterfront Drive
Eureka, CA 95501

October 2017

Sequoia Park Zoo Expansion and Renovation



CEQA

Mitigation Monitoring and Reporting Program

CITY OF EUREKA

This Mitigation Monitoring and Reporting Program (MMRP) has been prepared for the project described below in conformance with Section 21081.6 of the California Environmental Quality Act (CEQA) and Section 15097 of the CEQA Guidelines.

SCH#: 2017122051

PROJECT TITLE: Sequoia Park Zoo Renovation and Expansion

PROJECT APPLICANT: City of Eureka

CASE NO: ED-17-0015

PROJECT LOCATION: Southeastern Eureka between S and W Streets; between Glatt Street and Madrone Avenue. APN: 013-081-001.

ZONING & GENERAL PLAN LAND USE DESIGNATION: Zoning: Public (P). General Plan Land Use Designation: Parks and Recreation (PR).

PROJECT DESCRIPTION: As designated in the 2016 Sequoia Park Zoo Master Plan, the City of Eureka proposes to rearrange and add exhibits within the existing footprint of the Zoo and expand the footprint of the Zoo to accommodate new exhibits. The renovation and expansion of the Sequoia Park Zoo will significantly enhance the habitat and wildlife conservation components of the zoo and provide innovative, one-of-a-kind educational and interpretive opportunities.

LEAD AGENCY: City of Eureka, 531 "K" Street, Eureka, CA 95501-1165

CONTACT PERSON: Rob Holmlund, AICP, Development Services Director; *phone:* (707) 441-4160; *fax:* (707) 441-4202; *e-mail:* rholmlund@ci.eureka.ca.gov

INTRODUCTION: On January 29, 2018, a Mitigated Negative Declaration for the Sequoia Park Zoo Renovation and Expansion was adopted and a conditional use permit for the project was approved by the Planning Commission. Mitigation measures were made a condition of project approval. The purpose of this MMRP is to ensure that the mitigation measures adopted in connection with project approval are effectively implemented. This MMRP establishes the framework that the City of Eureka and others will use to implement the adopted mitigation measures and the monitoring and/or reporting of such implementation.

CEQA provides that the City of Eureka may choose whether the MMRP will monitor mitigation, report on mitigation, or both. "Reporting" generally consists of a written compliance review that is presented to the decision-making body or authorized staff person. A report may be required at various stages during project implementation or upon completion of the mitigation measure. "Monitoring" is generally an ongoing or periodic process of project oversight. There is often no clear distinction between monitoring and reporting and the program best suited to ensuring compliance in any given instance will usually involve elements of both. The choice of program may be guided by the following:

- (1) Reporting is suited to projects which have readily measurable or quantitative mitigation measures or which already involve regular review. For example, a report may be required upon issuance of final occupancy to a project whose mitigation measures were confirmed by building inspection.
- (2) Monitoring is suited to projects with complex mitigation measures, such as wetlands restoration or archeological protection, which may exceed the expertise of the City of Eureka to oversee; are expected to be implemented over a period of time; or, require careful implementation to assure compliance.
- (3) Reporting and monitoring are suited to all but the most simple projects. Monitoring ensures that project compliance is checked on a regular basis during and, if necessary, after implementation. Reporting ensures that the City of Eureka is informed of compliance with mitigation requirements.

ENFORCEMENT: In accordance with CEQA, the primary responsibility for making a determination with respect to potential environmental effects rests with the City of Eureka rather than the monitor or preparer of the CEQA documents. As such, the City of Eureka is identified as the primary enforcement agency for this MMRP.

PROGRAM MODIFICATION: After adoption of this MMRP, minor changes to this MMRP are permitted but can only be made by the City of Eureka. The Director of Development Services, after consultation with affected Departments or Agencies, may make minor modifications to this MMRP. If, for any reason, any mitigation measure specified in this MMRP cannot be implemented due to factors beyond the control of the owner/developer and/or the City of Eureka, at a noticed public hearing before the City Council of the City of Eureka, substitution of another mitigation measure may be approved. In no case shall deviations from this MMRP be permitted unless this MMRP continues to satisfy the requirements of Section 21081.6 of CEQA, as determined by the City of Eureka.

