County of Santa Cruz

PLANNING DEPARTMENT
701 OCEAN STREET, 4TH FLOOR, SANTA CRUZ, CA 95060
(831) 454-2580 FAX: (831) 454-2131
KATHLEEN MOLLOY PREVISICH, PLANNING DIRECTOR
www.sccoplanning.com

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

NOTICE OF PUBLIC REVIEW AND COMMENT PERIOD

Pursuant to the California Environmental Quality Act, the following project has been reviewed by the County Environmental Coordinator to determine if it has a potential to create significant impacts to the environment and, if so, how such impacts could be solved. A Negative Declaration is prepared in cases where the project is determined not to have any significant environmental impacts. Either a Mitigated Negative Declaration or Environmental Impact Report (EIR) is prepared for projects that may result in a significant impact to the environment.

Public review periods are provided for these Environmental Determinations according to the requirements of the County Environmental Review Guidelines. The environmental document is available for review at the County Planning Department located at 701 Ocean Street, in Santa Cruz. You may also view the environmental document on the web at www.sccoplanning.com under the Planning Department menu. If you have questions or comments about this Notice of Intent, please contact Todd Sexauer of the Environmental Review staff at (831) 454-3511.

The County of Santa Cruz does not discriminate on the basis of disability, and no person shall, by reason of a disability, be denied the benefits of its services, programs or activities. If you require special assistance in order to review this information, please contact Bernice Shawver at (831) 454-3137 to make arrangements.

PROJECT: Felton Library **APP #: 171167**

APN(S): 065-073-03 & 065-281-03

PROJECT DESCRIPTION: The project proposes to construct a library and an outdoor interactive environmental education program in two phases. Phase One would consist of the construction of a 9,657 square foot library with a fenced patio, parking lot, frontage improvements along Gushee Street, a monument sign, and related improvements; the replacement of a culvert in Bull Creek with pedestrian bridge, and restoration of the riparian area. Phase Two would consist of the construction of outdoor interactive environmental education areas and a second pedestrian bridge over Bull Creek.

PROJECT LOCATION: The proposed project is located on the west side of Gushee Street within the community of Felton in unincorporated Santa Cruz County. Santa Cruz County is bounded on the north by San Mateo County, on the south by Monterey and San Benito counties, on the east by Santa Clara County, and on the south and west by the Monterey Bay and the Pacific Ocean.

EXISTING ZONE DISTRICT: R-1-10
APPLICANT: Teall Messer
OWNER: County of Santa Cruz, Attn: Betsey Lynberg
PROJECT PLANNER: Annette Olson, (831) 454-3134
EMAIL: Annette.Olson@santacruzcounty.us
ACTION: Negative Declaration with Mitigations
REVIEW PERIOD: September 18, 2017 through October 17, 2018

This project will be considered at a public hearing by the Zoning Administrator. The time, date and location have not been set. When scheduling does occur, these items will be included in all public hearing notices for the project.

COUNTY OF SANTA CRUZ

PLANNING DEPARTMENT
701 OCEAN STREET, 4TH FLOOR, SANTA CRUZ, CA 95060
(831) 454-2580 FAX: (831) 454-2131 TDD: (831) 454-2123
KATHLEEN MOLLOY PREVISICH, PLANNING DIRECTOR
http://www.sccoplanning.com/

MITIGATED NEGATIVE DECLARATION

Project: Felton Library **APN(S): 065-073-03 & 065-281-03**

Project Description: The project proposes to construct a library and an outdoor interactive environmental education program in two phases. Phase One would consist of the construction of a 9,657 square foot library with a fenced patio, parking lot, frontage improvements along Gushee Street, a monument sign, and related improvements; the replacement of a culvert in Bull Creek with pedestrian bridge, and restoration of the riparian area. Phase Two would consist of the construction of outdoor interactive environmental education areas and a second pedestrian bridge over Bull Creek.

Project Location: The proposed project is located on the west side of Gushee Street within the community of Felton in unincorporated Santa Cruz County. Santa Cruz County is bounded on the north by San Mateo County, on the south by Monterey and San Benito counties, on the east by Santa Clara County, and on the south and west by the Monterey Bay and the Pacific Ocean.

Owner: County of Santa Cruz, Attn: Betsey Lynberg
Applicant: Teall Messer
Staff Planner: Annette Olson, (831) 454-3134
Email: Annette.Olson@santacruzcounty.us

This project will be considered at a public hearing by the Zoning Administrator. The time, date and location have not been set. When scheduling does occur, these items will be included in all public hearing notices for the project.

California Environmental Quality Act Mitigated Negative Declaration Findings:
Find, that this Mitigated Negative Declaration reflects the decision-making body's independent judgment and analysis, and; that the decision-making body has reviewed and considered the information contained in this Mitigated Negative Declaration and the comments received during the public review period; and, that revisions in the project plans or proposals made by or agreed to by the project applicant would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur; and, on the basis of the whole record before the decision-making body (including this Mitigated Negative Declaration) that there is no substantial evidence that the project as revised will have a significant effect on the environment. The expected environmental impacts of the project are documented in the attached Initial Study on file with the County of Santa Cruz Clerk of the Board located at 701 Ocean Street, 5th Floor, Santa Cruz, California.

Review Period Ends: October 17, 2017

Date:____________________

____
TODD SEXAUER, Environmental Coordinator
(831) 454-3511

County of Santa Cruz

PLANNING DEPARTMENT
701 OCEAN STREET, 4TH FLOOR, SANTA CRUZ, CA 95060
(831) 454-2580 FAX: (831) 454-2131 TDD: (831) 454-2123
KATHLEEN MOLLOY PREVISICH, PLANNING DIRECTOR
www.sccoplanning.com

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)
INITIAL STUDY/ENVIRONMENTAL CHECKLIST

Date: August 14, 2017 **Application Number:** 171167

Project Name: Felton Library **Staff Planner:** Annette Olson

I. OVERVIEW AND ENVIRONMENTAL DETERMINATION

APPLICANT: Teall Messer APN(s): 065-073-03 & 065-281-03

OWNER: County of Santa Cruz SUPERVISORAL DISTRICT: 5th

PROJECT LOCATION: The proposed project is located on the west side of Gushee Street within the community of Felton in unincorporated Santa Cruz County (Figure 1). Santa Cruz County is bounded on the north by San Mateo County, on the south by Monterey and San Benito counties, on the east by Santa Clara County, and on the south and west by the Monterey Bay and the Pacific Ocean.

SUMMARY PROJECT DESCRIPTION:

The project proposes to construct a library and an outdoor interactive environmental education program in two phases. Phase one would consist of the construction of a 9,657 square foot library with a fenced patio, parking lot, frontage improvements along Gushee Street, a monument sign, and related improvements; the replacement of a culvert in Bull Creek with pedestrian bridge, and restoration of the riparian area. Phase two would consist of the construction of outdoor interactive environmental education areas and a second pedestrian bridge over Bull Creek (Figure 2).

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED: *All of the following potential environmental impacts are evaluated in this Initial Study. Categories that are marked have been analyzed in greater detail based on project specific information.*

- [ ] Aesthetics and Visual Resources
- [ ] Agriculture and Forestry Resources
- [ ] Air Quality
- [x] Biological Resources
- [x] Cultural Resources
- [ ] Geology and Soils
- [x] Greenhouse Gas Emissions
- [ ] Mineral Resources
- [ ] Noise
- [ ] Population and Housing
- [ ] Public Services
- [ ] Recreation
- [x] Transportation/Traffic
- [ ] Utilities and Service Systems

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED: *All of the following potential environmental impacts are evaluated in this Initial Study. Categories that are marked have been analyzed in greater detail based on project specific information.*

- ☐ Hazards and Hazardous Materials
- ☒ Hydrology/Water Supply/Water Quality
- ☐ Land Use and Planning
- ☐ Tribal Cultural Resources
- ☐ Mandatory Findings of Significance

DISCRETIONARY APPROVAL(S) BEING CONSIDERED:

- ☐ General Plan Amendment
- ☐ Land Division
- ☐ Rezoning
- ☒ Development Permit
- ☐ Sewer Connection Permit
- ☐ Coastal Development Permit
- ☒ Grading Permit
- ☒ Riparian Exception
- ☐ LAFCO Annexation
- ☒ Other: Variances, Parking Plan, Sign Exception

OTHER PUBLIC AGENCIES WHOSE APPROVAL IS REQUIRED (e.g., permits, financing approval, or participation agreement):

Agency	Agency
County of Santa Cruz, DPW	Encroachment Permit
CDFW	1602 (Streambed Alteration Agreement)
RWQCB	401 (Water Quality Certification)
USACE	404 (Nationwide Permit)

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.

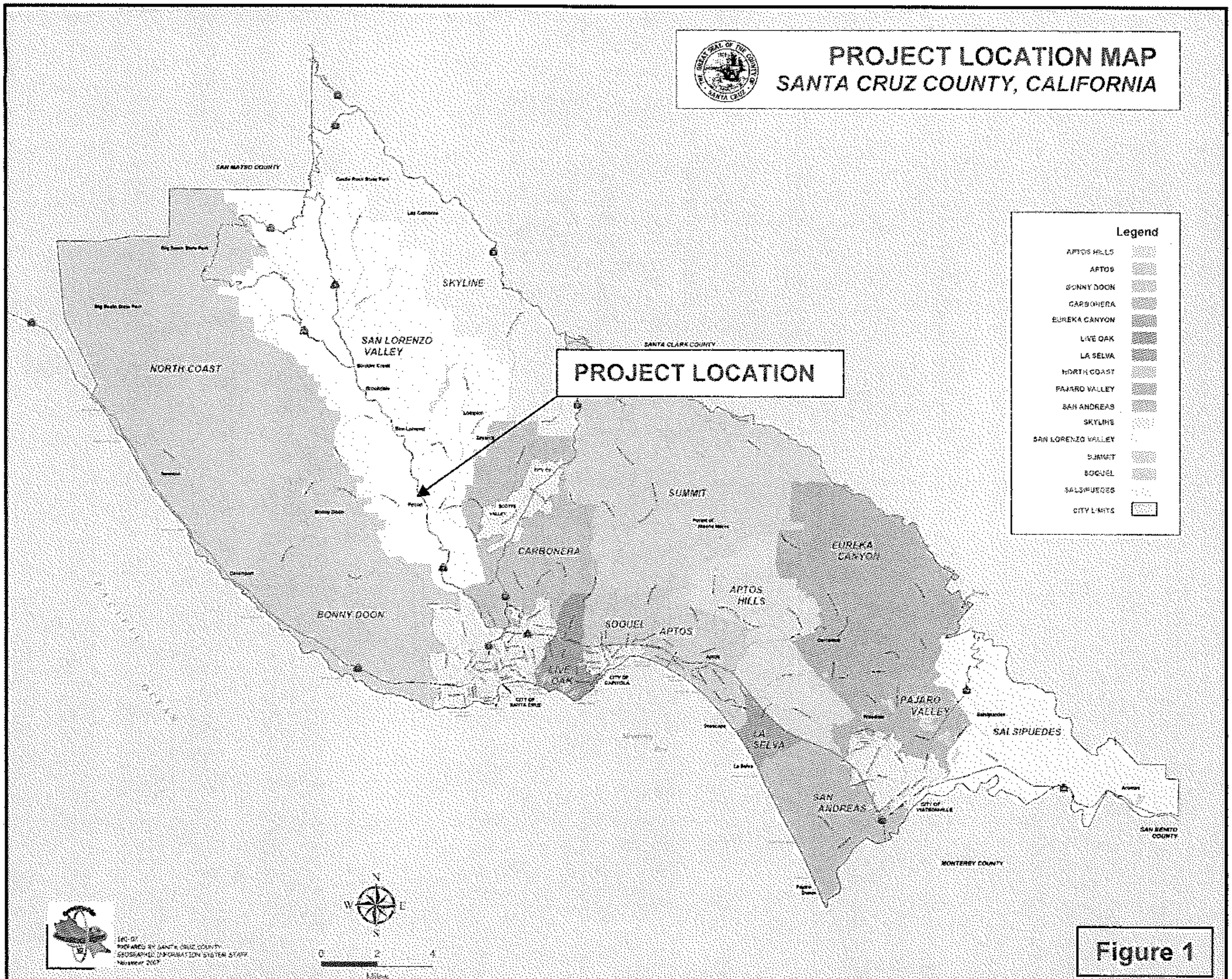
☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

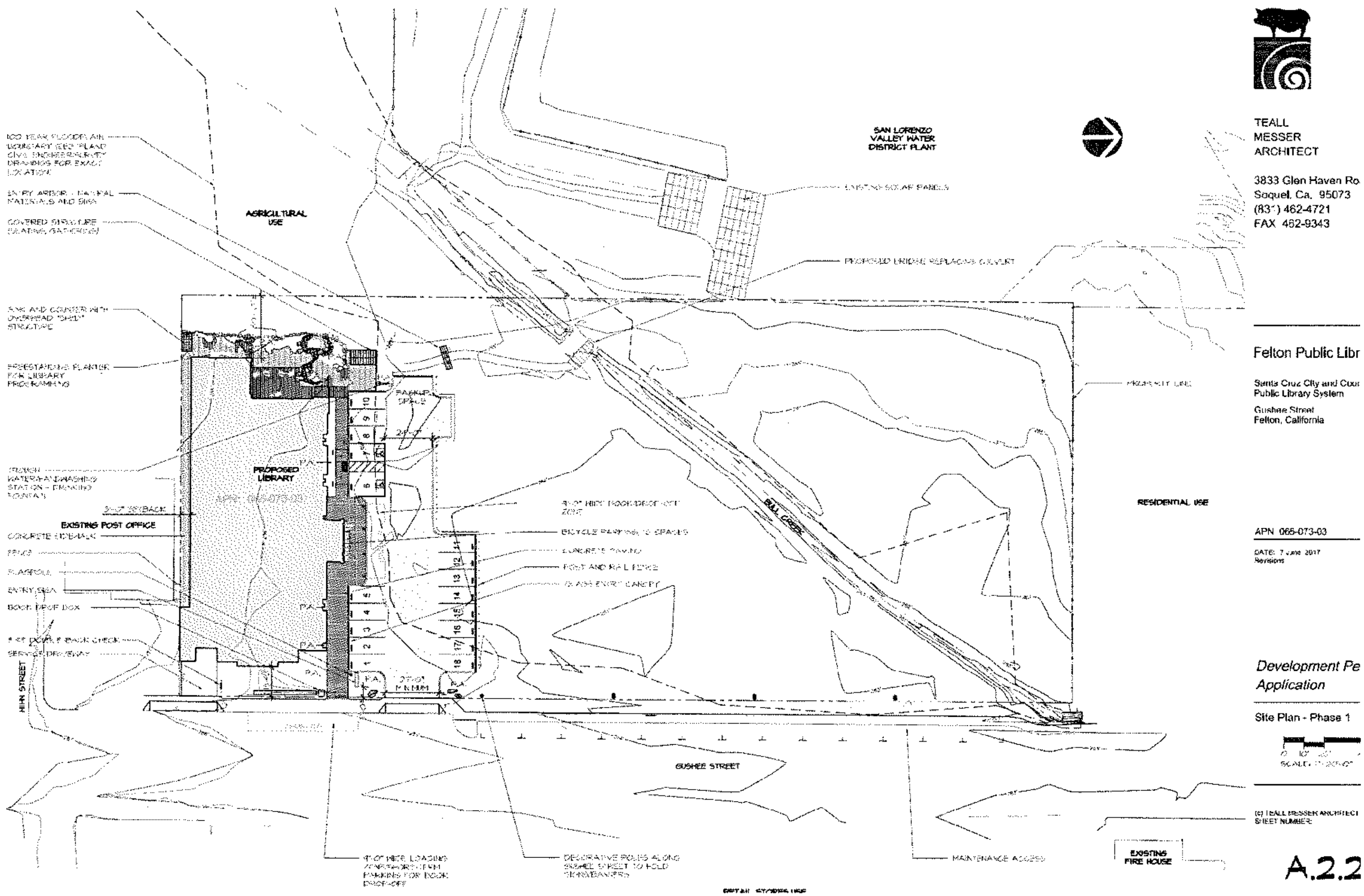
☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

TODD SEXAUER, Environmental Coordinator	9/14/17 Date


PROJECT LOCATION MAP
SANTA CRUZ COUNTY, CALIFORNIA
PROJECT LOCATION
Legend
APTOS HILLS
APTOS
BONNY DOON
CARBONERA
EUREKA CANYON
LIVE OAK
LA SELVA
NORTH COAST
PAJARO VALLEY
SAN ANDREAS
SKYLINE
SAN LORENZO VALLEY
SUMMIT
SOQUEL
SALSIPUEDES
CITY LIMITS
SAN MATEO COUNTY
SANTA CLARA COUNTY
MONTEREY COUNTY
SAN BENITO COUNTY
NORTH COAST
SKYLINE
SAN LORENZO VALLEY
SUMMIT
CARBONERA
EUREKA CANYON
APTOS HILLS
BONNY DOON
SOQUEL
APTOS
LIVE OAK
LA SELVA
PAJARO VALLEY
SALSIPUEDES
SAN ANDREAS
CITY OF SANTA CRUZ
CITY OF CAPITOLA
CITY OF WATSONVILLE
N
W
E
S
0
2
4
Miles
Figure 1

This page intentionally left blank.


SAN LORENZO VALLEY WATER DISTRICT PLANT
AGRICULTURAL USE
PROPOSED LIBRARY
EXISTING POST OFFICE
RESIDENTIAL USE
GUSHEE STREET
HIHN STREET
EXISTING FIRE HOUSE
BULL CREEK
TEALL
MESSER
ARCHITECT
3833 Glen Haven Ro
Soquel, Ca. 95073
(831) 462-4721
FAX 462-9343
Felton Public Libr
Santa Cruz City and Coun
Public Library System
Gushee Street
Felton, California
APN 065-073-03
Development Pe
Application
Site Plan - Phase 1
A.2.2

This page intentially left blank.

II. BACKGROUND INFORMATION

EXISTING SITE CONDITIONS:

Parcel Size (acres):	Approximately 2
Existing Land Use:	Vacant
Vegetation:	Mowed grass and riparian woodland associated with Bull Creek
Slope in area affected by project:	☒ 0 - 30% ☐ 31 – 100% ☐ N/A
Nearby Watercourse:	Bull Creek
Distance To:	Bull Creek runs through the property

ENVIRONMENTAL RESOURCES AND CONSTRAINTS:

Water Supply Watershed:	Yes	Fault Zone:	No
Groundwater Recharge:	A portion	Scenic Corridor:	Felton Town Plan
Timber or Mineral:	No	Historic:	No
Agricultural Resource:	No	Archaeology:	No
Biologically Sensitive Habitat:	Yes	Noise Constraint:	No
Fire Hazard:	SRA Moderate	Electric Power Lines:	No hazard
Floodplain:	No mapped FEMA floodplain.	Solar Access:	Available
Erosion:	Low potential	Solar Orientation:	Available
Landslide:	No	Hazardous Materials:	Low potential
Liquefaction:	Yes	Other:	---

SERVICES:

Fire Protection:	Felton FPD	Drainage District:	Zone 8
School District:	SLVUSD	Project Access:	Gushee/Kirby
Sewage Disposal:	Septic	Water Supply:	San Lorenzo Valley Water District

PLANNING POLICIES:

Zone District: R-1-10

Special Designation: Felton Town Plan

General Plan: R-UL

Urban Services Line:	☐ Inside	☒ Outside
Coastal Zone:	☐ Inside	☒ Outside

ENVIRONMENTAL SETTING AND SURROUNDING LAND USES:

Natural Environment

Santa Cruz County is uniquely situated along the northern end of Monterey Bay approximately 55 miles south of the City of San Francisco along the Central Coast. The Pacific Ocean and Monterey Bay to the west and south, the mountains inland, and the prime agricultural lands along both the northern and southern coast of the county create limitations on the style and amount of building that can take place. Simultaneously, these natural features create an environment that attracts both visitors and new residents every year. The natural landscape provides the basic features that set Santa Cruz apart from the surrounding counties and require specific accommodations to ensure building is done in a safe, responsible and environmentally respectful manner.

The California Coastal Zone affects nearly one third of the land in the urbanized area of the unincorporated County with special restrictions, regulations, and processing procedures required for development within that area. Steep hillsides require extensive review and engineering to ensure that slopes remain stable, buildings are safe, and water quality is not impacted by increased erosion. The farmland in Santa Cruz County is among the best in the world, and the agriculture industry is a primary economic generator for the County. Preserving this industry in the face of population growth requires that soils best suited to commercial agriculture remain active in crop production rather than converting to other land uses.

Project Site

The project site is located on the west side of Gushee Street one parcel north of its intersection with Hihn Street in Felton. Directly to the west of the library site is the San Lorenzo Valley Water District. The Water District property is included in this application as a portion of the interactive environmental education feature and restoration/mitigation work would occur on the District's parcel. To the south, located on the corner of Gushee Street and Hihn Street, is the U.S. Post Office. Across Hihn Street is a County of Santa Cruz maintenance yard. To the east, across Gushee Street is a Rite Aid store, and to the north are single-family homes.

The library parcel (APN 065-073-03) is vacant. Bull Creek, a perennial waterway, bisects the property from the southwest to the northeast, dividing the parcel into two distinct areas. Access to the southern area where the library building is proposed is available from Gushee Street. Access to the northern area is available from Kirby Street via an easement over the Water District property. Currently, internal vehicular access from the southern area of the library parcel to the northern area is possible via a culvert in Bull Creek. As a part of the project, however, the culvert would be removed and a pedestrian bridge would be installed to provide pedestrian access to the outdoor education feature.

PROJECT BACKGROUND:

The community of Felton, which is located in the San Lorenzo Valley, is currently served by an approximately 1,300 square foot library which is located within the historic Faye G. Belardi building. The library's small size, as well as the absences of on-site parking and other amenities typically found in modern libraries, prompted an effort to develop a new library. In 2016 the County acquired a two acre parcel located about 650 feet south of the existing library, and in June 2017, applied for the discretionary permits required to construct the library.

DETAILED PROJECT DESCRIPTION:

The project would be constructed in two phases. In the first phase, the library and related improvements such as the parking lot, monument sign, Gushee frontage, drainage improvements, and a septic system would be constructed. The new library is proposed to be 9,657 square feet in size and would include spaces for adult and youth to access traditional books as well as online materials. Small rooms, including a teen gathering room, and a library program room for small and large discussions and presentations by staff and the community would be available for library programming. A fenced outdoor area on the west side of the building would provide a flexible space for reading and library programming. The hours of operation may vary depending on available funding, but the anticipated hours are:

Sunday 1PM – 5PM
Monday Closed
Tuesday – Thursday 11 AM – 6 PM
Friday & Saturday 11 AM – 5 PM.

The parking lot would accommodate 18 vehicles and the remaining required parking (12 spaces) would be provided along Gushee Street as parallel parking where new curb, gutter and sidewalk would be constructed. The parking lot would be constructed of pervious paving over a gravel bed that would act as a detention/retention volume to hold runoff. Runoff would be directed either to a raingarden located on the west side of the building or to the gravel bed. Perforated pipes with an orifice sized to maintain the pre-development runoff rate would convey runoff to the street. A new inlet and about 96 linear feet of 12-inch drainage pipe would connect the project's drainage system to the existing catch basin located about 100 feet north of the library driveway.

The library proposes to install exterior lighting both for security and to illuminate the parking lot. The project would be required to comply with County Code 13.11.074(D), which requires that: all lighting should be directed onto the site and away from adjacent properties; light sources should be shielded; and light standards should not be any higher than 15 feet.

The septic system would be an enhanced treatment system with four underground tanks located in a portion of the parking lot, treatment equipment above ground just to the north of the parking lot and a leach field in the Hihn Street right-of-way.