SUMMARY OF POTENTIAL PROJECT IMPACTS: Below is a table that summarizes the impact potential for each category of impact as identified and analyzed in the Initial Study.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
I. Aesthetics		✓		
II. Agricultural Resources				✓
III. Air Quality			✓	
IV. Biological		✓		
V. Cultural		✓		
VI. Geology and Soils		✓		
VII. Greenhouse Gas Emissions			✓	
VIII. Hazards and Hazardous Materials			✓	
IX. Hydrology and Water Quality		✓		
X. Land Use and Planning				✓
XI. Mineral Resources				✓
XII. Noise		✓		
XIII. Population and Housing				✓
XIV. Public Services			✓	
XV. Recreation			✓	
XVI. Transportation and Traffic			✓	
XVII. Tribal Cultural Resources		✓		
XVIII. Utilities and Service Systems			✓	
XIX. Mandatory Findings of Significance		✓		

MMRP IMPLEMENTATION TABLE: To assure that this MMRP is effectively implemented the table on the following pages establishes the framework that the City of Eureka and others will use to implement the adopted mitigation measures and the monitoring and/or reporting of such implementation. The following abbreviations may be used in the MMRP table:

AQMD	Air Quality Management District
BD	City of Eureka Building Department
BMP	Best Management Practice(s)
CCC	California Coastal Commission
CCR	California Code of Regulations
CDFW	California Department of Fish & Wildlife
CEQA	California Environmental Quality Act
CGC	California Government Code
City.....	City of Eureka
DSD.....	Development Services Department
ENG.....	City of Eureka Engineering Department
ESHA	Environmentally Sensitive Habitat Area
MND	Mitigated Negative Declaration
PRC	Public Resources Code
PW.....	City of Eureka Public Works Department
RWQCB.....	Regional Water Quality Control Board
THPOs	Tribal Historic Preservation Officers
USACE	US Army Corps of Engineers

Mitigation Measure	Responsible Agency and/or Party	Action Required	Monitoring Phase/ Reporting Requirements	Enforcement	Compliance Verification	Notes/ Comments
<p>Aesthetics Mitigation Measure I-1: The surface of canopy walk pipes/posts shall be camouflaged with texture and color to match the forest surroundings, and artificial branches may be attached. The structural elements of the walkways (such as cables, fasteners, and planking) shall be painted to reduce their reflective qualities and to blend with the forest colors. If guy-wires are required to balance the horizontal loads from the cable-suspended walkways, the wires shall be minimized in length, hidden from view, and camouflaged, to the extent possible.</p>	<ul style="list-style-type: none"> ▶ City ▶ Contractor 	<p>This measure and language facilitating and insuring compliance shall be incorporated into design and contract documents prepared by the City for the project.</p>	<p>Prior to project approval and during project implementation and evaluated annually for maintenance.</p>	<p>BD shall, on the basis of their observations or complaints to the City, be empowered to direct the contractor to undertake additional measures in the field if it appears that the contractor is not following this measure.</p>		
<p>Aesthetics Mitigation Measure I-2: To avoid adverse impacts, new sources of light, including any outside night lighting associated with construction, will be designed to protect wildlife and nighttime views, including views of the night sky. This design goal will be satisfied using a variety of means as applicable, including fixture types, cut off angles, shields, lamp arm extensions, and pole heights. Specific design preferences include not directing light upward or to other properties, avoiding brightly illuminated vertical surfaces where feasible, such as walls and lamp poles, and not directing lighting toward ESHA. The Recommended Practices (RPs) of the Illuminating Engineering Society of North America (IES) should be consulted for lighting levels and quality of light.</p>	<ul style="list-style-type: none"> ▶ City ▶ Contractor ▶ BD 	<p>This measure and language facilitating and insuring compliance shall be incorporated into design and contract documents prepared by the City for the project.</p>	<p>Prior to project approval and during project implementation.</p>	<p>BD shall, on the basis of their observations or complaints to the City regarding lighting, be empowered to direct the contractor to undertake additional measures in the field if it appears that the contractor is not following this measure.</p>		
<p>Biological Resources Mitigation Measure IV-1: Amphibian Survey. If possible, restoration activities shall take place between July 15 and October 31, to minimize potential impacts to amphibian species noted in Section IV-a. If work must be completed during that time, a qualified biologist shall conduct surveys of all disturbance areas within the 50 feet of wetlands to verify absence of sensitive</p>	<ul style="list-style-type: none"> ▶ City ▶ Contractor 	<p>This measure and language facilitating and insuring compliance shall be incorporated into design and contract documents prepared by</p>	<p>Prior to rehabilitation within 50-foot wetland buffer zone.</p>	<p>A qualified biological monitor shall conduct field observations during the construction process to assure the appropriate implementation of this measure, and shall be</p>		