In addition, the culvert in Bull Creek would be removed and replaced with a pedestrian bridge. Removing the culvert would require the temporary dewatering of approximately 54 linear feet of Bull Creek. A temporary coffer dam would be installed and the disturbed area would be revegetated following construction.

As a part of the site development, 625 cubic yards of excavation and 45 cubic yards of fill are proposed. Within the floodplain, 48 cubic yards of fill is proposed to establish finish grades for accessibility improvements. To balance this fill within the floodplain, 48 cubic yards of excavation would occur in an area that is within the floodplain but not within the riparian area. Nine trees—all willows (*Salix iasiolepsis*)—are proposed for removal with a possible additional three trees depending on the outcome of further evaluation.

Restoration of the riparian woodland habitat would occur in Phase One. That restoration would be done at a 2:1 ratio, resulting in the restoration of about 14,170 square feet. Of that restoration area, about 11,974 square feet would occur on the water district property which is adjacent to the west. The remaining restoration area would occur on the library parcel.

Phase two of the project would include the construction of a second bridge and an interactive outdoor education feature. The outdoor education feature would be located primarily on the north side of Bull Creek, with two stations located on the water district property, and have stations where environmental activities would occur. These stations would be connected by a pedestrian path.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

III. ENVIRONMENTAL REVIEW CHECKLIST

A. AESTHETICS AND VISUAL RESOURCES

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
1. Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒

Discussion: The library site is located within the area addressed in the Felton Town Plan, a specific plan adopted by the Board of Supervisors in 1987. The Town Plan addresses scenic view corridors and a portion of the project site falls within Scenic View Corridor #1. However, because the project site falls outside of the area designated as the Village Core and is not located on a sloped hillside, there are no requirements in the Town Plan that would affect the library project. Given this, the project would result in no impact to a scenic vista.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
2. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒

Discussion: Other than as described in A.1. above, the project site is not located along a County designated scenic road, public viewshed area, scenic corridor, within a designated scenic resource area, or within a state scenic highway. Therefore, no impact is anticipated.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3. Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☒

Discussion: The existing visual setting is eclectic. The unremarkable U.S. Post Office building is located to the south, across the street from a large Rite-Aid store. Further to the south is a County maintenance yard. To the north are single-family residential properties. The water district property, including treatment facilities, is located to the west. The proposed project is an architect-designed building which would fit into this eclectic setting. The proposed landscape plan would further help the project fit into the existing surroundings. Given this, no impact is anticipated.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
4. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

Discussion:

The project would contribute an incremental amount of night lighting to the visual environment. However, the following project conditions, as required by County Code 13.11.074(D), would reduce this potential impact to a less than significant level: all lighting shall be directed onto the site and away from adjacent properties; light sources shall be

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

shielded; and light standards may not be any higher than 15 feet. Impacts would be less than significant.

B. AGRICULTURE AND FORESTRY RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
1. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒

Discussion: The project site does not contain any lands designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency. In addition, the project does not contain Farmland of Local Importance. Therefore, no Prime Farmland, Unique Farmland, Farmland of Statewide or Farmland of Local Importance would be converted to a non-agricultural use. No impact would occur from project implementation.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
2. Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒

Discussion: The project site is zoned residential (R-1-10), which is not considered to be an agricultural zone. Additionally, the project site's land is not under a Williamson Act Contract. Therefore, the project does not conflict with existing zoning for agricultural use, or a Williamson Act Contract. No impact is anticipated.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production	☐	☐	☐	☒

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
(as defined by Government Code Section 51104(g))?				

Discussion: The project is not located near land designated as Timber Resource. Therefore, the project would not affect the resource or access to harvest the resource in the future.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
4. *Result in the loss of forest land or conversion of forest land to non-forest use?*	☐	☐	☐	☒

Discussion: No forest land occurs on the project site or in the immediate vicinity. See discussion under B-3 above. No impact is anticipated.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
5. *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?*	☐	☐	☐	☒

Discussion: The project site and surrounding area within a radius of four miles does not contain any lands designated as Prime Farmland, Unique Farmland, Farmland of Statewide Importance or Farmland of Local Importance as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency. Therefore, no Prime Farmland, Unique Farmland, Farmland of Statewide, or Farmland of Local Importance would be converted to a non-agricultural use. In addition, the project site contains no forest land, and no forest land occurs within 2,300 feet of the proposed project site. Therefore, no impacts are anticipated.

C. AIR QUALITY

The significance criteria established by the Monterey Bay Unified Air Pollution Control District (MBUAPCD) has been 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
1. *Conflict with or obstruct implementation of the applicable air quality plan?*	☐	☐	☒	☐

Discussion: The project would not conflict with or obstruct any long-range air quality plans of the Monterey Bay Air Resources District (MBARD). Because general construction activity related emissions (i.e., temporary sources) are accounted for in the emission inventories included in the plans, impacts to air quality plan objectives are less than significant. See C-2 below.

General estimated basin-wide construction-related emissions are included in the MBARD emission inventory (which, in part, form the basis for the air quality plans cited below) and

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

are not expected to prevent long-term attainment or maintenance of the ozone and particulate matter standards within the North Central Coast Air Basin (NCCAB). Therefore, temporary construction impacts related to air quality plans for these pollutants from the proposed project would be less than significant, and no mitigation would be required, since they are presently estimated and accounted for in the District's emission inventory, as described below. No stationary sources would be constructed that would be long-term permanent sources of emissions.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
2. *Violate any air quality standard or contribute substantially to an existing or projected air quality violation?*	☐	☐	☒	☐

Discussion: Santa Cruz County is located within the North Central Coast Air Basin (NCCAB). The NCCAB does not meet state standards for ozone (reactive organic gases [ROGs] and nitrogen oxides [NOx]) and fine particulate matter (PM_{10}). Therefore, the regional pollutants of concern that would be emitted by the project are ozone precursors and PM_{10}.

Ozone is the main pollutant of concern for the NCCAB. The primary sources of ROG within the air basin are on- and off-road motor vehicles, petroleum production and marketing, solvent evaporation, and prescribed burning. The primary sources of NOx are on- and off-road motor vehicles, stationary source fuel combustion, and industrial processes. In 2010, daily emissions of ROGs were estimated at 63 tons per day. Of this, area-wide sources represented 49 percent, mobile sources represented 36 percent, and stationary sources represented 15 percent. Daily emissions of NOx were estimated at 54 tons per day with 69 percent from mobile sources, 22 percent from stationary sources, and 9 percent from area-wide sources. In addition, the region is "NOx sensitive," meaning that ozone formation due to local emissions is more limited by the availability of NOx as opposed to the availability of ROGs (MBUAPCD, 2013b).

PM_{10} is the other major pollutant of concern for the NCCAB. In the NCCAB, highest particulate levels and most frequent violations occur in the coastal corridor. In this area, fugitive dust from various geological and man-made sources combines to exceed the standard. Nearly three quarters of all NCCAB exceedances occur at these coastal sites where sea salt is often the main factor causing exceedance (MBUAPCD, 2005). In 2005 daily emissions of PM_{10} were estimated at 102 tons per day. Of this, entrained road dust represented 35 percent of all PM_{10} emission, windblown dust 20 percent, agricultural tilling operations 15 percent, waste burning 17 percent, construction 4 percent, and mobile sources, industrial processes, and other sources made up 9 percent (MBUAPCD, 2008).

Given the modest amount of new traffic that would be generated by the project there is no indication that new emissions of ROGs or NOx would exceed MBUAPCD thresholds for

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

these pollutants; and therefore, there would not be a significant contribution to an existing air quality violation.

Project construction may result in a short term, localized decrease in air quality due to generation of PM_{10}. However, standard dust control best management practices, such as periodic watering of graded/disturbed areas, would be implemented during construction to avoid significant air quality impacts from the generation of PM_{10}.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3.	*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)?*	☐	☐	☒	☐

Discussion: Project construction would have a limited and temporary potential to contribute to existing violations of California air quality standards for ozone and PM_{10} primarily through diesel engine exhaust and fugitive dust. However, the Santa Cruz monitoring station has not had any recent violations of federal or state air quality standards mainly through dispersion of construction-related emission sources. Therefore, the proposed project would not result in a cumulatively considerable net increase in criteria pollutants. The impact on ambient air quality would be less than significant.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
4.	*Expose sensitive receptors to substantial pollutant concentrations?*	☐	☐	☒	☐

Discussion: The proposed library project would not generate substantial pollutant concentrations. Emissions from construction activities represent temporary impacts that are typically short in duration. Impacts to sensitive receptors would be less than significant.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
5.	*Create objectionable odors affecting a substantial number of people?*	☐	☐	☒	☐

Discussion: California ultralow sulfur diesel fuel with a maximum sulfur content of 15 ppm by weight would be used in all diesel-powered equipment, which minimizes emissions of sulfurous gases (sulfur dioxide, hydrogen sulfide, carbon disulfide, and carbonyl sulfide). Therefore, no objectionable odors are anticipated from construction activities associated with the proposed project, and no mitigation measures would be required. The proposed project would not create objectionable odors affecting a substantial number of people; therefore, impacts are expected to be less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

D. BIOLOGICAL RESOURCES

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
1. *Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife, or U.S. Fish and Wildlife Service?*	☐	☒	☐	☐

Discussion: A biotic report by Biotic Resource Group (BRG) was completed in June 2017 (Attachment 2). The report reviews the project site; identifies sensitive habitats and species of concern; and provides avoidance and mitigation measures to either avoid or mitigate significant impacts. Bill Davilla, Principal of Ecosystems West peer-reviewed the Biotic Report and Matt Johnston, County staff, accepted the Biotic Report (Attachment 3). The biotic report identifies protected plant and wildlife species and provides recommendations for avoiding impacts and, when impacts are unavoidable, mitigating significant impacts. As described below, the project site supports riparian woodland, San Francisco dusky-footed woodrat, and may support California red-legged frogs and both migratory bird and raptor nests.

The biotic report evaluates whether or not areas of the riparian woodland meet the federal wetland criteria, one criterion of which is the presence of hydric soils. Soil testing found that no hydric soils were present (Attachment 2). Given this, no wetlands meeting the federal standard were found on-site. The County protects wetlands as a sensitive habitat and, since the County also uses the federal definition of wetland, no wetlands meeting the local standard were found on-site either.

County staff observed a fish within Bull Creek during a site visit. That fish was identified as a resident rainbow trout. However, because rainbow trout and the federally-protected steelhead can be easily mistaken for each other, additional analysis of the likelihood of Bull Creek to support steelhead was provided by Kristin Kittleson, Fishery Resource Planner for the County of Santa Cruz (Attachment 4). Ms. Kittleson's report identified significant barriers that would prevent steelhead from moving upstream to the site, confirming the fish as resident rainbow trout. Given this, no impact is anticipated to steelhead. Rainbow trout is not a protected species.

As noted in the project description, this project includes two parcels, the library parcel (APN 065-072-03) and the San Lorenzo Valley Water District Parcel (APN 065-281-03). The impacts evaluated below, as well as the mitigations identified to address those impacts, would apply both to the library and water district parcels.

Special Status Wildlife Species

Special status wildlife species include those listed, proposed or candidate species by the Federal or the State resource agencies as well as those identified as State species of special concern. In addition, all raptor nests are protected by CDFW Code, and all migratory bird nests are protected by the Federal Migratory Bird Treaty Act. The biotic report evaluated the potential presence of special status wildlife species and identified two species: San Francisco dusky-footed woodrat and California red-legged frog.

The California Natural Diversity Database lists an observation of an adult California red-legged frog approximately 0.5 miles upstream from the project site. The project site is not located within Designated Critical Habitat for the frog and, therefore, the project would not impact any Designated Critical Habitat. Given the recorded observation of the red-legged frog, however, avoidance measures have been included in the project to protect the frog.

San Francisco dusky-footed woodrat nests were observed within the riparian woodland. These are a state species of special concern and avoidance measures as well as mitigations are provided below to minimize potentially significant impacts if the woodrats are present during construction.

Impacts

Construction within the riparian woodland and within Bull Creek, including the dewatering of about 54 linear feet of the creek, has the potential for significant impacts to California red-legged frog if any are present during construction. In addition, woodrat nests, which are habitat for state species of special concern San Francisco dusky-footed woodrats, were observed in the riparian woodland. Removal of vegetation has the potential to injure or kill woodrats.

Mitigation Measures

BIO-1: Avoid Minimize Potential Impacts to California Red-legged Frog. The following measures shall be implemented to avoid and minimize potential impacts to California red-legged frog.

a. At least 15 days prior to the onset of activities, the applicant or project proponent shall submit the name(s) and credentials of qualified biologist to USFWS (Service) at least 15 days prior to the onset of activities. The applicant or project proponent shall submit the name(s) and credentials of biologists who would conduct activities specified in the following measures. No project activities shall begin until proponents have received written approval from the Service that the biologist(s) is qualified to conduct the work.
b. A Service-approved biologist shall survey the work site no more than 48 hours before the onset of activities. If California red-legged frogs are found, the approved biologist shall relocate the frogs to any area of suitable habitat

either upstream or downstream and well away from the project work area. Only Service-approved biologists shall participate in activities associated with the capture, handling, and moving of California red-legged frogs.

c. Before any activities begin on a project, a Service-approved biologist shall conduct a training session for all construction personnel. At a minimum, the training shall include a description of the California red-legged frog and its habitat, the importance of the California red-legged frog and its habitat, general measures that are being implemented to conserve the California red-legged frog as they relate to the project, and the boundaries within which the project may be accomplished. Brochures, books and briefings may be used in the training session, provided that a qualified person is on hand to answer any questions.

d. A Service-approved biologist shall be present at the work site until such time as all removal of California red-legged frogs, instruction of workers, and habitat disturbance have been completed. After this time, the contractor or permittee shall designate a person to monitor on-site compliance with all minimization measures. The Service-approved biologist shall ensure that this individual receives training outlined in measure 3 above and in the identification of California red-legged frogs. The monitor and the Service-approved biologist shall have the authority to halt any action that might result in impacts that exceed the levels anticipated by the USACE and Service during review of the proposed action. If work is stopped, the Corps and Service shall be notified immediately by the Service-approved biologist or on-site biological monitor.

e. During project activities, all trash that may attract predators shall be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris shall be removed from work areas.

f. All refueling, maintenance, and staging of equipment and vehicles shall occur at least 20 meters from any riparian habitat or water body. The USACE and permittee shall ensure contamination of habitat does not occur during such operations. Prior to the onset of work, the USACE shall ensure that the permittee has prepared a plan to allow a prompt and effective response to any accidental spills. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

g. A Service-approved biologist shall ensure that the spread or introduction of invasive exotic plant species shall be avoided to the maximum extent possible. When practicable, invasive exotic plants in the project areas shall be removed.

h. Project sites shall be revegetated with an appropriate assemblage of native riparian, wetland, and upland vegetation suitable for the area. A species list and restoration and monitoring plan shall be included with the project proposal for review and approval by the Service and the USACE. Such a plan must include, but not be limited to, location of the restoration, species to be used, restoration techniques, time of year the work will be done, identifiable success criteria for completion, and remedial actions if the success criteria are not achieved.
i. Stream contours shall be returned to the original condition at the end of project activities, unless consultation with the Service has determined that it is not beneficial to the species or feasible.
j. The number of access routes, number and size of staging areas, and the total area of the activity shall be limited to the minimum necessary to achieve the project goal. Routes and boundaries shall be clearly demarcated, and these areas shall be outside of riparian and wetland areas. Where impacts occur in these staging areas and access routes, restoration shall occur as identified in measures 1.8 and 1.9 above.
k. Work activities shall be completed between April 1 and November 1. Should the proponent or applicant demonstrate a need to conduct activities outside this period, the USACE may authorize such activities after obtaining the Service's approval.
l. To control erosion during and after project implementation, the applicant shall implement best management practices, as identified by the local RWQCB.
m. If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than five millimeters (mm) to prevent California red-legged frogs from entering the pump system. Water shall be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow shall be removed in a manner that would allow flow to resume with the least disturbance to the substrate.
n. A Service-approved biologist shall permanently remove from within the project area, any individuals of exotic species, such as bullfrogs, crayfish, and centrarchid fishes to the maximum extent possible.

BIO-2: Avoid Minimize Potential Impacts to San Francisco Dusky-footed Woodrat. The following measures shall be implemented to avoid impacts to this species:

a. A qualified biologist shall conduct a preconstruction surveys for San Francisco dusky-footed woodrat dens/nests in the riparian woodland within 30 days prior to construction or vegetation clearing.

b. If no nests are observed, no further mitigation is required.

c. If woodrat nests are observed within an area scheduled for clearing or grading, the biologist shall prepare a plan to either relocate the nest or construct a replacement nest in an area nearby that is not going to be disturbed. The plan shall be submitted to CDFW for approval and the County/applicant shall obtain permission from CDFW prior to implementing any nest relocation or replacement.

Riparian Woodland

Riparian woodlands are a sensitive and regulated habitat. Riparian woodland is considered a sensitive natural community by the California Department of Fish and Wildlife (CDFW), and is regulated under the California Fish and Game Code Section 1600 regarding lake and streambed alteration agreements. The riparian woodland in the project area falls within the CDFW stream zone, which extends laterally to the outer edge of riparian vegetation. Riparian corridors are also regulated by the County of Santa Cruz as a sensitive habitat (County Code 16.32). Projects such as the library project, which occur within a riparian area, require implementation of avoidance and minimization measures and mitigation for unavoidable impacts.

Impacts

Phase 1 and Phase 2 of the project would permanently impact approximately 7,049 square feet of riparian habitat. The Phase 1 disturbance, which totals approximately 5,569 square feet, would result from construction of the parking lot, patio area and the trail to the new bridge. Phase 2 disturbance, which totals approximately 1,480 square feet, would result from the construction of the outdoor education feature and trail and second footbridge. The project Biotic Report, prepared by Biotic Resource Group, provides mitigations for this disturbance, the implementation of which would reduce impacts to less than significant.

Mitigation Measures

The following mitigation measures would reduce significant impacts to riparian woodland to a less than significant level.

BIO-3: Provide Compensatory Mitigation for Impacts to Riparian Corridor. The following measures for erosion control and revegetation of the project area shall occur after construction. Pursuant to obtaining permits from USACE, CDFW and RWQCB, implement compensatory mitigation for Phase One and Phase Two project components to achieve the following: (Note: Regulatory agencies may require additional measures)

a. For Phase One work designate a minimum of 11,138 sq. ft. of native riparian mitigation. For Phase Two work designate a minimum of 2,960 sq. ft. of riparian mitigation. Mitigation shall occur in areas not currently supporting riparian trees/woodland. A preliminary review of the County property and the adjacent SLVWD property found approximately 14,179 sq. ft. of open areas suitable for revegetation. These areas are located outward of the existing riparian woodland. This mitigation will provide adequate compensation for temporary and permanent impacts to the riparian woodland and provide the following riparian functions: cover and forage for native wildlife and native riparian woodland plant diversity at a 2:1 (replacement: impact) ratio. Include tree replacement for trees removed by the project, using a minimum 3:1 tree replacement ratio. A conceptual layout of riparian compensation areas is presented in Appendix A. The plan depicts approximately 14,179 sq. ft. of riparian revegetation area as compensation for the Phase One and Phase Two project components.

b. Install native riparian vegetation that can persist in winter-wet and summer-dry site conditions. Provide supplemental irrigation in Years 1-2, or longer if there is an unseasonable drought or other unforeseen circumstance that requires a longer irrigation period. A preliminary plant list is presented in Table 4. Tree replacement shall be at minimum of 2:1.
c. Utilize plant propagules collected from the greater San Lorenzo River watershed and/or Santa Cruz County in the revegetation efforts. Obtain plants from native plant nurseries that employ Best Management Practices (BMP's) that control or eliminate the diseases caused by *Phytopthora ramorum*, as outlined by the California Oak Mortality Task Force.
d. Maintain 100% survival of installed container stock in Years 1-3, then achieve 80% survival in Years 4-5. Install replacement plants if needed to meet survival rates. If substantial replanting is necessary, the maintenance and monitoring period may need to be extended so that each plant is maintained and monitored for 5 years.
e. Control cover of target invasive weeds (e.g., thistles, Himalaya berry, Cape ivy, English ivy, pyracantha, and others) to less than 5% each year.
f. Maintain and monitor the site annually for 5 years and/or every year thereafter until success criteria have been met. Submit annual reports to County Planning Department by December 31 of each monitoring year. Submit annual monitoring reports for CDFW, RWQCB, and USACE as required by each regulating agency.

Table 4. Preliminary Planting List for Riparian Woodland Mitigation, August 2017

Common Name	Scientific Name	Size
Trees		
Arroyo Willow	*Salix lasiolepis*	Pole Cutting

Black Cottonwood	*Populus trichocarpa*	Pole Cutting
Dogwood	*Cornus sericea*	Tree Pot
Box Elder	*Acer negundo*	Tree Pot
Sycamore	*Platanus racemosa*	Tree Pot
Blue Elderberry	*Sambucus mexicana*	Tree Pot
Coast Live Oak	*Quercus agrifolia*	Tree Pot
Shrubs and Groundcovers		
Snowberry	*Symphoricarpos mollis. S. albus*	1 gallon
Flowering Currant	*Ribes sanguineum var. glutinosum*	1 gallon
California Blackberry	*Rubus ursinus*	1 gallon
California Rose	*Rosa californica*	1 gallon
California Bee Plant	*Scrophularia californica*	4" or 1 gallon
Spreading Rush	*Juncus patens*	4" or 1 gallon
Douglas or Ground Iris	*Iris douglasii or I. fernaldi*	4" or 1 gallon
Wetland Plants for Culvert Removal/Bridge Construction Area		
Santa Barbara Sedge	*Carex barbarae*	4" or 1 gallon
Bog Rush	*Juncus effusus*	4" or 1 gallon
Pacific Silverweed	*Potentilla anserina*	4" or 1 gallon
Dense Sedge	*Carex densa*	4" or 1 gallon

BIO-4: Implement Tree Protection and Erosion Control Measures Prior to and During Construction. The County and the outdoor education program shall implement standard erosion control BMPs and riparian habitat/tree protection measures during the construction period to minimize impacts to Bull Creek, including: (Note: Regulatory agencies may require additional measures)

a. Implement tree protection measures as outlined in the arborist report (Tree Inventory, Assessment, and Protection, August 8, 2017 by Monarch Consulting Arborists LLC, Richard Gessner, Arborist, Attachment 5).
b. Install perimeter silt fencing and construction area limit-of-work fencing. Install both the silt and plastic mesh fencing at the perimeter of the work area to prevent inadvertent impacts to the adjacent forest vegetation, creek channel, and injury to adjacent native trees. Protective fencing shall be in place prior to ground disturbances and removed once all construction is complete. During construction, no grading, construction or other work shall occur outside the designated limits of work. Maintain fencing in functional condition throughout the construction period, replace and repair as needed.
c. No excess soil, chemicals, debris, equipment or other materials shall be

dumped or stored outside the designated limits of work.

d. Hand tools shall be used to trim vegetation to the extent necessary to gain access to the work area. All removed material/vegetation shall be removed from the riparian corridor.

e. All staging of equipment and materials, and refueling of equipment, shall be located in existing roadways and parking areas. The contractor shall prepare and implement a fuel spill prevention and clean-up plan.

Migratory Bird Treaty Act

Migratory birds are protected under the federal Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR Part 10 including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). All migratory bird species are protected by the MBTA. Any disturbance that causes direct injury, death, nest abandonment, or forced fledging of migratory birds, is restricted under the MBTA. Any removal of active nests during the breeding season or any disturbance that results in the abandonment of nestlings is considered a 'take' of the species under federal law.

Impacts

Nesting birds may occur in the riparian vegetation which is proposed to be removed as well as in the woodland adjacent to the project site. Removal of trees and other vegetation for construction has the potential to kill or injure nesting birds, if any are present in the construction area. Noise from construction has the potential to cause abandonment by adult birds of chicks or eggs in areas of close proximity to construction. Because most nesting birds are protected by the Migratory Bird Treaty Act, measures are listed below to avoid potentially significant impacts if any are present during construction.

Mitigation Measures

The following mitigation measures would reduce significant impacts to a less than significant level.

BIO-5: Avoid impacts to Nesting Birds. Implement the following measures to avoid impacting nesting birds, if present. (Note: CDFW may require additional measures)

a. Schedule tree/vegetation removal to occur during the non-breeding season of raptors and migratory birds. Tree removal and limbing should occur between August 31 and March 14 of any given year. If this is not possible, then have a qualified biologist conduct a preconstruction survey for nesting birds. The surveys shall be conducted no more than 14 days prior to beginning of construction or vegetation removal.

b. A buffer zone with highly visible tape or fencing shall be established around the active bird nest and no construction shall take place within the buffer zone until the biologist confirms that all young have fledged the nest.
c. Buffer distances for bird nests should be site specific and an appropriate distance, as determined by a qualified biologist. The buffer distances should be specified to protect the bird's normal bird behavior to prevent nesting failure or abandonment. The buffer distance recommendation should be developed after field investigations that evaluate the bird(s) apparent distress in the presence of people or equipment at various distances. Abnormal nesting behaviors which may cause reproductive harm include, but are not limited to, flights/vocalizations directed towards project personnel, standing up from a brooding position, and flying away from the nest.
d. The qualified biologist shall have authority to order the cessation of all nearby project activities if the nesting birds exhibit abnormal behavior which may cause reproductive failure (nest abandonment and loss of eggs and/or young) until an appropriate buffer is established.
e. Typical protective buffers between each identified nest site and the construction site are as follows: i) 1,000 feet for large raptors such as buteos; ii) 500 feet for small raptors such as accipiters; and iii) 250 feet for passerines. The qualified biologist shall monitor the behavior of the birds (adults and young, when present) at the nest site to ensure that they are not disturbed by project activities. Nest monitoring shall continue during project activities until the young have fully fledged, are no longer being fed by the parents and have completely left the nest site, as determined by the qualified biologist.
f. The biologist shall prepare a report of nest survey results, nest monitoring (if any), and the dates when the nesting was completed, a report suitable for the applicant to submit to County and State resource agencies.

Tree Removal within Sensitive Habitats

The County regulates vegetation removal within riparian corridors which are identified as a sensitive habitat in County Code 16.34.

Impacts

Within the riparian corridor, trees adjacent to construction could inadvertently sustain impacts from construction activities. In addition, human uses within and/or in close proximity to the riparian corridor can adversely affect native wildlife utilization of the habitat.

Mitigation Measures

The following mitigation measures would reduce significant impacts to a less than significant level.

BIO-6: Trees to be retained that are located adjacent to construction shall be protected during construction, as directed by an arborist. If inadvertent damage to trees occurs, a remediation program should be developed by the arborist and implement; the measures shall be inspected by the County of Santa Cruz Planning Department and arborist to determine the success of the remedial measures. Oak trees removed by the project shall be replaced at a minimum of 2 new trees for every 1 tree removed.

BIO-7: To reduce project impacts from the project's encroachment into the County-designated riparian corridor, following Phase One construction, the County shall install a low split-rail type fence or vegetative barrier plantings between the riparian woodland and the parking lots/areas (where the parking areas are located adjacent to the riparian woodland). The fence or vegetative barrier plantings would protect the riparian area from indirect impacts from facility users (e.g. trampling, deposition of debris and garbage, etc.). The pedestrian paths constructed in Phase one and Phase Two should include signs to encourage users to stay on the path and not trample adjacent riparian vegetation.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
2. *Have a substantial adverse effect on any riparian habitat or sensitive natural community identified in local or regional plans, policies, regulations (e.g., wetland, native grassland, special forests, intertidal zone, etc.) or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?*	☐	☒	☐	☐

Discussion: See discussion in D-1 above. Mitigation measures BIO-3, BIO-4, BIO-6, BIO-7, and BIO-8 would reduce impact to a less than significant level.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3. *Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?*	☐	☐	☒	☐

Discussion: No federally or locally defined wetlands were found on-site (Attachment 2, page 5). Given this no impact to federally protected wetlands would occur.

BIO-8: In order to remove the culvert, about 54 feet of Bull Creek would have to be temporarily dewatered. The following are included as measures to ensure that no significant impact occurs in the dewatering stage of the project.

1. This dewatering plan is to be implemented by the Contractor when water is flowing in the creek between June 1st and October 15th. All in-stream project work and dewatering shall be limited to this period.

2. Detail of the proposed dewatering plan shall be approved by the County of Santa Cruz.

3. The project biologist shall be on-site to observe the dewatering of Bull Creek in order to relocate upstream any native aquatic fauna that are present in the dewatered reach.

4. The Contractor should expect to temporarily install pressure driven diversion systems to efficiently bypass clean creek water around the diversion area and remove silty water from the diversion area.

5. The proposed diversion pipes and pump sizes shall be sufficient to handle actual flows during the construction period.

6. The planned sump discharge site shall be revegetated in accordance with the Contractor's approved site dewatering plan and as directed by the County.

7. Prior to construction of the dewatering facilities a qualified county hired fish biologist, who has been authorized by National Marine Fisheries Service (NMFS) to handle protected fish, shall preform a survey for California Red-legged Frog with rescue and relocation as needed.

8. A letter from the county consulting biologist with the results of the survey and description of the rescue operations shall be submitted to the county Environmental Planning staff.

9. All dewatering facilities and diversion dams shall be removed at the end of the project and the stream channel shall be restored to conditions appropriate to those before the culvert being removed was originally placed in the creek.

10. The Contractor shall designate a staging area at a minimum of 20 meters removed from the construction site. All materials storage, portable restrooms, equipment and parking and other parts of the work not directly required to be in the area of the dewatering facilities shall be in this staging area.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
4 *Interfere substantially with the movement of any native resident or migratory fish or wildlife species or migratory wildlife corridors, or impede the use of native wildlife nursery sites?*	☐	☐	☒	☐

Discussion: Although County staff observed a rainbow trout on-site, it is not a migratory species. Bull Creek does not support Coho salmon or steelhead. The avoidance measures discussed above in D-1 and D-3 would help ensure that impacts to native resident fish, i.e. rainbow trout, are avoided.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
5. *Conflict with any local policies or ordinances protecting biological resources (such as the Sensitive Habitat Ordinance, Riparian and Wetland Protection Ordinance, and the Significant Tree Protection Ordinance)?*	☐	☒	☐	☐

Discussion: See discussions under D-1 and D-3 above. With the approval of a Riparian Exception, the project would be consistent with the County of Santa Cruz Riparian Corridor and Wetlands Protection Ordinance (Section 16.30.060 of the County Code). A Riparian Exception is required to allow for the removal of the culvert in Bull Creek, as well as the construction of: two pedestrian bridges, pedestrian path, parking lot, utilities (e.g. septic equipment, stormwater pipe), and some of the outdoor education stations. The following findings would need to be made.

1. *That there are special circumstances or conditions affecting the property;*

   The project site is significantly constrained by the presence of Bull Creek on the project site. The Bull Creek riparian corridor (which includes the channel and the associated riparian woodland vegetation) as well as the associated 100-year floodplain limits the area of developable land to approximately 16,500 square feet on the south side of the creek where the library is proposed. Given this, it is reasonable to allow modest encroachments into the riparian vegetation to enable the construction of the library improvements, including the required parking, and the outdoor education feature. In addition, removing the culvert in Bull Creek and replacing it with a pedestrian bridge that spans the creek (i.e. no footings are proposed for within the channel) would benefit the creek by removing a constriction point. On the north side of Bull Creek, the outdoor education stations would be sited outside of the riparian vegetation, but the path leading from the pedestrian bridge would unavoidably be located within the riparian corridor. The impact of this path would be minimal.

2. *That the exception is necessary for the proper design and function of some permitted*

or existing activity on the property;

As noted above, the presence of Bull Creek on the library parcel significantly constrains the developable area due to the size of the riparian corridor and related 100 year flood plain. The library is modestly sized at less than 10,000 square feet. Although the library is located entirely outside of the riparian corridor, improvements such as the parking lot, outdoor education feature, and septic and drainage features are located within the riparian vegetation (which is a part of the riparian corridor). There is no suitable alternative location for these improvements. Parking lots, stormwater management and septic improvements are necessary—and even required-- for the proper design and function of the project.

3. *That the granting of the exception will not be detrimental to the public welfare or injurious to other property downstream or in the area in which the project is located;*

   The granting of a Riparian Exception is not anticipated to be detrimental to the public welfare or injurious to other property downstream or in the area in that there would be no permanent alteration in Bull Creek other than the removal of the culvert and replacement with a pedestrian bridge. Although the riparian exception would facilitate the construction of a parking lot that otherwise could not be constructed, the parking lot is not anticipated to have negative downstream impacts in that there is adequate downstream capacity (Attachment 11) and it would be constructed of pervious paving, which allows for runoff to be infiltrated. To address the potential for sedimentation and water quality impacts during construction, the installation of sediment control devices and erosion control measures would be required.

4. *That the granting of this exception, in the Coastal Zone, will not reduce or adversely impact the riparian corridor, and there is no feasible less environmentally damaging alternative; and*

   The project is not located within the Coastal Zone.

5. *That the granting of the exception is in accordance with the purpose of this chapter, and with the objectives of the General Plan and elements thereof, and the Local Coastal Program Land Use Plan.*

   The granting of a Riparian Exception would be in accordance with the purpose of the Riparian Protection Ordinance and with the objectives of the General Plan, specifically Policy Objective 5.2 (Riparian Corridors and Wetlands). The project would be conditioned to obtain approvals from the United States Army Corps of Engineers (USACE), California Department of Fish and Wildlife and the Regional

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Water Quality Control Board as required by General Plan Policy 5.2.3.

Impacts from project implementation would be less than significant with mitigation incorporated.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
6. *Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?*	☐	☐	☐	☒

Discussion: The proposed project would not conflict with the provisions of any adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Therefore, no impact would occur.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
7. *Produce nighttime lighting that would substantially illuminate wildlife habitats?*	☐	☐	☒	☐

Discussion: The development area is adjacent to a riparian corridor, which could be adversely affected by a new or additional source of light that is not adequately deflected or minimized. The following project conditions, as required by County Code 13.11.074(D), would be included to minimize the impact of exterior lighting: all lighting shall be directed onto the site and away from adjacent properties; light sources shall be shielded; and light standards may not be any higher than 15 feet. The impact of the project's nighttime lighting would result in a less than significant impact.

E. CULTURAL RESOURCES

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
1. *Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5?*	☐	☐	☐	☒

Discussion: There are no structures on the property. As a result, no impacts to historical resources would occur from project implementation.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
2. *Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5?*	☐	☐	☒	☐

Discussion: According to the Archeological Reconnaissance Report prepared by Robert L. Edwards and Charr Simpson Smith of Archaeological Associates of Central California dated July 2012 (Attachment 6), there is no evidence of pre-historic cultural resources. However, pursuant to Section 16.40.040 of the Santa Cruz County Code, if archeological resources are uncovered during construction, the responsible persons shall immediately

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

cease and desist from all further site excavation and comply with the notification procedures given in County Code Chapter 16.40.040, which requires the notification of the Sheriff-Coroner if human remains are found and notification of the Planning Director if the discovery contains no human remains.

Impacts are expected to be less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3. *Disturb any human remains, including those interred outside of dedicated cemeteries?*	☐	☐	☒	☐

Discussion: Impacts are expected to be less than significant and no human remains are expected to be found on the project site. However, pursuant to Section 16.40.040 of the Santa Cruz County Code, if at any time during site preparation, excavation, or other ground disturbance associated with this project, human remains are discovered, the responsible persons shall immediately cease and desist from all further site excavation and notify the sheriff-coroner and the Planning Director. If the coroner determines that the remains are not of recent origin, a full archeological report shall be prepared and representatives of the local Native California Indian group shall be contacted. Disturbance shall not resume until the significance of the archeological resource is determined and appropriate mitigations to preserve the resource on the site are established.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
4. *Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?*	☐	☐	☐	☒

Discussion: No unique paleontological resources or unique geologic features are known to occur in the vicinity of the proposed project. No impacts are anticipated.

F. GEOLOGY AND SOILS

Would the project:

1. *Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:*

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
A. *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.*	☐	☐	☒	☐

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
B.	*Strong seismic ground shaking?*	☐	☐	☒	☐
C.	*Seismic-related ground failure, including liquefaction?*	☐	☒	☐	☐
D.	*Landslides?*	☐	☐	☒	☐

Discussion (A through D): The project site is located outside of the limits of the State Alquist-Priolo Special Studies Zone (County of Santa Cruz GIS Mapping, California Division of Mines and Geology, 2001). However, the project site is located approximately 8.5 miles southwest of the San Andreas fault zone, and approximately 4.1 miles south of the Zayante fault zone. While the San Andreas fault is larger and considered more active, each fault is capable of generating moderate to severe ground shaking from a major earthquake. Consequently, large earthquakes can be expected in the future. The October 17, 1989 Loma Prieta earthquake (magnitude 7.1) was the second largest earthquake in central California history.

All of Santa Cruz County is subject to some hazard from earthquakes. However, the project site is not located within or adjacent to a county or state mapped fault zone. A geotechnical investigation for the proposed project was performed by Brian D. Bauldry and Daleth Foster of Bauldry Engineering, dated December 12, 2003. Subsequent to that report, Brian D. Bauldry and Elizabeth M. Mitchell of Pacific Crest Engineering, Inc. provided a Geotechnical Investigation Report Update dated May 29, 2017. (Attachment 7). The report concludes that the loose to medium dense sands under-lying the site have a potential for liquefaction. The Pacific Crest report notes, however, that, "Structures built in accordance with the latest edition of the California Building Code have an increased potential for experiencing relatively minor damage which should be repairable." To that end, Carolyn Burke, Senior Civil Engineer for the County of Santa Cruz, has determined that the geotechnical reports are adequate for determining project feasibility but that additional recommendations related to site preparation and construction should be made to address the liquefaction risk and provides a requirement (GEO-1) for the future acceptance of the soils report and project plans.

<u>Impacts</u>

The project site contains soils that may be subject to liquefaction. When ground movement accelerates soils grains such that the soils becomes like a fluid, structures can become severely damaged or destroyed. Unmitigated by appropriate engineering, this has the potential to result in bodily injury or death.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Mitigation Measures

GEO-1: The geotechnical constraints [i.e. high ground water and potentially liquefiable soils] shall be addressed through the removal and replacement of all loose soils with compacted engineered fill, construction of a mat slab or similar type of foundation able to tolerate differential settlements, and the installation of subsurface drainage facilities to direct groundwater away from the proposed structure and associated utilities. Provided these features are included in the final project design, the identified constraints at the site would not result in a significant impact.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
2. *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?*	☐	☒	☐	☐

Discussion: The report cited above (see Discussion under F-1) concluded that there is a potential risk from liquefaction. The recommendations contained in the geotechnical report, as well as those noted by Carolyn Burke (Attachment 8), including the replacement of loose soils with engineered fill, the use of a mat slab or similar foundation, and drainage improvements, would be implemented to reduce this potential hazard to a less than significant level (Attachments 7 and 8). See Mitigation GEO-1 above.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3. *Develop land with a slope exceeding 30%?*	☐	☐	☐	☒

Discussion: No improvements are proposed on slopes in excess of 30%.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
4. *Result in substantial soil erosion or the loss of topsoil?*	☐	☐	☒	☐

Discussion: Some potential for erosion exists during the construction phase of the project, however, this potential is minimal because the site is relatively level and standard erosion controls are a required condition of the project. Prior to approval of a grading or building permit, the project must have an approved Erosion Control Plan (*Section 16.22.060 of the County Code*), which would specify detailed erosion and sedimentation control measures. The plan would include provisions for disturbed areas to be planted with ground cover and to be maintained to minimize surface erosion. Impacts from soil erosion or loss of topsoil would be considered less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
5. *Be located on expansive soil, as defined in Section 1802.3.2 of the California Building Code (2007), creating substantial*	☐	☐	☐	☒

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

risks to life or property?

Discussion: The geotechnical report for the project did not identify any elevated risk associated with expansive soils. Therefore, no impact is anticipated.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
6. *Have soils incapable of adequately supporting the use of septic tanks, leach fields, or alternative waste water disposal systems where sewers are not available for the disposal of waste water?*	☐	☐	☐	☒

Discussion: The proposed project would use a septic system, and County Environmental Health Services has accepted the plan which includes the placement of the leach field within the Hihn Street right-of-way (Attachment 9).

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
7. *Result in coastal cliff erosion?*	☐	☐	☐	☒

Discussion: The proposed project is not located in the vicinity of a coastal cliff or bluff; and therefore, would not contribute to coastal cliff erosion. No impact is anticipated.

G. GREENHOUSE GAS EMISSIONS

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
1. *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?*	☐	☐	☐	☐

Discussion: The proposed project, like all development, would be responsible for an incremental increase in greenhouse gas emissions by usage of fossil fuels during the site grading and construction. Santa Cruz County has recently adopted a Climate Action Strategy (CAS) intended to establish specific emission reduction goals and necessary actions to reduce greenhouse gas levels to pre-1990 levels as required under AB 32 legislation. The strategy intends to reduce greenhouse gas emissions and energy consumption by implementing measures such as reducing vehicle miles traveled through the County and regional long range planning efforts and increasing energy efficiency in new and existing buildings and facilities. All project construction equipment would be required to comply with the Monterey Bay Air Resources District emissions requirements for construction equipment. As a result, impacts associated with the temporary increase in greenhouse gas emissions are expected to be less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
2. *Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?*	☐	☐	☒	☐

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Discussion: See the discussion under G-1 above. No significant impacts are anticipated.

H. HAZARDS AND HAZARDOUS MATERIALS

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
1. *Create a significant hazard to the public or the environment as a result of the routine transport, use or disposal of hazardous materials?*	☐	☐	☒	☐

Discussion: The proposed project would not create a significant hazard to the public or the environment. No routine transport or disposal of hazardous materials is proposed. However, during construction, fuel would be used at the project site. Best management practices would be used to ensure that no impacts would occur. Impacts are expected to be less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
2. *Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?*	☐	☐	☒	☐

Discussion: Please see discussion under H-1 above. Project impacts would be considered less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3. *Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?*	☐	☐	☐	☒

Discussion: San Lorenzo Valley High School is located at 7105 Highway 9, approximately 3,800 feet to the north of the project site. Although fueling of equipment may occur within the staging area, best management practices would be implemented. No impacts are anticipated.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
4. *Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?*	☐	☐	☐	☒

Discussion: The project site is not included on the 12/19/16 list of hazardous sites in Santa Cruz County compiled pursuant to Government Code Section 65962.5. No impacts

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

are anticipated from project implementation.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
5. *For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?*	☐	☐	☐	☒

Discussion: The proposed project is not located within two miles of a public airport or public use airport. No impact is anticipated.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
6. *For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?*	☐	☐	☐	☒

Discussion: The nearest private airstrip, the Bonny Doon Village Airport, is located in Bonny Doon approximately three miles to the northwest. No impact is anticipated.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
7. *Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?*	☐	☐	☐	☒

Discussion: The proposed project would not conflict with implementation of the County of Santa Cruz Local Hazard Mitigation Plan 2015-2020 (County of Santa Cruz, 2020). Therefore, no impacts to an adopted emergency response plan or evacuation Plan would occur from project implementation.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
8. *Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?*	☐	☐	☒	☐

Discussion: Although the proposed project is located in a Fire Hazard Area, the project design incorporates all applicable fire safety code requirements and includes fire protection devices as required by the local fire agency. Impacts would be less than significant.

I. HYDROLOGY, WATER SUPPLY, AND WATER QUALITY

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
1. *Violate any water quality standards or waste discharge requirements?*	☐	☐	☒	☐

Discussion: The project would not discharge runoff either directly or indirectly into a

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

public or private water supply. Regardless, no commercial or industrial activities are proposed that would generate a substantial amount of contaminants. The parking and driveway associated with the project would incrementally contribute urban pollutants to the environment; however, the contribution would be minimal given the size of the driveway and parking area. Potential siltation from the proposed project would be addressed through implementation of erosion control best management practices (BMPs). The project engineer has prepared a Stormwater Pollution Plan which would be reviewed by the Regional Water Quality Control Board. No water quality standards or waste discharge requirements would be violated. Impacts would be less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
2. *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?*	☐	☐	☒	☐

Discussion: The project would obtain water from San Lorenzo Valley Water District and would not rely on private well water. Although the project would incrementally increase water demand, the Water District has indicated that adequate supplies are available to serve the project (Attachment 10).

Although the proposed project would be located in a mapped groundwater recharge area, the proposal would be consistent with General Plan policies 5.8.2 (*Land Division and Density Requirements in Primary Groundwater Recharge Areas*) since no land division is proposed, 5.8.3 (*Uses in Primary Groundwater Recharge Areas*), and 5.8.4 (*Drainage Design in Primary Groundwater Recharge Areas*). The project would also be consistent with Section 7.79.110 of the County Code (*New Development and Redevelopment*). The code states, "All responsible parties shall mitigate impacts due to development and implement Best Management Practices (BMPs) per the County Design Criteria adopted by the County of Santa Cruz and Chapters 16.20 and 16.22 SCCC to control the volume, runoff rate, and potential pollutant load of stormwater runoff from new development and redevelopment projects to minimize the generation, transport, and discharge of pollutants, prevent runoff in excess of predevelopment conditions, and maintain predevelopment groundwater recharge." David Heinrichsen of Ifland Engineers prepared a preliminary stormwater control plan, dated July 5, 2017. In it, he incorporates BMPs. The parking lot is to be constructed of pervious paving and runoff from the impervious portions of the project (the building and concrete surfaces) would be routed through the raingarden located on the west

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

side of the building or the pervious parking lot. Runoff that does not infiltrate would be released from the site at the pre-development rate. Given this, groundwater recharge would be facilitated. No adverse impact would occur to groundwater recharge with project implementation.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3. *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?*	☐	☐	☒	☐

Discussion: The proposed project is located adjacent to Bull Creek, and has the potential to generate water quality impacts during construction. However, the proposed project would be consistent with County Code Section 7.79.070, which states, "No person shall make any unpermitted alterations to drainage patterns or modifications to the storm drain system or any channel that is part of receiving waters of the county. No person shall deposit fill, debris, or other material in the storm drain system, a drainage channel, or on the banks of a drainage channel where it might enter the storm drain system or receiving waters and divert or impede flow." Although 54 linear feet of Bull Creek would be temporarily dewatered with the installation of a coffer dam to facilitate construction, this temporary alteration to the drainage pattern and channel would be temporary and fully permitted. An erosion control plan would also be required per Section 16.22.060 of the County Code. The Department of Public Works Drainage Section staff has reviewed and approved the proposed drainage plan. Impacts would be less than significant.

The following water quality protection and erosion and sediment control best management practices (BMPs) would be implemented, based on standard County requirements, to minimize construction-related contaminants and mobilization of sediment to Bull Creek.

The BMPs will be selected to achieve maximum sediment removal and represent the best available technology that is economically achievable and are subject to review and approval by the County. The County will perform routine inspections of the construction area to verify the BMPs are properly implemented and maintained. The County will notify contractors immediately if there is a noncompliance issue and will require compliance.

The BMPs will include, but are not limited to, the following.