Mitigation Measure	Responsible Agency and/or Party	Action Required	Monitoring Phase/ Reporting Requirements	Enforcement	Compliance Verification	Notes/ Comments
<p>amphibian species. Surveys shall be conducted not more than two weeks prior to start of vegetation removal. If sensitive amphibian species are found during the survey, an appropriate buffer area shall be established until the dates of seasonal avoidance are reached (July 15 to October 31).</p>		<p>the City for the project.</p>		<p>empowered to direct the contractor to temporarily suspend construction activities if evidence is presented to either department that the contractor is not in compliance with this measure, pending the development of specific actions to regain compliance.</p>		
<p>Biological Resources Mitigation Measure IV-2: Special Status Plant Avoidance. Areas of special-status plants shall be noted and marked to ensure they are not trampled during construction. If any portion of the community is harmed, it shall be restored to a level sufficient to ensure no net loss of the target species five years after the completion of construction. If translocation and/or re-planting or re-seeding into appropriate habitat in the immediate project area is required for conservation it will be done by hand by a qualified Biologist. Additionally, English Ivy shall be removed around sensitive-species to assist in improving those communities.</p>	<ul style="list-style-type: none"> ▶ City ▶ Contractor 	<p>This measure and language facilitating and insuring compliance shall be incorporated into design and contract documents prepared by the City for the project. Active five year biological observations if translocation/re-planting is necessary.</p>	<p>Prior to project implementation, duration of project construction, and five years post construction.</p>	<p>A qualified biological monitor shall conduct field observations during the construction process to assure the appropriate implementation of this measure, and shall be empowered to direct the contractor to temporarily suspend construction activities if evidence is presented to either department that the contractor is not in compliance with this measure, pending the development of specific actions to regain compliance.</p>		

Mitigation Measure	Responsible Agency and/or Party	Action Required	Monitoring Phase/ Reporting Requirements	Enforcement	Compliance Verification	Notes/ Comments
<p>Biological Resources Mitigation Measure IV-3: Snag Habitat. Although no nesting birds were observed in the study area, and a minimal number of trees are slated for removal, the potential to impact on special status bird species does exist. To minimize that potential future impact, the lowest 20-25 feet of trees slated for removal will be retained to create snag habitat. If the lower 20-25 feet is still deemed a hazard to humans or animals, the entire tree will be removed.</p>	<ul style="list-style-type: none"> ▶ City ▶ Contractor 	<p>This measure and language facilitating and insuring compliance shall be incorporated into design and contract documents prepared by the City for the project.</p>	<p>Prior to project approval and during project implementation.</p>	<p>A qualified arborist monitor shall conduct field observations during the construction process to assure the appropriate implementation of this measure, and shall be empowered to direct the contractor to temporarily suspend construction activities if evidence is presented to either department that the contractor is not in compliance with this measure, pending the development of specific actions to regain compliance.</p>		
<p>Biological Resources Mitigation Measure IV-4: Pre-Construction Nesting Surveys. If possible, vegetation clearing activities would take place between August 16 and March 13, outside of the active nesting season for migratory bird species (i.e., March 15 to August 1). If work must be completed during the nesting season, a qualified biologist would conduct preconstruction surveys of all ground disturbance areas and all trees adjacent to the Canopy Walk to verify absence of nesting migratory birds in the project area prior to vegetation removal and the start of construction. These surveys would be conducted within two weeks prior to start of vegetation removal or any construction activities. If nesting migratory birds are found in the project construction area during the</p>	<ul style="list-style-type: none"> ▶ City ▶ Contractor 	<p>This measure and language facilitating and insuring compliance shall be incorporated into design and contract documents prepared by the City for the project.</p>	<p>Prior to and during construction.</p>	<p>A qualified biological monitor shall conduct field observations during the construction process to assure the appropriate implementation of this measure, and shall be empowered to direct the contractor to temporarily suspend construction activities if evidence is presented to either department that the</p>		