- All earthwork or foundation activities involving rivers, ephemeral drainages, and culverts, will occur in the dry season (generally between June 1 and October 15).
- Implement a netting and tarp system at the bridge site to prevent and minimize debris from entering the river during demolition and construction activities.
- Equipment used in and around drainages and wetlands will be in good working

order and free of dripping or leaking engine fluids. All vehicle maintenance will be performed at least 300 feet from all drainages and wetlands. Any necessary equipment washing will be carried out where the water cannot flow into drainages or wetlands.

- Develop a hazardous material spill prevention control and countermeasure plan before construction begins that will minimize the potential for and the effects of hazardous or toxic substances spills during construction. The plan will include storage and containment procedures to prevent and respond to spills and will identify the parties responsible for monitoring the spill response. During construction, any spills will be cleaned up immediately according to the spill prevention and countermeasure plan. The County will review and approve the contractors' toxic materials spill prevention control and countermeasure plan before allowing construction to begin. Prohibit the following types of materials from being rinsed or washed into the streets, shoulder areas, or gutters: concrete; solvents and adhesives; thinners; paints; fuels; sawdust; dirt; gasoline; asphalt and concrete saw slurry; heavily chlorinated water.
- Any surplus concrete rubble, asphalt, or other rubble from construction will be taken to a local landfill.
- An erosion and sediment control plan will be prepared and implemented for the proposed project. It will include the following provisions and protocols. The Storm Water Pollution Prevention Plan (SWPPP) for the project will detail the applications and type of measures and the allowable exposure of unprotected soils.
    - Discharge from dewatering operations, if needed, and runoff from disturbed areas will be made to conform to the water quality requirements of the waste discharge permit issued by the RWQCB.
    - Temporary erosion control measures, such as sandbagged silt fences, will be applied throughout construction of the proposed project and will be removed after the working area is stabilized or as directed by the engineer. Soil exposure will be minimized through use of temporary BMPs, groundcover, and stabilization measures. Exposed dust-producing surfaces will be sprinkled daily, if necessary, until wet; this measure will be controlled to avoid producing runoff. Paved streets will be swept daily following construction activities.
    - The contractor will conduct periodic maintenance of erosion and sediment control measures.
    - An appropriate seed mix of native species will be planted on disturbed areas upon completion of construction, as described in the Biotic Report's preliminary

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

revegetation plan (Attachment 2).

- Cover or apply nontoxic soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more) that could contribute sediment to waterways.
- Enclose and cover exposed stockpiles of dirt or other loose, granular construction materials that could contribute sediment to waterways. Material stockpiles will be located in non-traffic areas only. Side slopes will not be steeper than 2:1. All stockpile areas will be surrounded by a filter fabric fence and interceptor dike.
- Contain soil and filter runoff from disturbed areas by berms, vegetated filters, silt fencing, straw wattle, plastic sheeting, catch basins, or other means necessary to prevent the escape of sediment from the disturbed area.
- Use other temporary erosion control measures (such as silt fences, staked straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, sandbag dikes, and temporary re-vegetation or other ground cover) to control erosion from disturbed areas as necessary.
- Avoid earth or organic material from being deposited or placed where it may be directly carried into the channel.

Implementation of the above BMPs would ensure that water quality impacts to Bull Creek and its tributaries are less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
4. *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding, on- or off-site?*	☐	☐	☒	☐

Discussion: The proposed project would temporarily alter the course of Bull Creek as a part of the culvert removal process. However, once the coffer dam that is required to dewater the creek to facilitate construction is removed, the creek would be returned to its existing course. Given that the impact would be temporary, the impact would be less than significant. The overall drainage pattern of the site would not be altered. The Department of Public Works Drainage Section staff has reviewed and approved the proposed drainage plan. Impacts from project construction would be less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
5. *Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems, or*	☐	☐	☒	☐

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
provide substantial additional sources of polluted runoff?				

Discussion: Drainage calculations prepared by Ifland Engineers, dated July 5, 2017, have been reviewed for potential drainage impacts and accepted by the Department of Public Works (DPW) Drainage Section staff. The calculations show that the predevelopment runoff rate would be maintained. County of Santa Cruz Department of Public Works Department provided a Downstream Drainage Evaluation, dated May 16, 2017, (Attachment 11) that found that there is adequate capacity to convey the runoff from the library project. The runoff rate from the property would be controlled first by slowing down the runoff by running it through the raingardens located on the west side of the structure and/or through the pervious paving of the parking lot and the gravel bed below the parking lot. From there, some of the runoff would infiltrate (retention) and some of it would be detained and then released at the pre-development runoff rate. DPW staff have determined that existing storm water facilities are adequate to handle the increase in drainage associated with the project. Refer to response I-1 for discussion of urban contaminants and/or other polluting runoff. Impacts would be considered less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
6. *Otherwise substantially degrade water quality?*	☐	☐	☒	☐

Discussion: Please see discussion under I-1 above. Impacts would be considered less than significant with the implementation of BMPs.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
7. *Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?*	☐	☐	☐	☒

Discussion: No impact would occur as no housing is proposed as a part of this project.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
8. *Place within a 100-year flood hazard area structures which would impede or redirect flood flows?*	☐	☐	☒	☐

Discussion: Because the Federal Emergency Management Agency (FEMA) has not delineated the flood plain boundaries of Bull Creek, Ifland Engineers provided an analysis of the flood hazard in their document, *100-year Floodplain Analysis of Bull Creek at the Proposed Felton Library Site* (dated May 2017) (Attachment 12) which was accepted on August 10, 2017 by the County (Attachment 13). Based upon this study, the proposed library building would be located entirely outside of the 100-year floodplain. A small amount of fill (48 cubic yards) is required to create the grades necessary for accessibility

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

improvements located within the floodplain. To compensate for this fill, 48 cubic yards of cut would occur in a different area of the flood plain. Given this, the proposed project would not impede or redirect flood flows. In a subsequent memo, "Creek Crossing and Flood Plain" (Attachment 16) the project engineer, Dave Heinrichsen, specifically addresses the anticipated effect of replacing the 48-inch in diameter and 20-foot long culvert with pedestrian bridges. Because the culvert restricts the flow, Mr. Heinrichsen anticipates that "the channel improvements would allow the flow within the channel to increase." This, in turn, is expected to result in "a lowering of base flood elevations for the areas identified as 'Overbank Channel' in the 100-year Flood Plain Analysis." Given this, a less than significant impact is anticipated from the project as a whole, but specifically the replacement of the culvert with two pedestrian bridges.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
9. *Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?*	☐	☐	☐	☒

Discussion: The proposed project would not increase the risk of flooding and would not lead to the failure of a levee or dam. No impact would occur.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
10. *Inundation by seiche, tsunami, or mudflow?*	☐	☐	☐	☒

Discussion: There are two primary types of tsunami vulnerability in Santa Cruz County. The first is a teletsunami or distant source tsunami from elsewhere in the Pacific Ocean. This type of tsunami is capable of causing significant destruction in Santa Cruz County. However, this type of tsunami would usually allow time for the Tsunami Warning System for the Pacific Ocean to warn threatened coastal areas in time for evacuation (County of Santa Cruz 2010).

The more vulnerable risk to the County of Santa Cruz is a tsunami generated as the result of an earthquake along one of the many earthquake faults in the region. Even a moderate earthquake could cause a local source tsunami from submarine landsliding in Monterey Bay. A local source tsunami generated by an earthquake on any of the faults affecting Santa Cruz County would arrive just minutes after the initial shock. The lack of warning time from such a nearby event would result in higher causalities than if it were a distant tsunami (County of Santa Cruz 2010).

The project site is located approximately 6.5 miles inland, five miles beyond the effects of a tsunami. In addition, no impact from a seiche or mudflow is anticipated. No impact would occur.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

J. LAND USE AND PLANNING

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
1. Physically divide an established community?	☐	☐	☐	☒

Discussion: The proposed project does not include any element that would physically divide an established community. No impact would occur.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
2. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒

Discussion: The proposed project does not conflict with any regulations or policies adopted for the purpose of avoiding or mitigating an environmental effect. General Plan policy 5.2.3 (Activities Within Riparian Corridors and Wetlands) states: "Development activities, land alterations and vegetation disturbance within riparian corridors and wetlands and required buffers shall be prohibited unless an exception is granted per the Riparian Corridor and Wetlands Protection ordinance." Findings for a Riparian Exception have been made (see complete discussion under Section D-5). Impacts would be considered less than significant with implementation of the specified mitigation measures.

The project includes requests for two variances to allow a reduction to the front and side yard setbacks. The special circumstance is the presence of Bull Creek and the related 100-year floodplain which significantly constrains the developable area. The first variance is a request to reduce the southern side yard setback from the required 10 feet to 0 feet and 5 feet. Setbacks are intended, in part, to preserve access to light and air. In some cases, reducing setbacks can compromise a neighbor's access to light and air. In this case, an institutional use--the U.S. Post Office--would be the affected neighbor. Because the post office is located on the library project's southern side, shading impacts from the library would be negligible as the library's shadow would be mostly cast to the north. Therefore, a less than significant impact is anticipated.

The second variance request is to reduce the front setback from the required setback of 20 to 15 feet. This variance would have no environmental impact in that there would be no shading impacts to the post office and no vehicular line of sight would be compromised. Related to this is the placement of a book drop within the front yard setback. The book drop would be about one and one-quarter feet from the curb. The book drop would not have an environmental effect in that it is a modestly sized structure, which would not impede vehicular line of sight since there would be on-street parking along the curb in this location. Drivers exiting the library parking lot would need to pull forward, past the book drop, to have a clear line of sight before pulling into the travel lane of Gushee Street.

A Parking Plan approval is requested as a part of the application to allow 12 of the required 30 parking spaces to be provide as on-street parking rather than within the on-site parking lot. County Code 13.10.553(A) allows for a specific parking plan to supersede the County Code parking standards (13.10.552) in order to permit a significant public amenity. In this case, the library would be the significant public amenity. The parking plan, prepared by Mott Macdonald (Attachment 14) proposes to provide 18 of the 30[1] required parking spaces on-site with the remaining 12 spaces provided as on-street parking along Gushee Street. According to the project traffic engineer, parallel parking spaces require 20 linear feet per vehicle which would result in a need for 240 feet of frontage for 12 cars. Given that the frontage along southbound Gushee is about 600 feet long, there would be ample room to accommodate 12 on-street parking spaces.

The traffic engineer also evaluated the usage of this stretch of Gushee. He found "little to no parking occupancy along this section of Southbound Gushee Street along the project site frontage north of the library driveway" (page 8). By allowing a Parking Plan to supersede the standard parking requirement to provide all parking on-site, greater environmental protection would be afforded to Bull Creek since locating all of the required parking on-site would necessitate further intrusion in to the riparian woodland and the parking along Gushee Street is already developed, i.e. it would not require additional paving. The environmental impacts are anticipated to be less than significant since the smaller parking lot would have less of an impact than would a larger parking lot.

The project also requests a sign exception as allowed by County Code 13.10.587 (Sign Exceptions) to allow a sign of 36 square feet where the zone district allows 12 square feet. The sign would be set back sufficiently such that it would not affect the line of sight of drivers leaving the library. The sign would be sized appropriately for the library building. This larger sign, then, would have no impact on the environment.

The project is subject to the Felton Town Plan, which contains a number of policies related to the library. The Town Plan anticipates the need for a new library site. Page 37 directs any new library to conform to the Felton Town Plan Design Guidelines. Those Guidelines allow for painted wood, but prohibits bright, primary colors that contrast with the surrounding natural environment (page 36). Further, wood colors are limited to green, beige, tan and brown. The project's design would meet the intent of the requirement on page 37 to construct a new library as a cluster of small component structures rather than a

[1] Note that Mott Macdonald calculated the required parking as 32, with the library parking lot have a deficit of 14 spaces. Staff's calculation resulted in a parking requirement of 30 spaces.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

monolithic building in that the structure is one-story in height and the roof would be broken up with cross gables. The project would be conditioned to comply with these requirements to insure compliance with the Felton Town Plan. Therefore, no impact would occur.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3. *Conflict with any applicable habitat conservation plan or natural community conservation plan?*	☐	☐	☐	☒

Discussion: The proposed project would not conflict with any applicable habitat conservation plan or natural community conservation plan. No impact would occur.

K. MINERAL RESOURCES

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
1. *Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?*	☐	☐	☐	☒

Discussion: The site does not contain any known mineral resources that would be of value to the region and the residents of the state. Therefore, no impact is anticipated from project implementation.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
2. *Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?*	☐	☐	☐	☒

Discussion: The project site is zoned residential (R-1-10), which is not considered to be an Extractive Use Zone (M-3) nor does it have a Land Use Designation with a Quarry Designation Overlay (Q) (County of Santa Cruz 1994). Therefore, no potentially significant loss of availability of a known mineral resource of locally important mineral resource recovery (extraction) site delineated on a local general plan, specific plan or other land use plan would occur as a result of this project.

L. NOISE

Would the project result in:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
1. *Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*	☐	☐	☒	☐

Discussion: Although construction activities would likely occur during daytime hours, noise may be audible to nearby residents. However, periods of noise exposure would be temporary. Noise from construction activity may vary substantially on a day-to-day basis,

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

however the construction hours would be limited as a condition of approval of the discretionary approval to Monday through Friday, from 7 AM to 6 PM.

The development of a new, larger library is anticipated to increase traffic volumes in the vicinity of the project. Because traffic noise is a primary contributor to the local noise environment, any increase in traffic resulting from the development of new residential and commercial uses would be expected to proportionally increase local noise levels. The following General Plan policies are applicable to noise generation: Policy 6.9.1, Land Use Compatibility Guidelines; Policy 6.9.3 Noise Sensitive Land Uses; Policy 6.9.5, Residential Development; and Policy 6.9.7, Construction Noise. The proposed project, once operational, would create an incremental increase in the existing noise environment. However, this increase would be small, and would be similar in character to noise generated by the surrounding existing uses. Adherence to applicable County and/or state noise standards would ensure that potential impacts related to this issue are less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
2. *Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?*	☐	☐	☒	☐

Discussion: The use of construction equipment would potentially generate vibration in the project area. The nearest residential property is located directly adjacent to the north of the project site on Kirby Street. Although there would be some light grading and the construction of a path and outdoor education feature on the north side of Bull Creek during Phase 2, most of the construction would occur on the south side of Bull Creek, which is about 250 feet away. Given this, it is not anticipated that nearby residences would experience significant groundborne vibration or groundborne noise levels during construction activities associated with the proposed project. Therefore, impacts would be considered less than significant

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3. *A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?*	☐	☐	☒	☐

Discussion: Other than an incremental increase in vehicle trips, the proposed project would not be anticipated to result in a permanent increase in the ambient noise level. The main source of ambient noise in the project area is traffic noise along Highway 9. Impacts are expected to be less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
4. *A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?*	☐	☐	☒	☐

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Discussion: See discussion under L-1 above. Noise generated during project construction would increase the ambient noise levels in adjacent areas. Construction would be temporary, and construction hours would be limited to Monday through Friday from 7 AM to 6 PM as a condition of approval for the discretionary permit. Given the limited hours of construction activity and the limited duration of this impact, it is considered to be less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
5. *For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?*	☐	☐	☐	☒

Discussion: The proposed project is not within two miles of a public airport. Therefore, the proposed project would not expose people residing or working in the project area. No impact is anticipated.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
6. *For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?*	☐	☐	☐	☒

Discussion: The proposed project is not located within two miles of a private airstrip located. No impact is anticipated.

M. POPULATION AND HOUSING

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
1. *Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?*	☐	☐	☐	☒

Discussion: The proposed project would not induce substantial population growth in an area because the project does not propose any physical or regulatory change that would remove a restriction to or encourage population growth in an area including, but limited to the following: new or extended infrastructure or public facilities; new commercial or industrial facilities; large-scale residential development; accelerated conversion of homes to commercial or multi-family use; or regulatory changes including General Plan amendments, specific plan amendments, zone reclassifications, sewer or water annexations; or LAFCO annexation actions. No impact would occur.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
2. *Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?*	☐	☐	☐	☒

Discussion: The proposed project would not displace any existing housing. No impact would occur.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3. *Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?*	☐	☐	☐	☒

Discussion: The proposed project would not displace a substantial number of people since the project is a library proposed to be constructed on a vacant parcel. No impact would occur.

N. PUBLIC SERVICES

Would the project:

1. *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; including the maintenance of roads?*	☐	☐	☒	☐

Discussion (a through e): While the project represents an incremental contribution to the need for services, the increase would be minimal. Moreover, the project meets all of the standards and requirements identified by the local fire agency or California Department of Forestry, as applicable, and school, park and transportation fees, as applicable, to be paid by the applicant would be used to offset the incremental increase in demand for public roads. Impacts would be considered less than significant.

O. RECREATION

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
1. *Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?*	☐	☐	☒	☐

Discussion: The proposed project would not substantially increase the use of existing neighborhood and regional parks or other recreational facilities. Impacts would be considered less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
2. *Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?*	☐	☒	☐	☐

Discussion: The proposed project does not propose the expansion recreational facilities. The outdoor education feature is intended primarily to be educational, but would have some recreational value. The physical effect of the outdoor education feature on the environment would be minimal given its small size. Impacts from this aspect of the project are considered as a part of this document and would be less than significant with the implementation of the biotic mitigations discussed in section D above.

P. TRANSPORTATION/TRAFFIC

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
1. *Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?*	☐	☒	☐	☐

Discussion: A traffic impact analysis, dated August 28, 2017, was provided by Leo Trujillo of Mott Macdonald (Attachment 14). Using the 9th edition of the Institute of Transportation Engineers Trip Generation Manual, the number of trips generated by the library are calculated to be 458 daily trips with 59 trips occurring during the afternoon peak hour. Because the earliest the library opens is 11 AM, the morning peak hour would not be impacted. Mott Macdonald provided a trip distribution and assignment of those trips to nearby intersections. The report identifies that the intersection of Highway 9 and Felton Empire Road-Graham Hill Road is currently operating at level of service of "F" during the afternoon peak hour. Caltrans, the agency with jurisdiction over Highway 9, considers any trips added to a deficient intersection to be a significant impact.

The report identifies a mitigation, the restriping of eastbound Felton Empire Road at Graham Hill to allow for one left lane and one through-right lane. Although this mitigation would not improve the level of service as measured by delay in seconds, it would off-set the additional library trips. Based on Table 2 of the Mott Macdonald report, for the existing conditions, the delay would decrease from 39.2 to 33.5 seconds with the implementation of the mitigation. For the cumulative scenario, which is based on an assumed growth rate of 1.26% per year for 17 years (an increase of 21.4% over the existing conditions), the delay would decrease from 200.2 to 172.5 seconds with the implementation of the mitigation. Given the improvement in the delay afforded with the mitigation, the project would have a less than significant impact.

Mitigation Measure

TRA-1: Intersection of Highway 9/Felton Empire Road-Graham Hill Road

Restripe eastbound Felton Empire Road as one left lane and one through/right lane.

Pedestrian, Bicycle and Transit Mobility

The project was evaluated to determine if it would adversely affect adopted policies, plans or program supporting alternative transportation or generate pedestrian, bicycle, or pedestrian facilities and plans. The library site is located in downtown Felton, one block west of Highway 9. This is a location that would facilitate multi-destination trips since the downtown area includes a grocery store, pharmacy, gasoline stations, retail shops, and services. New frontage improvements, including an ADA-compliant sidewalk, would be constructed which would enhance the pedestrian environment. In addition, space has been left to accommodate a horse pathway just west of the sidewalk as envisioned by the Felton Town Plan. A horse hitching post has also been provided. Gushee Street is a relatively quiet street that preferred by bicyclists as an alternative to Highway 9. Ten bicycle parking spaces are shown on the library project plans, which conforms to County Code bicycle parking requirements. Santa Cruz Metro service is available. Route 34, the South Felton route, has a bus stop at the intersection of Kirby and Highway 9, which is located about two blocks away from the library. This route also includes San Lorenzo Valley High and is likely to be used by high schoolers to reach the library after school. A second Santa Cruz Metro route, Route 35 San Lorenzo Valley, provides access to the other communities of the San Lorenzo Valley which are located along Highway 9. The bus stop for Route 35 is located on Graham

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Hill Road near its intersection with Highway 9. Route 35A provides access to the San Lorenzo Valley, via Scotts Valley and terminates in downtown Santa Cruz. The project does not conflict with any adopted plan or policy relating to alternative forms of transportation. No impact would occur to pedestrian, bicycle and transit mobility.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
2. *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?*	☐	☐	☐	☒

Discussion: In 2000, at the request of the Santa Cruz County Regional Transportation Commission (SCCRTC), the County of Santa Cruz and other local jurisdictions exercised the option to be exempt from preparation and implementation of a Congestion Management Plan (CMP) per Assembly Bill 2419. As a result, the County of Santa Cruz no longer has a Congestion Management Agency or CMP. The CMP statutes were initially established to create a tool for managing and reducing congestion; however, revisions to those statutes progressively eroded the effectiveness of the CMP. There is also duplication between the CMP and other transportation documents such as the Regional Transportation Plan (RTP) and the Regional Transportation Improvement Program (RTIP). In addition, the goals of the CMP may be carried out through the Regional Transportation Improvement Program and the Regional Transportation Plan. Any functions of the CMP which are useful, desirable and do not already exist in other documents may be incorporated into those documents.

The proposed project would not conflict with either the goals and/or policies of the RTP or with monitoring the delivery of state and federally-funded projects outlined in the RTIP. No impact would occur.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3. *Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?*	☐	☐	☐	☒

Discussion: No change in air traffic patterns would result from project implementation. Therefore, no impact is anticipated.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
4. *Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?*	☐	☐	☐	☒

Discussion: The proposed project consists of a library and related improvements. No

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

increase in hazards would occur from project design or from incompatible uses. No impact would occur from project implementation.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
5. *Result in inadequate emergency access?*	☐	☐	☒	☐

Discussion: The project's road access has been approved by the local fire agency or California Department of Forestry, as appropriate.

A temporary lane closure may be required for short periods of time during construction, including the construction of the mitigations TRA-1. A traffic control plan would be prepared. However, the proposed project would not restrict emergency access for police, fire, or other emergency vehicles. Impacts would be less than significant from project implementation.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
6. *Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?*	☐	☐	☐	☒

Discussion: The proposed project design would comply with current road requirements to prevent potential hazards to motorists, bicyclists, and/or pedestrians. The project includes pedestrian improvements along Gushee Street in the form of a new sidewalk. In addition, the project leaves space beside the sidewalk (i.e. to the west of the sidewalk) to accommodate horse riders as required by the Felton Town Plan. No impact would occur.

Q. TRIBAL CULTURAL RESOURCES

1. *Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:*

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
A. *Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources Code section 5020.1(k), or*	☐	☐	☐	☒
B. *A resource determined by the lead agency, in its discretion and*	☐	☐	☐	☒

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.				

Discussion: The project proposes to establish a library and outdoor education feature. Section 21080.3.1(b) of the California Public Resources Code (AB 52) requires a lead agency formally notify a California Native American tribe that is traditionally and culturally affiliated within the geographic area of the discretionary project when formally requested. As of this writing, no California Native American tribes traditionally and culturally affiliated with the Santa Cruz County region have formally requested a consultation with the County of Santa Cruz (as Lead Agency under CEQA) regarding Tribal Cultural Resources. As a result, no Tribal Cultural Resources are known to occur in or near the project area. Therefore, no impact to the significance of a Tribal Cultural Resource is anticipated from project implementation.

R. UTILITIES AND SERVICE SYSTEMS

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
1. *Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?*	☐	☐	☐	☒

Discussion: The proposed project's wastewater flows would not violate any wastewater treatment standards. No significant impacts would occur from project implementation.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
2. *Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?*	☐	☐	☒	☐

Discussion: The project would be served by a sewage disposal system, which would be sized to accommodate the demands of the project. Impacts would be considered less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3. *Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause*	☐	☐	☒	☐

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
significant environmental effects?				

Discussion: Drainage analysis of the project by David A. Heinrichsen of Ifland Engineers dated July 5, 2017 concluded that the project would maintain the pre-development runoff rate at the site for the design storm (Attachment 15). Department of Public Works staff have reviewed the drainage information and have determined that downstream storm facilities are adequate to handle the increase in drainage associated with the project (Attachment 11). Therefore, no additional drainage facilities would be required for the proposed project. No impacts are expected to occur from the proposed project.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
4. *Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?*	☐	☐	☐	☒

Discussion: The San Lorenzo Valley Water District has indicated that adequate water supplies are available to serve the project and has issued a will-serve letter for the proposed project, subject to the payment of fees and charges in effect at the time of service (Attachment 10). The development would also be subject to the water conservation requirements. Therefore, existing water supplies would be sufficient to serve the proposed project, and no new entitlements or expanded entitlements would be required. Impacts would be less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
5. *Result in determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?*	☐	☐	☐	☒

Discussion: The proposed project would be served by a septic system. Given this, there would be no impacts to a wastewater treatment provider. No impacts are expected to occur from project implementation.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
6. *Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?*	☐	☐	☒	☐

Discussion: Due to the small incremental increase in solid waste generation by the proposed project during construction and operations, the impact would be less than significant.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
7. *Comply with federal, state, and local statutes and regulations related to solid waste?*	☐	☐	☐	☒

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Discussion: The project would comply with all federal, state, and local statutes and regulations related to solid waste disposal. No impact would occur.

S. MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
1. *Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal 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?*	☐	☒	☐	☐

Discussion: 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 were considered in the response to each question in Section III (A through Q) of this Initial Study. Resources that have been evaluated as significant would be potentially impacted by the project, particularly biotic resources. However, mitigation has been included that clearly reduces these effects to a level below significance. These mitigations include restoration of the riparian woodland plant community to compensate for the permanent removal of the plant community in the areas of development; mitigations to avoid and minimize impacts to the California red-legged frog, the San Francisco dusky-footed woodrat and nesting birds; and mitigations to post-construction encroachments into the riparian area. As a result of this evaluation, there is no substantial evidence that, after mitigation, significant effects associated with this project would result. Therefore, this project has been determined not to meet this Mandatory Finding of Significance.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
2. *Does the project have impacts that are individually limited, but cumulatively considerable? ("cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?*	☐	☒	☐	☐

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Discussion: In addition to project specific impacts, this evaluation considered the projects potential for incremental effects that are cumulatively considerable. As a result of this evaluation, there were determined to be potentially significant cumulative effects related to biotic resources and traffic. However, mitigation has been included that clearly reduces these cumulative effects to a level below significance. This mitigation includes measures to reduce these impacts to a less than significant level. As a result of this evaluation, there is no substantial evidence that there are cumulative effects associated with this project. Therefore, this project has been determined not to meet this Mandatory Finding of Significance.

3. *Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?*	☐	☒	☐	☐

Discussion: In the evaluation of environmental impacts in this Initial Study, the potential for adverse direct or indirect impacts to human beings were considered in the response to specific questions in Section III (A through Q). As a result of this evaluation, there were determined to be potentially significant effects to human beings related to the following: traffic. However, mitigation has been included that clearly reduces these effects to a level below significance. As a result of this evaluation, there is no substantial evidence that, after mitigation, there are adverse effects to human beings associated with this project. Therefore, this project has been determined not to meet this Mandatory Finding of Significance.

IV. REFERENCES USED IN THE COMPLETION OF THIS INITIAL STUDY

California Department of Conservation. 1980

Farmland Mapping and Monitoring Program Soil Candidate Listing for Prime Farmland and Farmland of Statewide Importance Santa Cruz County U.S. Department of Agriculture, Natural Resources Conservation Service, soil surveys for Santa Cruz County, California, August 1980.

County of Santa Cruz, 2013

County of Santa Cruz Climate Action Strategy. Approved by the Board of Supervisors on February 26, 2013.

County of Santa Cruz, 2015

County of Santa Cruz Local Hazard Mitigation Plan 2015-2020. Prepared by the County of Santa Cruz Office of Emergency Services.

County of Santa Cruz, 1994

1994 General Plan and Local Coastal Program for the County of Santa Cruz, California. Adopted by the Board of Supervisors on May 24, 1994, and certified by the California Coastal Commission on December 15, 1994.

MBUAPCD, 2008

Monterey Bay Unified Air Pollution Control District (MBUAPCD), CEQA Air Quality Guidelines. Prepared by the MBUAPCD, Adopted October 1995, Revised: February 1997, August 1998, December 1999, September 2000, September 2002, June 2004 and February 2008.

MBUAPCD, 2013a

Monterey Bay Unified Air Pollution Control District, NCCAB (NCCAB) Area Designations and Attainment Status – January 2013. Available online at
http://www.mbuapcd.org/mbuapcd/pdf/Planning/Attainment_Status_January_2013_2.pdf

MBUAPCD, 2013b

Triennial Plan Revision 2009-2011. Monterey Bay Air Pollution Control District. Adopted April 17, 2013.

This page intentially left blank.

Attachment 1

Mitigation Monitoring and Reporting Program

This page intentionally left blank.

County of Santa Cruz

PLANNING DEPARTMENT
701 Ocean Street, 4th Floor, Santa Cruz, CA 95060
(831) 454-2580 Fax: (831) 454-2131 Tdd: (831) 454-2123
KATHLEEN MOLLOY PREVISICH, PLANNING DIRECTOR

MITIGATION MONITORING AND REPORTING PROGRAM
for
Felton Library Project
Application No. 171167, August 14, 2017

No.	Environmental Impact	Mitigation Measures	Responsibility for Compliance	Method of Compliance	Timing of Compliance
Biological Resources					
BIO-1	*Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife, or U.S. Fish and Wildlife Service?*	**Avoid Minimize Potential Impacts to California Red-legged Frog.** The following measures shall be implemented to avoid and minimize potential impacts to California red-legged frog. a. At least 15 days prior to the onset of activities, the applicant or project proponent shall submit the name(s) and credentials of qualified biologist to USFWS (Service) at least 15 days prior to the onset of activities. The applicant or project proponent shall submit the name(s) and credentials of biologists who would conduct activities specified in the following measures. No project activities shall begin until proponents have received written approval from the Service that the biologist(s) is qualified to conduct the work. b. A Service-approved biologist shall survey the work site no more than 48 hours before the onset of activities. If California red-legged frogs are found, the approved biologist shall relocate the frogs to any area of suitable habitat either upstream or downstream and well away from the project work area. Only Service-approved biologists shall participate in activities associated with the capture, handling, and moving of California red-legged frogs. c. Before any activities begin on a project, a Service-approved biologist shall conduct a training session for all construction personnel. At a minimum, the training shall include a description of the California red-legged frog and its habitat, the importance of the California red-legged frog and its habitat, general measures that are being implemented to conserve the California red-legged frog as they relate to the project, and the boundaries within which the project may be accomplished. Brochures, books and briefings may be used in the training session, provided that a qualified person is on hand to answer any questions. d. A Service-approved biologist shall be present at the work site until such time as all removal of California red-legged frogs, instruction of workers, and habitat disturbance have been completed. After this time, the contractor or permittee shall designate a person to monitor on-site compliance with all minimization measures. The Service-approved biologist shall ensure that this individual receives training outlined in measure 3 above and in the identification of California red-legged frogs. The monitor and the Service-approved biologist shall have the authority to halt any action that might result in impacts that exceed the levels anticipated by the USACE and Service during review of the	Applicant	Compliance monitored by the County Planning Department, USFWS and approved biologist	To be implemented prior to and during project construction

No.	Environmental Impact	Mitigation Measures	Responsibility for Compliance	Method of Compliance	Timing of Compliance
		proposed action. If work is stopped, the Corps and Service shall be notified immediately by the Service-approved biologist or on-site biological monitor. e. During project activities, all trash that may attract predators shall be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris shall be removed from work areas. f. All refueling, maintenance, and staging of equipment and vehicles shall occur at least 20 meters from any riparian habitat or water body. The USACE and permittee shall ensure contamination of habitat does not occur during such operations. Prior to the onset of work, the USACE shall ensure that the permittee has prepared a plan to allow a prompt and effective response to any accidental spills. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur. g. A Service-approved biologist shall ensure that the spread or introduction of invasive exotic plant species shall be avoided to the maximum extent possible. When practicable, invasive exotic plants in the project areas shall be removed. h. Project sites shall be revegetated with an appropriate assemblage of native riparian, wetland, and upland vegetation suitable for the area. A species list and restoration and monitoring plan shall be included with the project proposal for review and approval by the Service and the USACE. Such a plan must include, but not be limited to, location of the restoration, species to be used, restoration techniques, time of year the work will be done, identifiable success criteria for completion, and remedial actions if the success criteria are not achieved. i. Stream contours shall be returned to the original condition at the end of project activities, unless consultation with the Service has determined that it is not beneficial to the species or feasible. j. The number of access routes, number and size of staging areas, and the total area of the activity shall be limited to the minimum necessary to achieve the project goal. Routes and boundaries shall be clearly demarcated, and these areas shall be outside of riparian and wetland areas. Where impacts occur in these staging areas and access routes, restoration shall occur as identified in measures 1.8 and 1.9 above. k. Work activities shall be completed between April 1 and November 1. Should the proponent or applicant demonstrate a need to conduct activities outside this period, the USACE may authorize such activities after obtaining the Service's approval. l. To control erosion during and after project implementation, the applicant shall implement best management practices, as identified by the local RWQCB. m. If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than five millimeters (mm) to prevent California red-legged frogs from entering the pump			

No.	Environmental Impact	Mitigation Measures	Responsibility for Compliance	Method of Compliance	Timing of Compliance
		system. Water shall be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow shall be removed in a manner that would allow flow to resume with the least disturbance to the substrate. n. A Service-approved biologist shall permanently remove from within the project area, any individuals of exotic species, such as bullfrogs, crayfish, and centrarchid fishes to the maximum extent possible.			
BIO-2		**Avoid Minimize Potential Impacts to San Francisco Dusky-footed Woodrat.** The following measures shall be implemented to avoid impacts to this species: a. A qualified biologist shall conduct a preconstruction surveys for San Francisco dusky-footed woodrat dens/nests in the riparian woodland within 30 days prior to construction or vegetation clearing. b. If no nests are observed, no further mitigation is required. c. If woodrat nests are observed within an area scheduled for clearing or grading, the biologist shall prepare a plan to either relocate the nest or construct a replacement nest in an area nearby that is not going to be disturbed. The plan shall be submitted to CDFW for approval and the County/applicant shall obtain permission from CDFW prior to implementing any nest relocation or replacement.	Applicant	Compliance monitored by the County Planning Department, CDFW and qualified biologist	To be implemented prior to and during project construction
BIO-3		**BIO-3: Provide Compensatory Mitigation for Impacts to Riparian Corridor.** The following measures for erosion control and revegetation of the project area shall occur after construction. Pursuant to obtaining permits from USACE, CDFW and RWQCB, implement compensatory mitigation for Phase One and Phase Two project components to achieve the following: (Note: Regulatory agencies may require additional measures) a. For Phase One work designate a minimum of 11,138 sq. ft. of native riparian mitigation. For Phase Two work designate a minimum of 2,960 sq. ft. of riparian mitigation. Mitigation shall occur in areas not currently supporting riparian trees/woodland. A preliminary review of the County property and the adjacent SLVWD property found approximately 14,179 sq. ft. of open areas suitable for revegetation. These areas are located outward of the existing riparian woodland. This mitigation will provide adequate compensation for temporary and permanent impacts to the riparian woodland and provide the following riparian functions: cover and forage for native wildlife and native riparian woodland plant diversity at a 2:1 (replacement: impact) ratio. Include tree replacement for trees removed by the project, using a minimum 3:1 tree replacement ratio. A conceptual layout of riparian compensation areas is presented in Appendix A. The plan depicts approximately 14,179 sq. ft. of riparian revegetation area as compensation for the Phase One and Phase Two project components. b. Install native riparian vegetation that can persist in winter-wet and summer-dry site conditions. Provide supplemental irrigation in Years 1-	Applicant	Compliance monitored by the County Planning Department, CDFW, USACE, and RWQCB	To be implemented prior to, during, and following project construction

No.	Environmental Impact	Mitigation Measures	Responsibility for Compliance	Method of Compliance	Timing of Compliance
		2, or longer if there is an unseasonable drought or other unforeseen circumstance that requires a longer irrigation period. A preliminary plant list is presented in Table 4. Tree replacement shall be at minimum of 2:1. c. Utilize plant propagules collected from the greater San Lorenzo River watershed and/or Santa Cruz County in the revegetation efforts. Obtain plants from native plant nurseries that employ Best Management Practices (BMP's) that control or eliminate the diseases caused by *Phytopthora ramorum*, as outlined by the California Oak Mortality Task Force. d. Maintain 100% survival of installed container stock in Years 1-3, then achieve 80% survival in Years 4-5. Install replacement plants if needed to meet survival rates. If substantial replanting is necessary, the maintenance and monitoring period may need to be extended so that each plant is maintained and monitored for 5 years. e. Control cover of target invasive weeds (e.g., thistles, Himalaya berry, Cape ivy, English ivy, pyracantha, and others) to less than 5% each year. f. Maintain and monitor the site annually for 5 years and/or every year thereafter until success criteria have been met. Submit annual reports to County Planning Department by December 31 of each monitoring year. Submit annual monitoring reports for CDFW, RWQCB, and USACE as required by each regulating agency.			

Table 4. Preliminary Planting List for Riparian Woodland Mitigation, August 2017

Common Name	Scientific Name	Size
Trees		
Arroyo Willow	*Salix lasiolepis*	Pole Cutting
Black Cottonwood	*Populus trichocarpa*	Pole Cutting
Dogwood	*Cornus sericea*	Tree Pot
Box Elder	*Acer negundo*	Tree Pot
Sycamore	*Platanus racemosa*	Tree Pot
Blue Elderberry	*Sambucus mexicana*	Tree Pot
Coast Live Oak	*Quercus agrifolia*	Tree Pot
Shrubs and Groundcovers		
Snowberry	*Symphoricarpos mollis. S. albus*	1 gallon
Flowering Currant	*Ribes sanguineum var. glutinosum*	1 gallon
California Blackberry	*Rubus ursinus*	1 gallon
California Rose	*Rosa californica*	1 gallon
California Bee Plant	*Scrophularia californica*	4" or 1 gallon
Spreading Rush	*Juncus patens*	4" or 1 gallon
Douglas or Ground Iris	*Iris douglasii or I. fernaldi*	4" or 1 gallon
Wetland Plants for Culvert Removal/Bridge Construction Area		
Santa Barbara Sedge	*Carex barbarae*	4" or 1 gallon
Bog Rush	*Juncus effusus*	4" or 1 gallon
Pacific Silverweed	*Potentilla anserina*	4" or 1 gallon
Dense Sedge	*Carex densa*	4" or 1 gallon

No.	Environmental Impact	Mitigation Measures	Responsibility for Compliance	Method of Compliance	Timing of Compliance
BIO-4		**Implement Tree Protection and Erosion Control Measures Prior to and During Construction.** The County and the outdoor education program shall implement standard erosion control BMPs and riparian habitat/tree protection measures during the construction period to minimize impacts to Bull Creek, including: (Note: Regulatory agencies may require additional measures) a. Implement tree protection measures as outlined in the arborist report (Tree Inventory, Assessment, and Protection, August 8, 2017 by Monarch Consulting Arborists LLC, Richard Gessner, Arborist, Attachment 5). b. Install perimeter silt fencing and construction area limit-of-work fencing. Install both the silt and plastic mesh fencing at the perimeter of the work area to prevent inadvertent impacts to the adjacent forest vegetation, creek channel, and injury to adjacent native trees. Protective fencing shall be in place prior to ground disturbances and removed once all construction is complete. During construction, no grading, construction or other work shall occur outside the designated limits of work. Maintain fencing in functional condition throughout the construction period, replace and repair as needed. c. No excess soil, chemicals, debris, equipment or other materials shall be dumped or stored outside the designated limits of work. d. Hand tools shall be used to trim vegetation to the extent necessary to gain access to the work area. All removed material/vegetation shall be removed from the riparian corridor. e. All staging of equipment and materials, and refueling of equipment, shall be located in existing roadways and parking areas. The contractor shall prepare and implement a fuel spill prevention and clean-up plan.	Applicant	Compliance monitored by the County Planning Department, CDFW, USACE, and RWQCB	To be implemented prior to and during project construction
BIO-5		**Avoid impacts to Nesting Birds.** Implement the following measures to avoid impacting nesting birds, if present. (Note: CDFW may require additional measures) a. Schedule tree/vegetation removal to occur during the non-breeding season of raptors and migratory birds. Tree removal and limbing should occur between August 31 and March 14 of any given year. If this is not possible, then have a qualified biologist conduct a preconstruction survey for nesting birds. The surveys shall be conducted no more than 14 days prior to beginning of construction or vegetation removal. b. A buffer zone with highly visible tape or fencing shall be established around the active bird nest and no construction shall take place within the buffer zone until the biologist confirms that all young have fledged the nest. c. Buffer distances for bird nests should be site specific and an appropriate distance, as determined by a qualified biologist. The buffer distances should be specified to protect the bird's normal bird behavior to prevent nesting failure or abandonment. The buffer distance recommendation should be developed after field investigations that evaluate the bird(s) apparent distress in the presence of people or equipment at various	Applicant	Compliance monitored by the County Planning Department and CDFW	To be implemented prior to, during, and following project construction

No.	Environmental Impact	Mitigation Measures	Responsibility for Compliance	Method of Compliance	Timing of Compliance
		distances. Abnormal nesting behaviors which may cause reproductive harm include, but are not limited to, flights/vocalizations directed towards project personnel, standing up from a brooding position, and flying away from the nest. d. The qualified biologist shall have authority to order the cessation of all nearby project activities if the nesting birds exhibit abnormal behavior which may cause reproductive failure (nest abandonment and loss of eggs and/or young) until an appropriate buffer is established. e. Typical protective buffers between each identified nest site and the construction site are as follows: i) 1,000 feet for large raptors such as buteos; ii) 500 feet for small raptors such as accipiters; and iii) 250 feet for passerines. The qualified biologist shall monitor the behavior of the birds (adults and young, when present) at the nest site to ensure that they are not disturbed by project activities. Nest monitoring shall continue during project activities until the young have fully fledged, are no longer being fed by the parents and have completely left the nest site, as determined by the qualified biologist. f. The biologist shall prepare a report of nest survey results, nest monitoring (if any), and the dates when the nesting was completed, a report suitable for the applicant to submit to County and state resource agencies.			
BIO-6		Trees to be retained that are located adjacent to construction shall be protected during construction, as directed by an arborist. If inadvertent damage to trees occurs, a remediation program should be developed by the arborist and implement; the measures shall be inspected by the County of Santa Cruz Planning Department and arborist to determine the success of the remedial measures. Oak trees removed by the project shall be replaced at a minimum of 2 new trees for every 1 tree removed.	Applicant	Compliance monitored by the County Planning Department and qualified arborist	To be implemented prior to, during, and following project construction
BIO-7		To reduce project impacts from the project's encroachment into the County-designated riparian corridor, following Phase One construction, the County shall install a low split-rail type fence or vegetative barrier plantings between the riparian woodland and the parking lots/areas (where the parking areas are located adjacent to the riparian woodland). The fence or vegetative barrier plantings would protect the riparian area from indirect impacts from facility users (e.g. trampling, deposition of debris and garbage, etc.). The pedestrian paths constructed in Phase one and Phase Two should include signs to encourage users to stay on the path and not trample adjacent riparian vegetation.	Applicant	Compliance monitored by the County Planning Department	To be implemented following Phase One and Phase Two of project construction
N/A	*Have a substantial adverse effect on any riparian habitat or sensitive natural community identified in local or regional plans, policies, regulations (e.g., wetland, native grassland, special*	See Mitigation Measures BIO-3, BIO-4, BIO-6, BIO-7, and BIO-8.	Applicant	Compliance monitored by the County Planning Department, CDFW, USACE, and RWQCB	To be implemented prior to, during, and following project construction

No.	Environmental Impact	Mitigation Measures	Responsibility for Compliance	Method of Compliance	Timing of Compliance
	forests, intertidal zone, etc.) or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?				
BIO-8	*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?*	In order to remove the culvert, about 54 feet of Bull Creek would have to be temporarily dewatered. The following are included as measures to ensure that no significant impact occurs in the dewatering stage of the project. 1. This dewatering plan is to be implemented by the Contractor when water is flowing in the creek between June 1st and October 15th. All in-stream project work and dewatering shall be limited to this period. 2. Detail of the proposed dewatering plan shall be approved by the County of Santa Cruz. 3. The project biologist shall be on-site to observe the dewatering of Bull Creek in order to relocate upstream any native aquatic fauna that are present in the dewatered reach. 4. The Contractor should expect to temporarily install pressure driven diversion systems to efficiently bypass clean creek water around the diversion area and remove silty water from the diversion area. 5. The proposed diversion pipes and pump sizes shall be sufficient to handle actual flows during the construction period. 6. The planned sump discharge site shall be revegetated in accordance with the Contractor's approved site dewatering plan and as directed by the County. 7. Prior to construction of the dewatering facilities a qualified county hired fish biologist, who has been authorized by National Marine Fisheries Service (NMFS) to handle protected fish, shall preform a survey for California Red-legged Frog with rescue and relocation as needed. 8. A letter from the county consulting biologist with the results of the survey and description of the rescue operations shall be submitted to the county Environmental Planning staff. 9. All dewatering facilities and diversion dams shall be removed at the end of the project and the stream channel shall be restored to conditions appropriate to those before the culvert being removed was originally placed in the creek. 10. The Contractor shall designate a staging area at a minimum of 20 meters removed from the construction site. All materials storage, portable restrooms, equipment and parking and other parts of the work not directly required to be in the area of the dewatering facilities shall be in this staging area.	Applicant	Compliance monitored by the County Planning Department, qualified biologist, CDFW, USACE, NMFS, and RWQCB	To be implemented prior to, during and following project construction
Geology and Soils					
GEO-1	*Expose people or structures to potential substantial adverse*	The geotechnical constraints [i.e. high ground water and potentially liquefiable soils] shall be addressed through the removal and replacement of all loose soils with compacted engineered fill, construction of a mat slab	Applicant	Compliance monitored by the County Planning	To be implemented prior to and during project construction

No.	Environmental Impact	Mitigation Measures	Responsibility for Compliance	Method of Compliance	Timing of Compliance
	effects, including the risk of loss, injury, or death involving: Seismic-related ground failure, including liquefaction?	or similar type of foundation able to tolerate differential settlements, and the installation of subsurface drainage facilities to direct groundwater away from the proposed structure and associated utilities. Provided these features are included in the final project design, the identified constraints at the site would not result in a significant impact.		Department	
Recreation					
N/A	*Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?*	See Mitigation Measures BIO-1 through BIO-8.	Applicant	Compliance monitored by the County Planning Department, qualified biologist, CDFW, USACE, NMFS, and RWQCB	To be implemented prior to, during, and following project construction
Transportation/Traffic					
TRA-1	*Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?*	**Intersection of Highway 9/Felton Empire Road-Graham Hill Road** Restripe eastbound Felton Empire Road as one left lane and one through/right lane.	Applicant	Compliance monitored by the County Planning Department and DPW	To be implemented prior to, during, and following project construction

2

Felton Library Project
Santa Cruz County, CA

Biotic Report
Final, August 21, 2017

Biotic Resources Group

Biotic Assessments ◆ Resource Management ◆ Permitting

ATTACHMENT 2

Biotic Resources Group
Biotic Assessments ◆ Resource Management ◆ Permitting

Felton Library Project
Santa Cruz County, CA

Biotic Report

Prepared for:

Teall Messer, Architect

Prepared by:

Biotic Resources Group
Kathleen Lyons, Plant Ecologist

With

Dana Bland & Associates
Dana Bland, Wildlife Biologist

Final, August 21, 2017

2551 South Rodeo Gulch Road, Suite 12 ◆ Soquel, CA 95073 ◆ (831) 476-4803 ◆ brg@cruzio.com

INTRODUCTION

The proposed Felton Library project site is located in the town of Felton, an unincorporated area of Santa Cruz County. The project site is accessed from Gushee Street and is adjacent to the Felton Post Office. Bull Creek, a perennial waterway, traverses the property. The project site is located on a 2.03-acre County-owned property and an easement on an adjoining property owned by the San Lorenzo Valley Water District (SLVWD) (Figure 1). The project is proposed in two phases. In Phase One, the County will build the branch library building, on and off-street parking, and a bridge over Bull Creek. In Phase Two, the County (or others) will implement a nature explore program that will consist of nature explorer stations, a loop pathway, and a bridge crossing over Bull Creek (*Overall Landscape Site Plan,* Joni Janecki Landscape Architects, plan dated April 28, 2017 and *Site Plan,* Teall Messer, Architect, dated May 31, 2017).