Mitigation Measure	Responsible Agency and/or Party	Action Required	Monitoring Phase/ Reporting Requirements	Enforcement	Compliance Verification	Notes/ Comments
<p>preconstruction surveys, they would be avoided with an appropriate buffer area until the young birds have fledged. Buffers would be 250-feet for raptors, 100-feet for threatened and endangered species, 50-feet for other special-status bird species; however, buffers may be modified after consultation with, and agreement by CDFW. If state listed California Endangered Species Act (CESA), federally listed Endangered Species Act (ESA), or raptors are found outside of the construction area but near the construction area, appropriate buffers will be implemented. If non-listed state CESA, non-listed federal ESA, including state species of special concern are found near, but outside of the construction area, no buffers will be implemented.</p>				<p>contractor is not in compliance with this measure, pending the development of specific actions to regain compliance.</p>		
<p>Biological Resources Mitigation Measure IV-5: Coastal Bramble Replacement. Coastal Brambles removed by the Zoo expansion project will be replaced 1:1. Where primitive trails are eliminated, <i>Rubus</i> species will be transplanted from the expansion area to those areas. Transplanting <i>Rubus</i> species into the former trail alignment around the base of the old-growth trees to speed revegetation and create coastal bramble communities adjacent to the expansion area. Areas will be monitored to ensure vegetation survival and success of coastal bramble habitat creation, and trail removal revegetation. If the transplanted <i>Rubus</i> species does not survive, they will be replaced with the same species.</p>	<ul style="list-style-type: none"> ▶ City ▶ Contractor 	<p>This measure and language facilitating and insuring compliance shall be incorporated into design and contract documents prepared by the City for the project. Active five-year biological observations.</p>	<p>Throughout the duration of project construction and five years post construction.</p>	<p>A qualified biological monitor shall conduct field observations during the construction process to assure the appropriate implementation of this measure, and shall be empowered to direct the contractor to temporarily suspend construction activities if evidence is presented to either department that the contractor is not in compliance with this measure, pending the development of specific actions to regain compliance.</p>		

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<p>Biological Resources Mitigation Measure IV-6: The foundations for the pipe supports for the ADA segment of the Canopy Walk shall be strategically located to minimize placement within the dripline and to avoid damage to the structural roots. Poles placement at a distance 3 times the trunk diameter away from the base of old growth trees shall be prioritized. If large structural roots are encountered, an attempt shall be made to realign or relocate the hole to avoid the root.</p>	<ul style="list-style-type: none"> ▶ City ▶ Contractor 	<p>This measure and language facilitating and insuring compliance shall be incorporated into design and contract documents prepared by the City for the project.</p>	<p>Prior to project approval and during project implementation.</p>	<p>A qualified arborist monitor shall conduct field observations during the construction process to assure the appropriate implementation of this measure, and shall be empowered to direct the contractor to temporarily suspend construction activities if evidence is presented to either department that the contractor is not in compliance with this measure, pending the development of specific actions to regain compliance.</p>		
<p>Biological Resources Mitigation Measure IV-7: To mitigate the potential impact of the horizontal loads, the suspended walkways shall be designed to be as light as possible. To reduce the horizontal loads, the walkways shall be as short and as narrow (2' to 3'-wide) as possible and the route shall be a one-way loop to minimize the number of people on the walkway at any one time. The trees shall be evaluated by engineers and arborists pre-construction to determine if the imposed loads will trigger a significant response. If deemed necessary by the arborists and/or engineers, guy wires shall be used to balance the horizontal loads. If guy wires are required, they shall be attached to the walkways and affixed to the ground with helical anchors. The suspended cables and guy</p>	<ul style="list-style-type: none"> ▶ City ▶ Contractor 	<p>This measure and language facilitating and insuring compliance shall be incorporated into design and contract documents prepared by the City for the project.</p>	<p>Prior to project approval and during project implementation.</p>	<p>A qualified arborist monitor shall conduct field observations during the construction process to assure the appropriate implementation of this measure, and shall be empowered to direct the contractor to temporarily suspend construction activities if evidence is presented to either department that the</p>		