The Biotic Resources Group and Dana Bland & Associates originally assessed the biotic resources within the County-owned property in 2003. Additional site visits were conducted in August 2012 (County property) and in 2017 (County and SLVWD properties). The focus of the assessment was to identify sensitive biotic resources on the properties, with particular emphasis on resources within the proposed development areas as depicted on the Overall Landscape Site Plan.

Specific tasks conducted for this study include:

- Characterize and map the major plant communities on the two properties;
- Identify sensitive biotic resources, including plant and wildlife species of concern, within the areas proposed for Phase One and Phase Two activities, and
- Evaluate the potential effects of the proposed land uses on sensitive biotic resources and recommend measures to avoid or reduce such impacts.

Intended Use of this Report

The findings presented in this biological report are intended for the sole use of Teall Messer, Architect and the County of Santa Cruz in evaluating the proposed project. The findings presented by the Biotic Resources Group in this report are for information purposes only; they are not intended to represent the interpretation of any State, Federal or County laws or ordinances pertaining to permitting actions within sensitive habitat or endangered species. The interpretation of such laws and/or ordinances is the responsibility of the applicable governing body.

EXISTING BIOTIC RESOURCES

METHODOLOGY

The biotic resources of the County and SLVWD properties were assessed through literature review and field observations. The site(s) was surveyed in February and August 2003, August 2012 and February and August 2017. Areas on the two properties were walked to ascertain the dominant community features and species occurrences. The field surveys focused on areas proposed for the library, parking, pathways, and nature explorer program features. Areas on the property that are not proposed for development were viewed in a more cursory manner. Vegetation mapping of the project site was conducted from the field survey and review of aerial photos on file with the County of Santa Cruz's GIS system and Google Earth images. The major plant communities on the site were identified during the field reconnaissance visits. The plant communities were mapped onto the project site plan (Figure 2).

To assess the potential occurrence of special status biotic resources, two electronic databases were accessed to determine recorded occurrences of sensitive plant communities and sensitive species. Information was obtained from the California Native Plant Society's (CNPS) Electronic Inventory (2017), and California Department of Fish and Wildlife (CDFW) RareFind 5 database (CDFG, 2017) for the Felton USGS quadrangle and surrounding quadrangles. An evaluation of fish resources in Bull Creek and fish utilization of the project reach was conducted by the County in summer 2017 (Bull Creek Fish 2017, Kristen Kittleson, Resource Planner, Environmental Health Division, Health Services Agency). A review of potential wetlands (vegetation and hydric soils) was conducted in August 2017.

This report summarizes the findings of the reconnaissance-level biotic assessment. The potential impacts of the proposed development on sensitive resources are discussed below. Measures to reduce significant impacts to a level of less-than-significant are recommended, as applicable.

EXISTING BIOTIC RESOURCES

Two plant community types were observed on the two properties. These community types are willow-cottonwood riparian woodland and annual, non-native grassland. A portion of the property was barren in 2003, as evidenced by piles of base rock, asphalt and other debris; however, these areas supported annual grassland in 2017. The site supports soils mapped as Soquel loam, 2-19% slope.

Riparian Woodland

The riparian woodland occurs along Bull Creek, on both the County and SLVWD properties. The creek, and associated woodland, traverses the central portion of the project site, as depicted on Figure 2. Bull Creek exits the property at Gushee Street where it enters an underground culvert via a cement drop structure and eventually leads to the San Lorenzo River. The woodland is co-dominated by trees of arroyo willow (*Salix lasiolepis)*, black cottonwood (*Populus trichocarpa)*, and coast live oak (*Quercus agrifolia)*. Other tree species include dogwood (*Cornus sp.)*, California bay (*Umbellularia californica)*, and box elder (*Acer negundo)*. The County maintains access for creek channel maintenance along Bull Creek; therefore, woody vegetation (except for one willow) is absent in an approximately 15-foot wide strip on the south side of the creek channel.

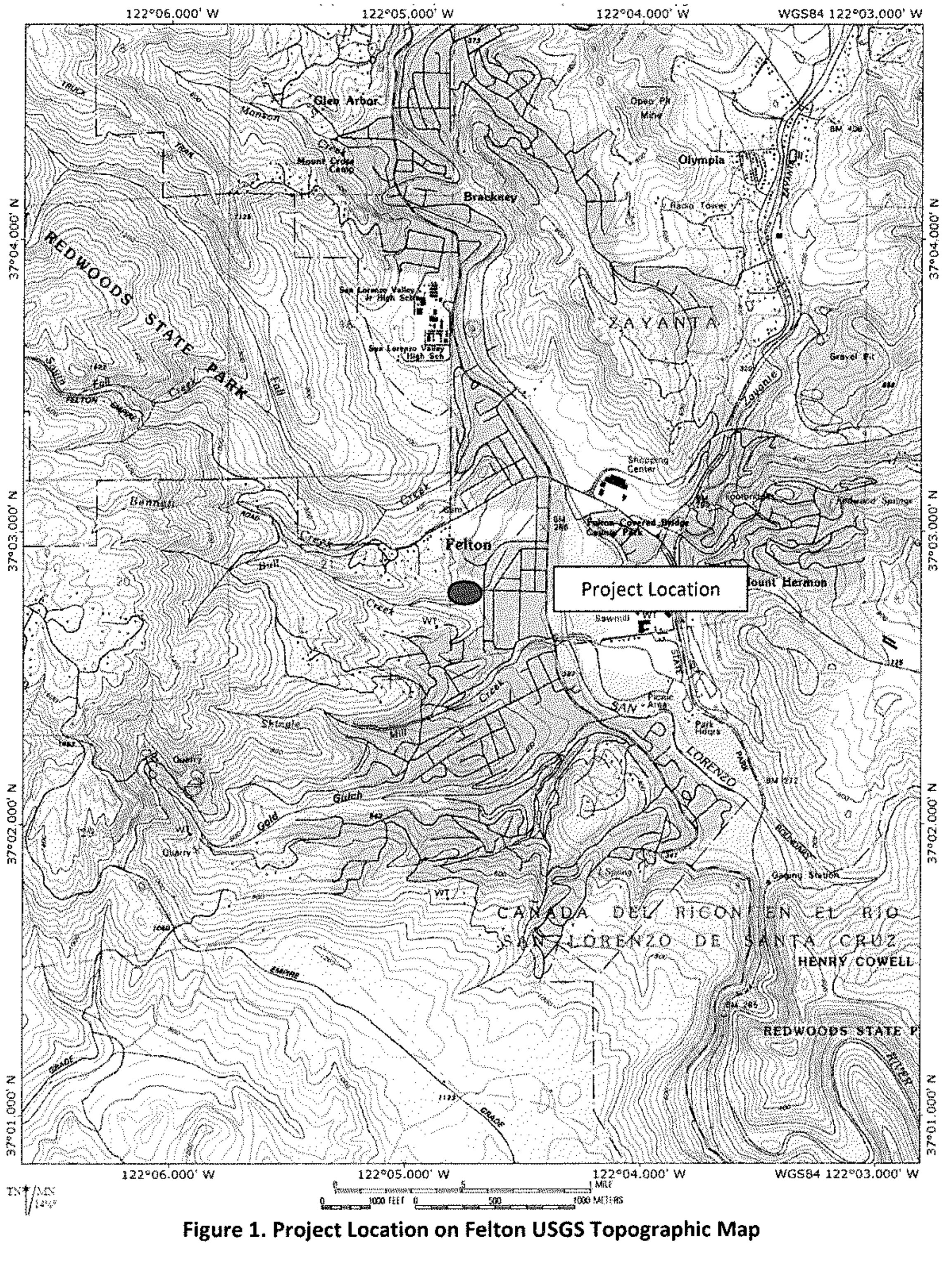


Figure 1. Project Location on Felton USGS Topographic Map

ATTACHMENT 2

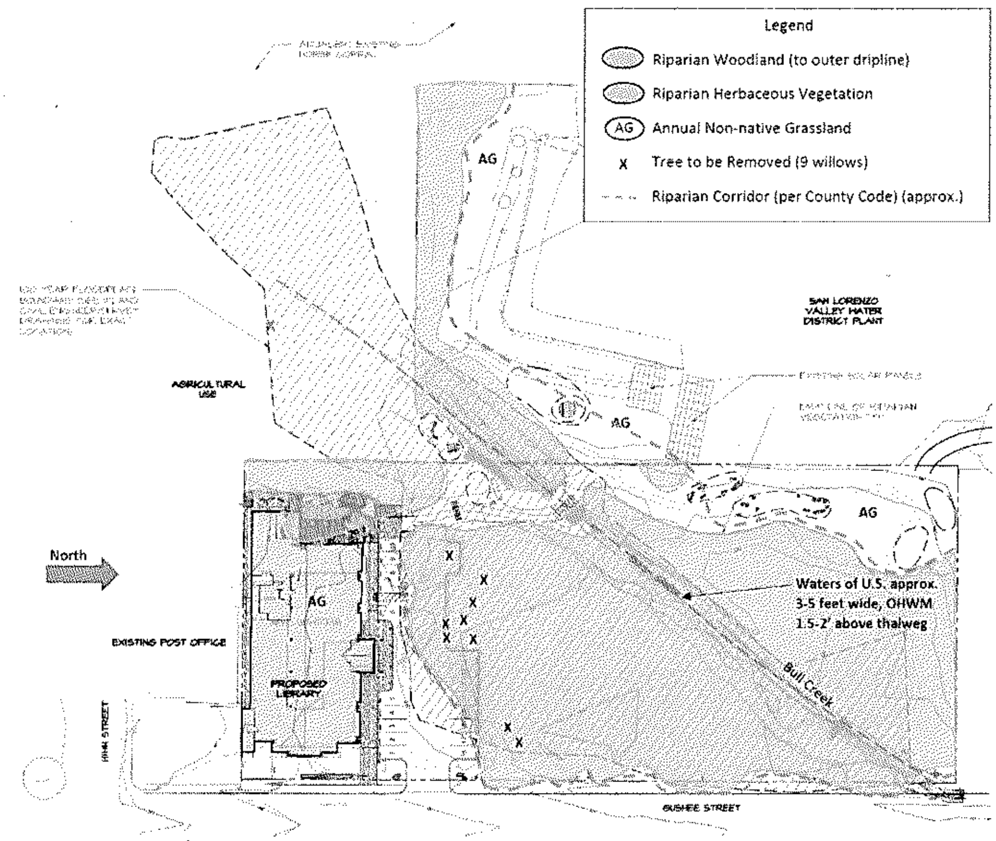


Figure 2. Distribution of Vegetation Types on Project Site Plan

ATTACHMENT 2

In most locations, the riparian woodland supports a dense understory of vines and herbaceous species, including California blackberry (*Rubus ursinus*), Himalaya berry (*Rubus ameniacus*), curly dock (*Rumex crispus*), young dogwoods, and young oaks. Along the edge of the creek channel and in some areas affected by creek channel maintenance, herbaceous riparian plants were found. Plant species include spreading rush (*Juncus patens*), bog rush (*Juncus effusus*), water parsley (*Oenanthe sarmentosa*), nutgrass (*Cyperus sp.*), water smartweed (*Polygonum sp.*), and willow herb (*Epilobium ciliatum*). In August 2017, these areas were evaluated to determine if they meet federal wetland requirements. Soil pits were dug and the soil color, texture and characteristics were evaluated. No hydric soil characteristics (i.e., low chroma, mottles) were found; therefore, the areas do not meet the requirements of federally-designated wetlands.

In addition to Himalaya berry, other invasive non-native plant species observed include calla lily (*Zantedeschia aethiopica*), milk thistle (*Silybum marianum*), English ivy (*Hedera helix*), pyracantha (*Pyracanth asp.*), privet (*Ligustrum sp.*), *Prunus sp.* and Cape ivy (*Delairea odorata*). The riparian woodland is bisected by an existing dirt/base-rocked road; the creek crossing has a corrugated metal pipe culvert. The downstream end of the culvert and the downstream creek is depicted in Figure 3 (2003). The character of the riparian woodland is depicted in Figure 4 (2017).

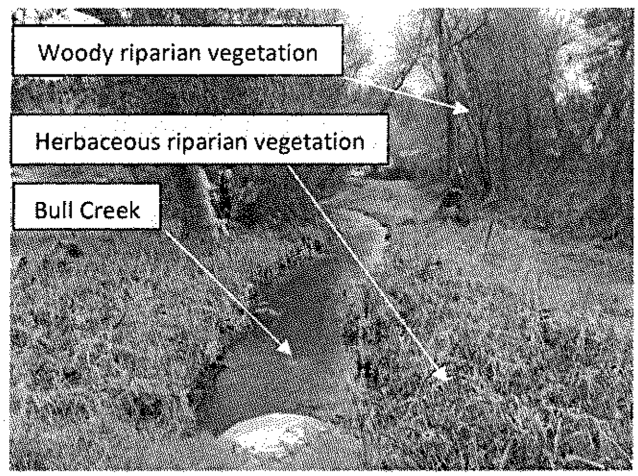


Figure 3. View of downstream end of existing culvert along dirt/base-rocked road that traverses Bull Creek. Herbaceous riparian vegetation is located downstream of the culvert.

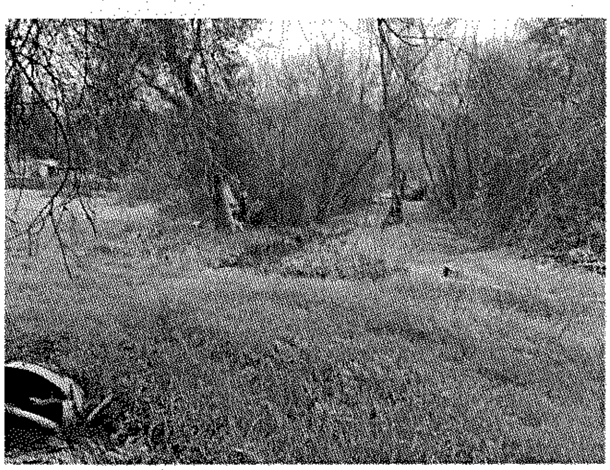


Figure 4. Character of riparian woodland, looking downstream from road crossing of Bull Creek.

ATTACHMENT 2

Bull Creek supports both in-stream wetlands and open water habitat. The wetland vegetation occurs along the edge of the Bull Creek channel below OHWM. The plant species are a mixture of native and non-native species, including curly dock, spreading rush, nutgrass (*Cyperus* sp.) and sedges (*Carex* spp.). In addition, the creek channel supports open water. During the surveys, the channel averaged 3-5 feet in width. The limit of Ordinary High Water (OHWM) (as defined by the U.S. Army Corps of Engineers criteria) is approximately 1.5-2 feet above the thalweg (lowest point) of the creek, as determined by field indicators (e.g., vegetation patterns and scour lines). The extent of OHWM is depicted on Figure 2; the in-stream wetlands are located below the OHWM.

Wildlife Resources of Riparian Woodland. In general, riparian habitat is one of the highest value habitats for wildlife species diversity and abundance in California. Factors that contribute to the high wildlife value include the seasonal presence of surface water, the variety of niches provided by the high structural complexity of the habitat, and the abundance of plant growth. Riparian habitat on the project site may be used by wildlife for food, water, escape cover, nesting, and thermal cover. Forage plants in this section of riparian woodland are primarily blackberry and Himalaya berry. The periodic clearing of vegetation for flood control also reduces the value of this riparian habitat for wildlife.

Common wildlife species that were observed in the riparian habitat during the site visit included Pacific treefrog *(Hyla regilla)*, mourning dove (*Zenaida macroura*), Black phoebe *(Sayornis nigricans)*, scrub jay (*Aphelocoma coerulescens*), Steller's jay (*Cyanocitta stelleri*), American crow (*Corvus brachyrhynchos*), and Chestnut-backed chickadee (*Poecile rufescens*). Dens for dusky-footed woodrat (*Neotoma fuscipes annectens)*, a species of special concern, were also observed in the woodland.

The CNDDB lists an observation of an adult California red-legged frog, a federally listed threatened species, in Bull Creek approximately 0.5 mile upstream of the project site (CDFW 2017). That observation was made in 2004. Dense wetland and emergent vegetation is present along the portion of Bull Creek that flows through this project site; therefore, the creek and adjacent riparian habitat provide potential cover and foraging habitat for this frog species. Due to swift winter flows along the creek, it does not provide potential breeding habitat for the frog. The riparian habitat also provides suitable nesting habitat for migratory birds, which are protected under the federal Migratory Bird Treaty Act.

County personnel observed fish in the channel in summer 2017 (Matt Johnston, pers. comm.). Due to a concern on the potential presence of steelhead in the creek, County personnel conducted a fishery assessment of Bull Creek, including whether steelhead were present in the creek and/or could access the creek from the San Lorenzo River (Bull Creek Fish, 2017). The County's report concluded that resident rainbow trout occur in the creek; however, no anadromous fish (i.e., steelhead) from the San Lorenzo River are expected because the culvert between Gushee Street and the San Lorenzo River is a likely barrier to upstream migration. The non-anadromous rainbow trout is not a protected species under any state or federal regulation.

Annual, Non-Native Grassland

The grassland occurs north and south of Bull Creek on the County property and north of the creek on the SLVWD property, as depicted on Figure 2. The areas proposed for the library was previously disturbed (as evidenced by gravels, compaction, stored materials in 2003). The other grasslands are routinely mowed. The vegetation is comprised of a mixture of non-native grasses and forbs, including wild oat (*Avena* sp.), ripgut brome (*Bromus diandrus)*, velvet grass (*Holcus lanatus)*, Italian ryegrass (*Lolium perenne),* English plantain (*Plantago lanceolata)*, sheep's sorrel (*Rumex acetosella*), bristly ox-tongue (*Picris echioides)*, curly dock, mayweed (*Anthemis cotula*), milk thistle, bur clover *(Medicago polymorpha)*, storksbill (*Erodium botrys)*, and Mediterranean clover (*Trifolium angustifolium)*. Scattered occurrences of native plants were observed,

ATTACHMENT 2

such as small-flowered vetch (*Vicia americana*), lupine (*Lupinus* sp.), and California poppy (*Eschscholzia californica*).

Wildlife Resources of Grasslands. In general, grasslands provide an important foraging resource for a wide variety of wildlife species. The grasses and forbs produce an abundance of seeds and attract numerous insects, providing food for granivorous and insectivorous wildlife. Sparrows, rabbits and rodents are commonly found in this habitat. Consequently, grasslands are valuable foraging sites for raptors such as hawks and owls, and other predators including coyote, fox, skunk and snakes. Species that forage aerially over grasslands include bats and swallows.

The relatively small extent of grassland, predominance of non-native plants, and the previous man-made disturbances reduce the overall value of the grassland to wildlife. Common wildlife species that are expected to utilize grassland habitat on the project site include western fence lizard (*Sceloporus occidentalis*), house finch (*Carpodacus mexicanus*), and Botta's pocket gopher (*Thomomys bottae*). No special status wildlife species are expected to inhabit this grassland habitat.

SENSITIVE BIOTIC RESOURCES

Regulated Habitats

The project area is located adjacent to Bull Creek, a perennial tributary to the San Lorenzo River. According to County Code (Section 16.32), all lakes, wetlands, estuaries, lagoons, streams and rivers are considered sensitive habitat. According to County Code (Section 16.30) the riparian corridor along perennial channels extends 50 feet outward from the bank-full flow line or to the edge of riparian vegetation, whichever is greater. As riparian woodlands often support bands of herbaceous vegetation along the water's edge, these herbaceous areas are regulated by the County as a component of the riparian corridor. Herbaceous riparian vegetation was observed along portions of Bull Creek (i.e., downstream of the culvert and a low area south of creek); all of these resources are located within the riparian corridor. These areas do not support hydric soils, based on field samples obtained in August 2017; therefore, they are not wetlands. A portion of the project is located within the riparian corridor of this creek (pending confirmation from this regulatory agency). The approximate extent of the County-defined riparian corridor is depicted on Figure 2.

California Department of Fish and Wildlife (CDFW) is a trustee agency that has jurisdiction under Section 1600 et seq. of the CDFW Code. Under Sections 1600-1603 of the California Fish and Game Code, CDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel or bank of any river, stream or lake which supports fish or wildlife. CDFW also regulates alterations to ponds and impoundments. CDFW jurisdictional limits typically extend to the top of bank or to the edge of riparian habitat if such habitat extends beyond top of bank (outer drip line), whichever is greater. A portion of the proposed project is located within CDFW's jurisdiction. A Streambed Alteration Agreement with CDFW will likely be required (pending confirmation from this regulatory agency).

Water quality in California is governed by the Porter-Cologne Water Quality Control Act and certification authority under Section 401 of the Clean Water Act, as administered by the Regional Water Quality Control Board (RWQCB). The Section 401 water quality certification program allows the State to ensure that activities requiring a Federal permit or license comply with State water quality standards. Water quality certification must be based on a finding that the proposed discharge will comply with water quality standards which are in the regional board's basin plans. The Porter-Cologne Act requires any person discharging waste or proposing to discharge waste in any region that could affect the quality of the waters of the state to file a report of waste discharge. The RWQCB issues a permit or waiver that includes implementing water quality control plans that take into account the beneficial uses to be protected. Waters of the State subject to RWQCB regulation extend to the top of bank, as well as isolated water/wetland features and saline waters. Should there be no Section 404 nexus (i.e., isolated feature not subject to USACE jurisdiction), a report of waste discharge (ROWD) is filed with the RWQCB. The RWQCB interprets waste to include fill placed into water bodies. A portion of the proposed project is within RWQCB jurisdiction. As a USACE permit will likely be required for the culvert removal work, a Section 401 water quality certification from the RWQCB will likely be required (pending confirmation from this regulatory agency).

The US Army Corps of Engineers (USACE) regulates activities within waters of the United States pursuant to congressional acts: Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act (1977, as amended). Section 10 of the Rivers and Harbors Act requires a permit for any work in, over, or under navigable waters of the United States. Navigable waters are defined as those waters subject to the ebb and flow of the tide to the Mean High Water mark (tidal areas) or below the Ordinary High Water mark (freshwater areas). Construction of the bridge over Bull Creek will require removal of the existing culvert. Culvert removal work, including temporary construction-period dewatering of the work area, will occur below the Ordinary High Water Mark (OHWM) of Bull Creek; therefore, this portion of the project will be within USACE jurisdiction. No in-channel wetlands were observed upstream of the existing culvert; however, some herbaceous wetlands were observed downstream of the culvert (below OHWM). A USACE Nationwide Permit will likely be required for the culvert work (pending confirmation from this regulatory agency).