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wires shall have slack and shall not rigidly restrain the trees.				contractor is not in compliance with this measure, pending the development of specific actions to regain compliance.		
<p>Biological Resources Mitigation Measure IV-8: Bark Erosion. Netting or a rigid barrier will be installed around the inner ring of the Canopy Walk platforms to prevent damage but still allow the public to see the trunk.</p>	<ul style="list-style-type: none"> ▶ City ▶ Contractor 	<p>This measure and language facilitating and insuring compliance shall be incorporated into design and contract documents prepared by the City for the project.</p>	<p>Prior to project approval, during project implementation and evaluated annually for maintenance or required adjustments.</p>	<p>A qualified biological monitor shall conduct field observations during the construction process to assure the appropriate implementation of this measure, and shall be empowered to direct the contractor to temporarily suspend construction activities if evidence is presented to either department that the contractor is not in compliance with this measure, pending the development of specific actions to regain compliance.</p>		
<p>Biological Resources Mitigation Measure IV-9: a. A maximum number of trees shall be retained within the Zoo expansion area. b. Trails shall be realigned/relocated further from the base of old growth trees, where possible.</p>	<ul style="list-style-type: none"> ▶ City ▶ Contractor 	<p>This measure and language facilitating and insuring compliance shall be incorporated into design and contract</p>	<p>Throughout the duration of project construction and annually for five years.</p>	<p>A qualified biological monitor shall conduct field observations during the construction process to assure the appropriate implementation of this</p>		

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<p>c. Primitive (undesigned) trails shall be eliminated through native planting and mulching. d. Split rail fences and informative signs shall be installed to deter additional primitive trail creation and use. e. Invasive species shall be removed in areas near the Canopy Walk. f. English Ivy shall be removed from redwoods. g. Native redwood forest plants shall be planted to increase habitat and scenic resources.</p>		<p>documents prepared by the City for the project. Active five-year biological observations.</p>		<p>measure, and shall be empowered to direct the contractor to temporarily suspend construction activities if evidence is presented to either department that the contractor is not in compliance with this measure, pending the development of specific actions to regain compliance.</p>		
<p>Mitigation Measure V-1: Resource Discovery. If potential archaeological or paleontological resources are encountered during project subsurface construction activities or geotechnical testing, all work within 50 feet of the find shall be stopped, and a qualified archaeologist funded by the City of Eureka and approved by the City of Eureka shall be contacted to evaluate the find, determine its significance, and identify any required mitigation. The applicant shall be responsible for implementing the mitigation prior to construction activities being re-started at the discovery site.</p>	<p>► City ► Contractor</p>	<p>This measure and language facilitating and insuring compliance shall be incorporated into design and contract documents prepared by the City for the project. If archaeological or paleontological resources are discovered: (1) hiring of a qualified archaeologist by the applicant acceptable to the City; and (2) implementation of any mitigation identified by the archaeologist prior</p>	<p>Throughout the duration of geotechnical testing and project construction.</p>	<p>Cultural monitors shall be retained by the City to observe all ground disturbing activities. Said monitors shall have the authority to suspend all construction as described within the subject mitigation measure.</p>		

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		to resumption of construction activities at the location.				
<p>Mitigation Measure V-2: Human Remains. In accordance with California Health and Safety Code Section 7050.5 and California Public Resources Code Sections 5097.94 and 5097.98, if human remains are uncovered during project construction activities, work within 50 feet of the remains shall be suspended immediately, and the City of Eureka Development Services Department (DSD) and Humboldt County Coroner shall be immediately notified. If the remains are determined by the Coroner to be Native American in origin, the Native American Heritage Commission (NAHC) shall be notified within 24 hours, and the guidelines of the NAHC shall be adhered to in the treatment and disposition of the remains.</p>	<ul style="list-style-type: none"> ▶ City ▶ Contractor 	<p>This measure and language facilitating and insuring compliance shall be incorporated into design and contract documents prepared by the City for the project</p>	<p>Throughout the duration of geotechnical testing and project construction.</p>	<p>Notification by the DSD of the County Coroner, relevant Native American representative, and NAHC if human remains are found</p>		
<p>Geology and Soils Mitigation Measure VI-1: A California registered Geotechnical Engineer shall conduct a design-level geotechnical study for the project. The geotechnical study shall evaluate seismic hazards and provide recommendations to mitigate the effect of strong ground shaking; any unstable, liquefiable, or expansive soils; or settlement in adherence with current California Building Code (CBC) standards for earthquake resistant construction. The seismic criteria shall take into account the active faults in the Eureka area and beyond, and ground motions and shaking related to the faults shall be accounted. The geotechnical study shall include evaluation of unstable land in the project area, including areas susceptible to liquefaction, lateral spreading, or settlement, and areas containing expansive soils. The study shall provide measures to repair, stabilize, or avoid such soils, and include grading, drainage, paving, and foundation design</p>	<ul style="list-style-type: none"> ▶ City ▶ Contractor 	<p>This measure and language facilitating and insuring compliance shall be incorporated into design and contract documents prepared by the City for the project.</p>	<p>Prior to and during project construction.</p>	<p>ENG shall ensure the project is designed and constructed in conformance with the specific recommendations contained in the design-level geotechnical study.</p>		

Mitigation Measure	Responsible Agency and/or Party	Action Required	Monitoring Phase/ Reporting Requirements	Enforcement	Compliance Verification	Notes/ Comments
<p>recommendations.</p> <p>The project shall be designed and constructed in conformance with the specific recommendations contained in the design-level geotechnical study, including recommendations for grading, ground improvement, and foundation support. The recommendations made in the geotechnical study shall be incorporated into the final plans and specifications and implemented during construction. Professional inspection of foundation and excavation, earthwork and other geotechnical aspects of site development shall be performed during construction in accordance with the current version of the CBC.</p>						
<p>Hydrology and Water Quality Mitigation Measure IX-1: A SWPPP, to be implemented during construction, will be submitted to the City of Eureka Public Works Stormwater Division and subject to approval by the NCRWQCB, and City of Eureka Building, Planning, Engineering, and Public Works Departments.</p>	<ul style="list-style-type: none"> ▶ City ▶ Contractor ▶ RWQCB 	<p>This measure and language facilitating and insuring compliance shall be incorporated into design and contract documents prepared by the City for the project.</p>	<p>Prior to and during construction.</p>	<p>Completion of and adherence to required documents and measures.</p>		
<p>Hydrology and Water Quality Mitigation Measure IX-2: All stormwater post-construction will be detained on site through capture and low impact development design.</p>	<ul style="list-style-type: none"> ▶ City 	<p>This measure and language facilitating and insuring compliance shall be incorporated into design and contract documents prepared by the City for the project.</p>	<p>Post construction</p>	<p>Building Permit completion, City of Eureka official will inspect and approve.</p>		
<p>Noise Mitigation Measure XII-1: Construction activities will be</p>	<ul style="list-style-type: none"> ▶ City ▶ Contractor 	<p>This measure and language facilitating</p>	<p>Once during plan check and ongoing during</p>	<p>City of Eureka official will inspect and approve.</p>		

Mitigation Measure	Responsible Agency and/or Party	Action Required	Monitoring Phase/ Reporting Requirements	Enforcement	Compliance Verification	Notes/ Comments
limited to the hours of 7:00 AM to 7:00 PM on weekdays and 8:00 AM to 6:00 PM on Saturdays, Sundays, and Holidays, except in emergencies.		and insuring compliance shall be incorporated into design and contract documents prepared by the City for the project.	construction.			