Sensitive Habitats

Sensitive habitats are defined by local, State, or Federal agencies as those habitats that support special status species, provide important habitat values for wildlife, represent areas of unusual or regionally restricted habitat types, and/or provide high biological diversity.

CDFW classifies and ranks the State's natural communities to assist in the determining the level of rarity and imperilment. Vegetation types are ranked between S1 and S5. For vegetation types with ranks of S1-S3, all associations within the type are considered to be highly imperiled. If a vegetation alliance is ranked as S4 or S5, these alliances are generally considered common enough to not be of concern; however, it does not mean that certain associations contained within them are not rare (CDFW, 2007 and 2010). The riparian woodland along Bull Creek is ranked S3 (sensitive).

According to County Code, the riparian corridor is considered a sensitive habitat. Development activities shall conform to permitted uses and impacts to sensitive habitat be avoided. If development occurs within any sensitive habitat area the County requires projects mitigate significant environmental impacts and restoration of any area which is degraded sensitive habitat or has caused or is causing the degradation, with restoration commensurate with the scale of the development.

Special Status Plant Species

Plant species of concern include those listed by either the Federal or State resource agencies as well as those identified as rare by CNPS (List 1B). The search of the CNPS and CNDDB inventories identified the special status plant species with potential to occur in the project area. No special status plant species have been recorded in the CNDDB as occurring within the immediate project area, although occurrences of species are known from sandhill habitat several miles north of the site. All species evaluated for potential occurrence within the proposed project area as per CNDDB and CNPS records are listed on Table 1.

ATTACHMENT 2

No special status plant species were observed and none are expected due to the lack of suitable attributes for special status species within the greater project region. The project area lacks specialized micro habitats (i.e., sandy or grassland substrate, sandhills) conducive to the occurrence of special status plant species. For annual species that were not detectable during the survey period, the species presence/absence evaluation was based on habitat suitability, as presented under Rationale in Table 1.

Table 1. Special Status Plant Species and Their Predicted Occurrence Within the Felton Library Project Site, August 2017.

Common Name	Scientific Name	Status	General Habitat Description	Habitat Present/ Absent	Rationale
Bent-flowered fiddleneck	*Amsinckia lunaris*	CNPS List 1B.2	Grassland, scrub	A	Site lacks suitable habitat.
Santa Cruz manzanita	*Arctostaphylos andersonii*	CNPS List 1B.2	Broadleaf upland forest, chaparral, coniferous forests; open sites	A	Not observed within site; site lacks suitable habitat.
Hooker's manzanita	*Arctostaphylos hookeri ssp. hoookeri*	CNPS List 1B.2	Broadleaf upland forest, chaparral, coniferous forests; open sites	A	Not observed within site; site lacks suitable habitat.
Pajaro manzanita	*Arctostaphylos pajaroensis*	CNPS List 1B.1	Broadleaf upland forest, chaparral, open sites	A	Not observed within site; site lacks suitable habitat.
Bonny Doon manzanita	*Arctostaphylos silvicola*	CNPS List 1B.2	Chaparral, closed cone coniferous forests; restricted to Zayante sands	A	Not observed within site; site lacks suitable habitat and substrate.
Marsh sandwort	*Arenaria paludicola*	CE FE CNPS List 1B.1	Marshes and swamps	A	Site lacks suitable habitat.
Santa Cruz Mtns. pussypaws	*Calyptridium parryi var. hesseae*	CNPS List 1B.1	Zayante Sandhills chaparral and pine forest	A	Site lacks suitable habitat and substrate.
Swamp harebell	*Campanula californica*	CNPS List 1B.2	Bogs and marshes	A	Site lacks suitable habitat.
Deceiving sedge	Carex saliniformis	CNPS List 1B.2	Mesic sites in coastal prairie	A	Site lacks suitable habitat.
Congdon's tarplant	Centromadia parryi ssp. congdonii	CNPS List 1B.1	Grassland, moist areas	A	Site lacks suitable habitat.
Ben Lomond spineflower	*Chorizanthe pungens var. hartwegiana*	FE CNPS List 1B.1	Ponderosa pine and maritime chaparral within Zayante sands	A	Not observed within site; site lacks suitable habitat.
Monterey spineflower	*Chorizanthe pungens var. pungens*	FT CNPS List 1B.2	Oak woodland, chaparral, scrub; sandy substrate	A	Not observed within site; site lacks suitable habitat.

ATTACHMENT 2

Table 1. Special Status Plant Species and Their Predicted Occurrence Within the Felton Library Project Site, August 2017.

Common Name	Scientific Name	Status	General Habitat Description	Habitat Present/ Absent	Rationale
Scotts Valley spineflower	*Chorizanthe robusta var. hartwegii*	FE CNPS List 1B.1	Grasslands with mudstone and sandstone outcrops	A	Site lacks suitable habitat.
Robust spineflower	*Chorizanthe robusta var. robusta*	FE CNPS List 1B.1	Coastal dunes, grassland, and scrub with loose sandy soils	A	Site lacks suitable habitat.
Mt. Hamilton thistle	*Cirsium fontinale var. campylon*	CNPS List 1B.1	Serpentine seeps, moist grassland	A	Site lacks suitable habitat.
San Francisco collinsia	*Collinsia multicolor*	CNPS List 1B.2	Moist shady woodland	A	Site lacks suitable microhabitat.
Tear drop moss	*Dacryophyllum falcifolium*	CNPS List 1B.3	Redwood forest on limestone outcrops	A	Site lacks suitable microhabitat; no outcrop conditions in study area
Santa Clara dudleya	*Dudley abramsii ssp. setchellii*	FE CNPS List 1B.1	Serpentine outcrops	A	Site lacks suitable habitat.
Ben Lomond buckwheat	*Eriogonum nudum var. decurrens*	CNPS List 1B.1	Ponderosa pine woodland, sandhills	A	Site lacks suitable habitat.
Sand loving wallflower	*Erysimum ammophilum*	CNPS List 1B.2	Openings in chaparral, sand dunes; sand substrate	A	Site lacks suitable habitat.
Santa Cruz wallflower	*Erysimum teretifolium*	FE CE CNPS List 1B.1	Openings in chaparral, ponderosa pine forest; Zayante sands	A	Site lacks suitable habitat.
Minute pocket moss	*Fissidens pauperculus*	CNPS List 1B.2	Redwood forest on limestone outcrops	A	Site lacks suitable microhabitat; no outcrops.
Fragrant fritillary	*Fritillaria liliacea*	CNPS List 1B.2	Ultramafic talus in chaparral and foothill woodland	A	Site lacks suitable microhabitat; no serpentine.
Monterey gilia	*Gilia tenuiflora ssp. arenaria*	FE CT CNPS List 1B.2	Openings in chaparral, sand dunes; sand substrate	A	Site lacks suitable habitat.
Santa Cruz cypress	*Hesperocyparis abramsiana var. abramsiana*	FE CE CNPS List 1B.2	Coniferous forest and chaparral on sandstone and granitic derived soils	A	Site lacks suitable habitat.
Loma Prieta hoita	*Hoita strobilina*	CNPS List 1B.1	Chaparral, cismontane woodland, riparian woodland with serpentine soils and mesic conditions	A	Not observed within site; site lack suitable habitat.

ATTACHMENT 2

Table 1. Special Status Plant Species and Their Predicted Occurrence Within the Felton Library Project Site, August 2017.

Common Name	Scientific Name	Status	General Habitat Description	Habitat Present/ Absent	Rationale
Santa Cruz tarplant	*Holocarpha macradenia*	FT CE CNPS List 1B.1	Coastal prairie and grasslands with sandy soil types	A	No suitable habitat on site.
Kellogg's horkelia	*Horkelia cuneata ssp. sericea*	CNPS List 1B.1	Openings on old dunes and coastal sandhills	A	No suitable habitat on site.
Point Reyes horkelia	*Horkelia marinensis*	CNPS List 1B.2	Coastal dunes, prairies, scrub	A	No suitable habitat on site.
Smooth lessingia	*Lessingia micradenia var. glabrata*	CNPS List 1B.2	Serpentine soils in chaparral and grasslands	A	No suitable habitat on site.
Indian Valley bush-mallow	*Malacothamnus aboriginum*	CNPS List 1B.2	Riparian scrub, chaparral, woodland	A	No suitable habitat on site.
Arcuate bush-mallow	*Malacothamnus arcuatus*	CNPS List 1B.2	Serpentine chaparral	A	No suitable habitat on site.
Halls bush-mallow	*Malacothamnus hallii*	CNPS List 1B.2	Riparian scrub, chaparral, woodland	A	No suitable habitat on site.
Marsh microseris	*Microseris paludosa*	CNPS List 1B.2	Coastal grassy habitats (mesic)	A	No suitable habitat on site.
Northern curly-leaved monardella	*Monardella sinuate ssp. nigrescens*	CNPS List 1B.2	Openings in chaparral, ponderosa pine forest; Zayante sands	A	Not observed in project area; no suitable habitat.
Woodland woolythreads	*Monolopia gracilens*	CNPS List 1B.2	Openings in redwood and mixed evergreen forests	A	Not observed in project area during survey.
Dudley's lousewort	*Pedicularis dudleyi*	CR CNPS List 1B.2	Redwood forest, moist areas near streams	A	Not observed in project area during survey.
Santa Cruz Mountains beardtongue	*Penstemon rattanii var. kleei*	CNPS List 1B.2	Sandy shale slopes in chaparral, coniferous forests	A	No suitable habitat on site; not observed
White-rayed pentachaeta	*Pentachaeta bellidiflora*	FE CE CNPS List 1B.1	Valley and foothill grassland, open dry rocky slopes, often on serpentine bedrock	A	Not observed within site; site lacks suitable habitat.
White-flowered rein orchid	*Piperia candida*	CNPS List 1B.2	North coast coniferous forest, lower montane coniferous forest, broadleaved upland forest, on serpentine, mossy banks, rock outcrops	A	Not observed within site; site lacks suitable microhabitat.

ATTACHMENT 2

Table 1. Special Status Plant Species and Their Predicted Occurrence Within the Felton Library Project Site, August 2017.

Common Name	Scientific Name	Status	General Habitat Description	Habitat Present/ Absent	Rationale
Choris' popcorn-flower	*Plagiobothrys chorisianus var. chorisianus*	CNPS List 1B.2	Chaparral, coastal scrub, coastal prairie (mesic areas)	A	No suitable habitat on site.
San Francisco popcorn-flower	*Plagiobothrys diffusus*	CE CNPS List 1B.1	Grassland, coastal prairie (mesic areas)	A	No suitable habitat on site.
Hairless popcorn-flower	*Plagiobothrys glaber*	CNPS List 1A	Grassland, coastal prairie (mesic areas)	A	No suitable habitat on site.
Scotts Valley polygonum	*Polygonum hickmanii*	FE CE CNPS List 1B.1	Grassland with sandstone or mudstone outcrops	A	No suitable habitat on site.
Pine rose	*Rosa pinetorum*	CNPS List 1B.2	Closed cone (pine) coniferous forest	A	No suitable habitat on site.
San Francisco campion	*Silene verecunda ssp. verecunda*	CNPS List 1B.2	Sand hills and rocky soils in coastal prairie and scrub	A	No suitable habitat on site.
Metcalf Canyon jewelflower	*Strepthanthus albidus ssp. albidus*	FE CNPS List 1B.2	Serpentine soils in chaparral and grasslands	A	No suitable habitat on site.
Most beautiful jewelflower	*Strepthanthus albidus ssp. peramerous*	CNPS List 1B.2	Serpentine soils in chaparral and grasslands	A	No suitable habitat on site.
Santa Cruz clover	*Trifolium buckwestiorum*	CNPS List 1B.1	Moist grasslands	A	No suitable habitat on site.

Absent [A] - No habitat present and no further work needed.
Habitat Present [HP] - Habitat is, or may be present. The species may be present.
Present [P] - Species is present
Status: -Federal Endangered (FE); Federal Threatened (FT); Federal Proposed (FP, FPE, FPT); Federal Candidate (FC), Federal Species of Concern (FSC); California State Endangered (CE); California State Threatened (CT); California Native Plant Society (CNPS)

Special Status Wildlife Species

Special status wildlife species include those listed, proposed or candidate species by the Federal or the State resource agencies as well as those identified as State species of special concern. In addition, all raptor nests are protected by CDFW Code, and all migratory bird nests are protected by the Federal Migratory Bird Treaty Act. Special status wildlife species were evaluated for their potential presence in the project area as described in Table 2 below.

California red-legged frog may occur for seasonal foraging in portions of Bull Creek, and may be present during the summer construction period. The site is not within Designated Critical Habitat for this frog species. The USACE will request a Section 7 consultation with USFWS pursuant to issuing a Nationwide Permit for the culvert removal/bridge installation.

ATTACHMENT 2

According to the County's expert fisheries biologist, the site does not provide habitat for the federally listed steelhead. Although tributaries to the San Lorenzo River are included in the Designated Critical Habitat for steelhead, because this site has significant barriers that prevent steelhead from moving upstream from the river to the site, it would not meet the primary constituent elements for Critical Habitat. Therefore, the project will not adversely affect Designated Critical Habitat for the steelhead. The USACE may also request consultation with NMFS regarding concurrence on the findings of "no effect" as described in the County's 2017 fishery evaluation.

Table 2. Special Status Wildlife Species and their Predicted Occurrence at Felton Library Project Site, August 2017.

SPECIES	STATUS[1]	HABITAT	POTENTIAL OCCURRENCE ON SITE
Invertebrates			
Ohlone tiger beetle *Cicindela ohlone*	FE	Coastal terrace prairie with sparse vegetation and openings, Watsonville loam soils	None, no suitable habitat on site.
Monarch butterfly *Danaus plexippus*	*	Eucalyptus, acacia and pine trees groves provide winter habitat when they have adequate protection from wind and nearby source of water	No suitable habitat on site.
Fish			
Tidewater goby *Eucyclogobius newberryi*	FE, CSC	Coastal lagoons and associated creeks up to 1 mile inland	No suitable habitat on site.
Steelhead *Oncorhynchus mykiss*	FT	Perennial creeks and rivers with gravels for spawning	None, downstream barrier. See Fishery Report by County (Bull Creek Fish, 2017). Does not meet PCEs for CH.
Amphibians			
California red-legged frog *Rana aurora draytonii*	FT, CSC	Riparian, marshes, estuaries and ponds with still water at least into June.	May occur for forage and movement; breeding habitat absent. Site outside CH.
Foothill yellow-legged frog *Rana boylii*	CSC	Perennial creeks with cobble substrate for egg attachment.	None, habitat unsuitable.
Reptiles			
Western pond turtle *Actinemys marmorata*	CSC	Creeks and ponds with water of sufficient depth for escape cover, and structure for basking; grasslands or bare areas for nesting.	None, no suitable habitat.
Birds			
White-tailed kite *Elanus leucurus*	FP	Nests in tall riparian trees adjacent to open lands for foraging	None, no suitable habitat on site.
Mammals			
Pallid bat *Antrozous pallidus*	CSC	Roosts in caves, hollow trees, mines, buildings, bridges, rock outcroppings	None, no suitable habitat on site.
Santa Cruz kangaroo rat *Dipodomys venustus*	None	Manzanita chaparral with sandy soils	None. No suitable habitat on site.
San Francisco dusky-footed woodrat *Neotoma fuscipes annectens*	CSC	Woodlands including oaks, willow riparian, Eucalyptus	Dens observed in riparian woodland.

ATTACHMENT 2

Table 2. Special Status Wildlife Species and their Predicted Occurrence at Felton Library Project Site, August 2017.

SPECIES	STATUS[1]	HABITAT	POTENTIAL OCCURRENCE ON SITE
American badger *Taxidea taxus*	CSC	Grasslands with friable soils	None, no suitable habitat on site.

[1] Key to status: FE=Federally listed as endangered species; FT= Federally listed as threatened species; FP=Fully protected species by State; CSC=California species of special concern; * = Species of local concern under County LCP; CH = Designated Critical Habitat

ATTACHMENT 2

IMPACT AND MITIGATION DISCUSSION

IMPACT CRITERIA

Thresholds of Significance

The thresholds of significance presented in the CEQA Guidelines were used to evaluate project impacts and to determine if implementation of the proposed Project would pose significant impacts to botanical resources. For this analysis, significant impacts are those that substantially affect, either directly or through habitat modifications:

a) A species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by CDFW or USFWS or NMFS;
b) Riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by CDFW or USFWS;
c) 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.

ENVIRONMENTAL IMPACTS, MITIGATION MEASURES AND SIGNIFICANCE DETERMINATION FOR THE PROPOSED PROJECT

The Phase One and Phase Two project components were evaluated for potential direct and indirect impacts to biotic resources, as per the CEQA criteria presented above. Impacts to sensitive habitats/resources and/or special status species were considered potentially significant. A discussion of Phase One and Phase Two project features and determination of potential impacts, as per CEQA criteria (a) through (e) are presented below. The project site is not located in an area subject to a Habitat Conservation plan, Natural Community Conservation plan or other approved conservation plan, as be item (f), above.

a) **Special Status Species.** The riparian woodland associated with Bull Creek and the open water/in-stream wetlands of Bull Creek have the potential to support California red-legged frog, a special status species. Construction within the riparian woodland or within Bull Creek has the potential for adverse impacts to California red-legged frog if any are present in the area during construction; therefore, measures are identified below to avoid and minimize potentially adverse impacts if any are present in the construction area. With implementation of the measures below, the project may affect, but is not likely to adversely affect the California red-legged frog. Note: The USACE will request a Section 7 consultation with USFWS for the California red-legged frog pursuant to issuing a Nationwide Permit for the culvert removal/bridge installation work. As noted above, the site is not within Designated Critical Habitat for this frog species, and the project will not adversely modify any Designated Critical Habitat.

   Wood rat dens were observed in the riparian woodland. Removal of trees and other vegetation for construction has the potential to kill or injure woodrats, if any are present in the construction area.

San Francisco dusky-footed wood rats are a State species of special concern, and measures are listed below to avoid and minimize potentially significant impacts if any are present in the construction area.

Bull Creek does not provide habitat for anadromous fish (i.e., steelhead), based on a fish evaluation conducted by the County in 2017. The creek was observed to support resident rainbow trout, an unprotected species. The project will have no effect on steelhead. Note: The USACE may request consultation with NMFS regarding concurrence on the findings of the County's fishery evaluation.

Recommended Measure BIO-1: Avoid Minimize Potential Impacts to California Red-legged Frog. The following measures shall be implemented to avoid and minimize potential impacts to California red-legged frog.

1.1 At least 15 days prior to the onset of activities, the applicant or project proponent shall submit the name(s) and credentials of qualified biologist to USFWS (Service) at least 15 days prior to the onset of activities. The applicant or project proponent shall submit the name(s) and credentials of biologists who would conduct activities specified in the following measures. No project activities shall begin until proponents have received written approval from the Service that the biologist(s) is qualified to conduct the work.

1.2 A Service-approved biologist shall survey the work site no more than 48 hours before the onset of activities. If California red-legged frogs are found, the approved biologist shall relocate the frogs to any area of suitable habitat either upstream or downstream and well away from the project work area. Only Service-approved biologists shall participate in activities associated with the capture, handling, and moving of California red-legged frogs.

1.3 Before any activities begin on a project, a Service-approved biologist shall conduct a training session for all construction personnel. At a minimum, the training shall include a description of the California red-legged frog and its habitat, the importance of the California red-legged frog and its habitat, general measures that are being implemented to conserve the California red-legged frog as they relate to the project, and the boundaries within which the project may be accomplished. Brochures, books and briefings may be used in the training session, provided that a qualified person is on hand to answer any questions.

1.4 A Service-approved biologist shall be present at the work site until such time as all removal of California red-legged frogs, instruction of workers, and habitat disturbance have been completed. After this time, the contractor or permittee shall designate a person to monitor on-site compliance with all minimization measures. The Service-approved biologist shall ensure that this individual receives training outlined in measure 3 above and in the identification of California red-legged frogs. The monitor and the Service-approved biologist shall have the authority to halt any action that might result in impacts that exceed the levels anticipated by the USACE and Service during review of the proposed action. If work is stopped, the Corps and Service shall be notified immediately by the Service-approved biologist or on-site biological monitor.

1.5 During project activities, all trash that may attract predators shall be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris shall be removed from work areas.

1.6 All refueling, maintenance, and staging of equipment and vehicles shall occur at least 20 meters from any riparian habitat or water body. The USACE and permittee shall ensure contamination of habitat does not occur during such operations. Prior to the onset of work, the USACE shall ensure that the permittee has prepared a plan to allow a prompt

ATTACHMENT 2

and effective response to any accidental spills. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

1.7 A Service-approved biologist shall ensure that the spread or introduction of invasive exotic plant species shall be avoided to the maximum extent possible. When practicable, invasive exotic plants in the project areas shall be removed.

1.8 Project sites shall be revegetated with an appropriate assemblage of native riparian, wetland, and upland vegetation suitable for the area. A species list and restoration and monitoring plan shall be included with the project proposal for review and approval by the Service and the USACE. Such a plan must include, but not be limited to, location of the restoration, species to be used, restoration techniques, time of year the work will be done, identifiable success criteria for completion, and remedial actions if the success criteria are not achieved.

1.9 Stream contours shall be returned to the original condition at the end of project activities, unless consultation with the Service has determined that it is not beneficial to the species or feasible.

1.10 The number of access routes, number and size of staging areas, and the total area of the activity shall be limited to the minimum necessary to achieve the project goal. Routes and boundaries shall be clearly demarcated, and these areas shall be outside of riparian and wetland areas. Where impacts occur in these staging areas and access routes, restoration shall occur as identified in measures 1.8 and 1.9 above.

1.11 Work activities shall be completed between April 1 and November 1. Should the proponent or applicant demonstrate a need to conduct activities outside this period, the USACE may authorize such activities after obtaining the Service's approval.

1.12 To control erosion during and after project implementation, the applicant shall implement best management practices, as identified by the local RWQCB.

1.13 If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than five millimeters (mm) to prevent California red-legged frogs from entering the pump system. Water shall be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow shall be removed in a manner that would allow flow to resume with the least disturbance to the substrate.

1.14 A Service-approved biologist shall permanently remove from within the project area, any individuals of exotic species, such as bullfrogs, crayfish, and centrarchid fishes to the maximum extent possible.

Recommended Measure BIO-2: Avoid Minimize Potential Impacts to San Francisco Dusky-footed Woodrat. The following measures shall be implemented to avoid impacts to this species:

2.1 A qualified biologist shall conduct a preconstruction surveys for San Francisco dusky-footed woodrat dens/nests in the impact area and 50-foot wide buffer within 30 days prior to construction or vegetation clearing. The location of all nests, observed animals or carcasses shall be mapped onto an aerial image or project base map.

2.2 If no nests are observed, no further mitigation is required.

2.3 If woodrat nests are observed within an area scheduled for clearing or grading, the biologist shall prepare a plan to either relocate the nest or construct a replacement nest in an area nearby that is not going to be disturbed. The plan shall include a map of all woodrat nests, avoidance and minimization measures and mitigation. Examples of actions include installation of protective fencing between nests and construction, establishment of buffer zones around nests, and creation of replacement brush piles. The plan shall be submitted to

ATTACHMENT 2

CDFW for review and approval. The County/applicant shall obtain approval of the plan from CDFW prior to implementing any nest relocation or replacement.

2.4 For trails within the riparian woodland, route trails to avoid woodrat nests and maintain a minimum 10-foot buffer between the trail and the woodrat nest.

b) **Riparian Woodland.** The riparian woodland, including the open water and aquatic resources in Bull Creek, is a sensitive and regulated habitat. Project activities within this resource require implementation of avoidance and minimization measures and compensatory mitigation for unavoidable impacts.

A summary of impacts to the riparian woodland from the project is presented in Table 3.

Table 3. Analysis of Impacts and Potential Compensation at Felton Library Project Site, August 2017.

Project Feature	Permanent Riparian Impact (approx.) (sq. ft.)[1]	Recommended Mitigation Ratio[2]	Riparian Creation/Compensation (approx.) (sq. ft.)
Phase One - Library			
Library Parking Lot Area	4,094		
Library Patio Area	1,376		
Trail to New Bridge	99		
Phase 1 Total	**5,569 sq. ft.**	**2:1**	**11,138 sq. ft.**
Phase Two -Nature Explore			
Trails (185 l. ft. x 8 ft. wide) and foot bridge	1,480		
Phase 2 Total	**1,480 sq. ft.**	**2:1**	**2,960 sq. ft.**
Available Compensation Areas			
SLVWD Property			11,974
County Land (between nature explorer areas and dripline)			2,205
Total Compensation Area Available on Site			**14,179 sq. ft.**

[1] Includes removal of nine willow trees. [2] Mitigation to include tree replacement at minimum 3:1 ratio

Phase One Project. The library structure and parking improvements will require work within a portion of the riparian woodland/riparian corridor. In addition, the culvert removal and bridge construction over Bull Creek will occur in the riparian corridor. Approximately 5,569 square feet of woodland (based on extent of dripline and as regulated by CDFW, RWQCB, and the County) will be removed to accommodate the project (Table 3). The site plan shows the removal of nine willow trees (Trees # 302 through 308, 310, and 311) to accommodate the on-site parking. The trees range from 12 inches to 36 inches in diameter (See Tree Inventory, Assessment, and Protection, May 31, 2017 by Monarch Consulting Arborists LLC, Richard Gessner, Arborist). The location if these trees are identified with an "X" on Figure 2. Another willow (tree #301) will have two large branches cut back and cabled to accommodate the library and outdoor patio. Small trees of dogwood and other understory vegetation will also be removed. This vegetation removal is a significant impact to biological resources.

ATTACHMENT 2

Table 4. Preliminary Planting List for Riparian Woodland Mitigation, August 2017

Common Name	Scientific Name	Size
Trees		
Arroyo Willow	*Salix lasiolepis*	Pole Cutting
Black Cottonwood	*Populus trichocarpa*	Pole Cutting
Dogwood	*Cornus sericea*	Tree Pot
Box Elder	*Acer negundo*	Tree Pot
Sycamore	*Platanus racemosa*	Tree Pot
Blue Elderberry	*Sambucus mexicana*	Tree Pot
Coast Live Oak	*Quercus agrifolia*	Tree Pot
Shrubs and Groundcovers		
Snowberry	*Symphoricarpos mollis. S. albus*	1 gallon
Flowering Currant	*Ribes sanguineum var. glutinosum*	1 gallon
California Blackberry	*Rubus ursinus*	1 gallon
California Rose	*Rosa californica*	1 gallon
California Bee Plant	*Scrophularia californica*	4" or 1 gallon
Spreading Rush	*Juncus patens*	4" or 1 gallon
Douglas or Ground Iris	*Iris douglasii or I. fernaldi*	4" or 1 gallon
Wetland Plants for Culvert Removal/Bridge Construction Area		
Santa Barbara Sedge	*Carex barbarae*	4" or 1 gallon
Bog Rush	*Juncus effusus*	4" or 1 gallon
Pacific Silverweed	*Potentilla anserina*	4" or 1 gallon
Dense Sedge	*Carex densa*	4" or 1 gallon

Recommended Measure BIO-4: Implement Tree Protection and Erosion Control Measures Prior to and During Construction. The County and the Nature Explore Program shall implement standard erosion control BMP's and riparian habitat/tree protection measures during the construction period to minimize impacts to Bull Creek, including: (Note: Regulatory agencies may require additional measures)

4.1 Implement tree protection measures as outlined in the arborist report (Tree Inventory, Assessment, and Protection, May 31, 2017 by Monarch Consulting Arborists LLC, Richard Gessner, Arborist).

4.2 Install perimeter silt fencing and construction area limit-of-work fencing. Install both the silt and plastic mesh fencing at the perimeter of the work area to prevent inadvertent impacts to the adjacent forest vegetation, creek channel, and injury to adjacent native trees. Protective fencing shall be in place prior to ground disturbances and removed once all construction is complete. During construction, no grading, construction or other work shall occur outside the designated limits of work. Maintain fencing in functional condition throughout the construction period, replace and repair as needed.

4.3 No excess soil, chemicals, debris, equipment or other materials shall be dumped or stored outside the designated limits of work.

4.4 Hand tools shall be used to trim vegetation to the extent necessary to gain access to the work area. All removed material/vegetation shall be removed from the riparian corridor.

4.5 All staging of equipment and materials, and refueling of equipment, shall be located in existing roadways and parking areas. The contractor shall prepare and implement a fuel spill prevention and clean-up plan.

ATTACHMENT 2

c) **Federally Protected Wetlands.** Bull Creek was found to support federal jurisdictional areas. Federal jurisdiction typically extends to the Ordinary High Water Mark of waterway; however, jurisdiction can also include adjacent wetlands (vegetated areas above OHWM). The site was not found to support any wetlands above the OHWM of Bull Creek. Bridge construction (with culvert removal) will require temporary dewatering of the creek channel and the temporary placement of fill within the channel during construction (i.e., coffer dam or equivalent), which is Waters of the U.S.

Recommended Measure BIO-5: Minimize Impacts to Water of the U.S. Pursuant to obtaining permits from USACE for work within Bull Creek, implement erosion control and water quality protection measures as outline in Measure BIO-4. To avoid impacts to special status species, implement Measure BIO-1. Areas around the culvert/bridge construction area should be revegetated with native wetland plant species, as listed in Table 4. (Note: USACE may require additional measures).

d) **Migratory Birds.** Nesting birds may occur in the riparian vegetation to be removed as well as in the woodland adjacent to the project site. Removal of trees and other vegetation for construction has the potential to kill or injure nesting birds, if any are present in the construction area. Noise from construction has the potential to cause abandonment by adult birds of chicks or eggs in areas of close proximity to construction. Because most nesting birds are protected by the Migratory Bird Treaty Act, measures are listed below to avoid potentially significant impacts if any are present during construction.

Recommended Measure BIO-6: Avoid impacts to Nesting Birds. Implement the following measures to avoid impacting nesting birds, if present. (Note: CDFW may require additional measures)

6.1 Schedule tree/vegetation removal to occur during the non-breeding season of raptors and migratory birds. Tree removal and limbing should occur between August 31 and March 14 of any given year. If this is not possible, then have a qualified biologist conduct a preconstruction survey for nesting birds. The surveys shall be conducted no more than 14 days prior to beginning of construction or vegetation removal.

6.2 A buffer zone with highly visible tape or fencing shall be established around the active bird nest and no construction shall take place within the buffer zone until the biologist confirms that all young have fledged the nest.

6.3 Buffer distances for bird nests should be site specific and an appropriate distance, as determined by a qualified biologist. The buffer distances should be specified to protect the bird's normal bird behavior to prevent nesting failure or abandonment. The buffer distance recommendation should be developed after field investigations that evaluate the bird(s) apparent distress in the presence of people or equipment at various distances. Abnormal nesting behaviors which may cause reproductive harm include, but are not limited to, flights/vocalizations directed towards project personnel, standing up from a brooding position, and flying away from the nest.

6.4 The qualified biologist shall have authority to order the cessation of all nearby project activities if the nesting birds exhibit abnormal behavior which may cause reproductive failure (nest abandonment and loss of eggs and/or young) until an appropriate buffer is established.

6.5 Typical protective buffers between each identified nest site and the construction site are as follows: i) 1,000 feet for large raptors such as buteos; ii) 500 feet for small raptors

ATTACHMENT 2

such as accipiters; and iii) 250 feet for passerines. The qualified biologist shall monitor the behavior of the birds (adults and young, when present) at the nest site to ensure that they are not disturbed by project activities. Nest monitoring shall continue during project activities until the young have fully fledged, are no longer being fed by the parents and have completely left the nest site, as determined by the qualified biologist.

6.6 The biologist shall prepare a report of nest survey results, nest monitoring (if any), and the dates when the nesting was completed, a report suitable for the applicant to submit to County and State resource agencies.

e) **Local Policies or Ordinances.** The County has a sensitive habitat ordinance that regulates vegetation removal and other impacts within such habitats. Within the riparian corridor (sensitive habitat), trees adjacent to construction could be inadvertently impacts from construction activities (e.g., limb breakage, damage to tree trunks, etc.). In addition, human uses within and/or in close proximity to the riparian corridor can adversely affect native wildlife utilization of the habitat.

Recommended Measure BIO-7: Trees to be retained that are located adjacent to construction shall be protected during construction, as directed by an arborist. If inadvertent damage to trees occurs, a remediation program should be developed by the arborist and implemented; the measures shall be inspected by the County of Santa Cruz Planning Department and arborist to determine the success of the remedial measures.

Recommended Measure BIO-8: To reduce project impacts from the projects encroachment into the County-designated riparian corridor, following Phase One construction, the County shall install a low split-rail type fence or vegetative barrier plantings between the riparian woodland and the parking lots/areas (where the parking areas are located adjacent to the riparian woodland). The fence or vegetative barrier plantings would protect the riparian area from indirect impacts from facility users (i.e., trampling, deposition of debris, etc.). The pedestrian paths constructed in Phase One and Phase Two should include signs to encourage users to stay on the path and not trample adjacent riparian vegetation.

LITERATURE CITED AND REFERENCES

California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California. CNPS, Sacramento CA. 2017.

California, State of, Department of Fish & Game. 2002. Designated Endangered, Threatened or Rare Plants and Candidates with Official Listing Dates.

California, State of, Department of Fish & Game. 2017. Natural Diversity DataBase, Natural Communities. 2017 RareFind 5 program.

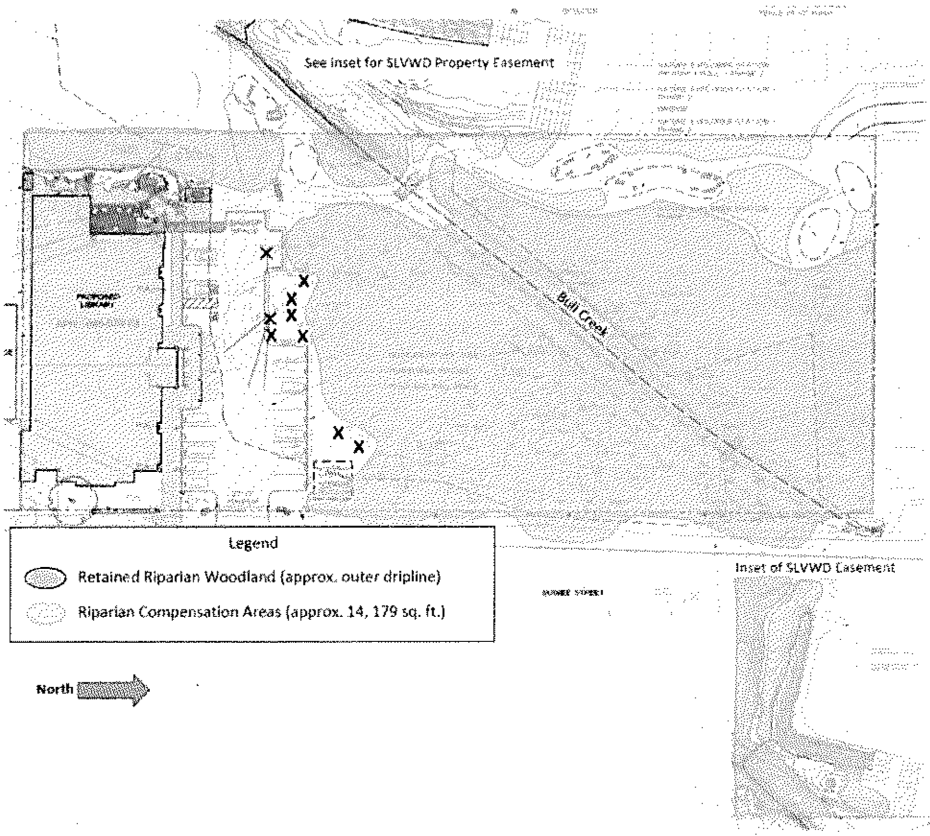
Hickman, J. 2012. The Jepson Manual Vascular Plants of California. Berkeley: University of California Press.

Holland, R.F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. CDFG Unpublished report, October 1986.

Monarch Consulting Arborists LLC. 2017. Tree Inventory, Assessment, and Protection Proposed Felton Library, Gushee Street, Felton, CA 95018

Santa Cruz County, 2017. Bull Creek Fish 2017, Kristen Kittleson, Resource Planner, Environmental Health Division, Health Services Agency.

Appendix A
Conceptual Riparian Compensation Plan



Appendix A. Conceptual Riparian Compensation Plan

ATTACHMENT 2

ECOSYSTEMS WEST
CONSULTING GROUP

July 7, 2017

Mathew Johnston
Environmental Coordinator
Planning Department
County of Santa Cruz
701 Ocean Street
Santa Cruz, CA 95060

Re: Biological Review of the Biotic Report for the Felton Library Project

Dear Matt:

This letter summarizes our review of the "Biological Report" prepared by Biotic Resource Group (BRG) in association with Dana Bland and Associates dated 6 June 2017 for Teall Messer, Architect. The biotic survey and report findings were prepared evaluate potential biological impacts from development of a two phased project consisting of a new branch library building, on and off street parking, a couple of bridge crossings over Bull Creek, a nature exploration program consisting of nature stations, a loop pathway/boardwalk, and riparian compensation enhancement and restoration. The Felton Library project is located in the town of Felton in the San Lorenzo Valley in Santa Cruz County. Project site will be accessed from Gushee Street, adjacent to the U.S. Post Office on the north side. The project site is on a 2.03-acre County owned parcel with an easement on the adjoining San Lorenzo Valley Water District property on the west side.

Kathleen Lyons and Dana Bland conducted biological surveys in 2003, August 2012 on the County owned parcel and February 2017 on both the County owned parcel and the portion of the SLV Water District property proposed for easement access. The focus of these surveys include surveys for special-status species with potential to occur on or adjacent to the parcels, map and characterize vegetation communities within the project area, and conduct preliminary determination of water features found on or adjacent to the parcels. No protocol-level surveys were conducted for listed species known to occur in the vicinity of the lower San Lorenzo River watershed. The timings of the 2017 surveys were not entirely conducted at a phenological period to provide clearance level surveys, in particular for annual special-status plants and nesting birds and maternal roosting bats.

Bill Davilla of EcoSystems West, Matt Johnston of the County of Santa Cruz Planning Department conducted an overview of the parcels on June 27, 2017 with a specific focus on those areas designated for development, improvements, and enhancement. Particular focus was on the location, extent, and condition of riparian habitat adjacent to Bull Creek and within the northern portion of the parcel.

180 Seventh Avenue, Suite 201, Santa Cruz, CA 95062
Phone: 831-429-6730 * Fax: 831-429-8742

The vegetation habitats on the properties are characterized by BRG as riparian woodland and annual, non-native grassland. The predominant habitat on the County parcel is riparian habitat composed of woody overstory of arroyo willow, black cottonwood, and coast live oak, California bay and box elder. The understory includes vines, herbs, and occasional shrubs. Observed understory associates include California blackberry, Himalaya berry, elderberry, spreading rush, bog rush, and nut grass. The upper (southern end) of Bull Creek riparian vegetation had been cleared of woody vegetation on the east edge of the stream bank for flood management by the Santa Cruz County Public Works department. The annual grassland habitat is located in the northwest corner of the County parcel and on portions of the SLV Water District property proposed for easement mitigation. The site proposed for the library building and adjacent on-site parking has been cleared and covered in woody mulch.

No special-status plant species were observed on the parcels and there is no potential habitat for species known to occur in the vicinity of the parcels (Table 1). No special-status wildlife species were observed during the course of field surveys with the exception of San Francisco dusky-footed woodrat. Potential breeding habitat for birds and bats occurs in the trees and riparian vegetation along the stream corridor. San Francisco dusky footed woodrat nests were observed in the riparian understory. BRG notes an NDDB record of putative California red-legged frog (CRLF) occurrence was documented 0.5 mile upstream of the parcel on Bull Creek in 2004. No CRLF were incidentally observed during the course of field survey in February of 2017, or during the previous survey periods, although the timing of the visits were not conducted during the typical breeding periods. To my knowledge, no biologist has reconfirmed the presence of CRLF after the 2004 siting. BRG states that the section of Bull Creek on the project parcel would provide only potential cover and foraging habitat and that due to the strong current would not provide breeding habitat. BRG notes that fish may occur in the creek but the anadromous fishery occurring in the San Lorenzo River is not expected to occur in this section of Bull Creek due to the presence of a drop structure at Gushee Street on the north end of the parcel. During the site visit by Matt and I on June 27, we observed small unidentified fingerlings and an 8-inch trout in the wider section of upper Bull Creek. It is not clear if this individual was from this year or is an older land locked individual.

Biotic Resources Group recognized one sensitive habitat type (cottonwood-willow riparian woodland) on the parcels. The cottonwood-willow riparian habitat meets the County definition of a sensitive habitat due to its CDFG rarity index ranking of S3 and under the County Sensitive Habitat/Riparian Ordinance.

Mitigation measures are based on potential impacts to special-status species including CRLF and wood rat dens, promote avoidance through monitoring, project design (particularly, the nature activity sites) and worker's education. In general, a review of the measures proposed in the biotic report are consistent with the resources affected by the development of the project and should be implemented as appropriate. One possible exception may be in "Recommended Measure BIO-6" which recommends breeding bird buffers of 250 feet for nesting raptors and 50 feet for other migratory bird species. Recent, conditions on County projects from California Department of Fish and Wildlife has been 500 feet for raptors and 250 feet for migratory birds. Although, I don't necessarily concur with the CDFW prescribed buffers, it may be appropriate to check in advance of completion of CEQA review to determine if they will concur with Biotic Report's recommendations. Finally, since possible anadromous fish were observed during our field visit, there should be a more detailed assessment of the source of the fishery and if the species observed was indeed steelhead trout.

Should you require further clarification of this review, please don't hesitate to contact me.

Sincerely,

Bill Davilla
Principal

ATTACHMENT 3

COUNTY OF SANTA CRUZ

PLANNING DEPARTMENT
701 OCEAN STREET, 4TH FLOOR, SANTA CRUZ, CA 95060
(831) 454-2580 FAX: (831) 454-2131 TDD: (831) 454-2123
KATHLEEN MOLLOY PREVISICH, PLANNING DIRECTOR

September 7, 2017

Teall Messer
3833 Glen Haven Rd
Soquel, CA 95073

APN: 065-073-03
App #: REV171066

Dear Mr. Messer:

The Biotic Report authored by Biotic Resources Group, dated June 6, 2017 and updated August 21, 2017, has been reviewed for consistency with the Santa Cruz County Code. The Biotic Report was prepared to evaluate potential biological impacts from development of a two phased project consisting of a new branch library building, on and off street parking, a couple of bridge crossings over Bull Creek, a nature exploration program consisting of nature stations, a loop pathway/boardwalk, and riparian compensation enhancement and restoration. On June 27, 2017, I conducted a site assessment with the County consulting biologist, Bill Davilla of Ecosystems West, as a part of the review of the June 6, 2017 report. The Ecosystems West review letter of that report is attached. During that site visit we identified salmonids in Bull Creek on the subject parcel. As a result of that sighting, the County fisheries biologist, Kristen Kittleson, performed an evaluation of the channel downstream of the project in order to determine whether the fish present could be anadromous steelhead, and thus subject to federal regulations under the National Marine Fisheries Service, or were residential trout. It has been determined that the 900 feet of culvert with periodic grade changes constitutes a complete barrier to up-stream migration and the trout are resident trout.

The report identifies impacts to riparian woodland, the potential presence of California red-legged frogs and San Francisco dusky-footed woodrats, and the potential to impact nesting migratory birds. The report includes recommended mitigation measures to address these impacts. Beyond the recommended measures, the County will add a provision that a biologist be present during any dewatering activities in order to relocate upstream any native aquatic fauna that are present in the dewatered reach. Provided the recommended measures are included as conditions of approval of the development of this parcel, the County finds the proposal to be consistent with the County Code. The report is accepted and biotic approval has been granted for the proposed library development project.

Sincerely,

Matthew Johnston
Environmental Planning

Cc: Annette Olson, Project Planner

Steelhead and Resident Rainbow Trout in Bull Creek, Felton, California

21 July 2017

Prepared by Kristen Kittleson, Fishery Resource Planner, County of Santa Cruz

Report Purpose

The purpose of this report is to provide information on the presence of steelhead or resident rainbow trout in Bull Creek, San Lorenzo River Watershed. Steelhead and resident rainbow trout are the same species, *Oncorhynchus mykiss* (O. mykiss) – with different life histories. Steelhead rear in freshwater, migrate to the ocean to mature and return as adults to spawn. Resident rainbows mature and reproduce in freshwater but sometimes migrate to the ocean at an older age. Steelhead are protected as threatened under the Federal Endangered Species Act; resident rainbows are not protected by the ESA listing.

Key finding

Bull Creek supports resident rainbow trout and should be managed to protect or enhance habitat for these fish. To connect to the San Lorenzo River, Bull Creek flows through a 900-foot' culvert system that includes a 362' section of 7% slope. This culvert system effectively prohibits or severely limits passage for adult steelhead into Bull Creek. Resident rainbows may occasionally get carried downstream into the San Lorenzo River system.

General Setting

Bull Creek originates from on Ben Lomond Mountain, within a small subwatershed on the west side of the San Lorenzo River Watershed. A portion of the upper watershed is owned by the San Lorenzo Valley Water District (SLVWD) and includes a small reservoir and impassable, 12' high dam. Downstream of the reservoir, the creek flows through private properties and into the County of Santa Cruz Public Works yard. The creek passes through a low gradient culvert under the Public Works yard and Hihn Street before flowing through the Felton Library property. The stream is very low gradient through the Felton Library property and passes under a short 30' culvert from an old road crossing.

At Gushee Street, Bull Creek enters about 940' of culvert that carries the stream under Kirby Street, along and under Highway 9, under the New Leaf Market property, and out to the San Lorenzo River just downstream of Graham Hill Road. The culvert is composed of sections at different gradients and connected with drop structures. The section under Kirby Street is 6' tall X 4' wide. The steepest part of the culvert is the section closest to the San Lorenzo River; this section is 362 feet at a slope of 7.15%. The culvert outlet is 3'9" tall X 4' wide and is perched about 4-5' above the baseflow elevation of the San Lorenzo River but would be submerged during high flows.

ATTACHMENT 4

Steelhead information

Bull Creek has not been previously considered a steelhead stream. The 2008 CEMAR report documented any historical information about steelhead and resident rainbow trout distribution in Santa Cruz County. No observations or studies of steelhead are documented for Bull Creek. A 1980 CDFG report noted that Bull Creek does not have hydrologic connectivity to the San Lorenzo River and reported that a local resident had never seen salmonids in the stream.

Bull Creek was not mapped as either a steelhead or resident rainbow trout stream in the 2004 Steelhead and Coho Salmon Distribution Map that included information from area fishery biologists. Bull Creek is mapped for intrinsic potential in the Steelhead Recovery Plan, but is not mapped as critical habitat. Pool development is poor throughout the stream which limits habitat for either steelhead or resident rainbow trout (July 2017 observations and DWA 2014).

Oncorhynchus mykiss

O. mykiss have been observed in Bull Creek regularly over the past few years (see references). In June and July 2017, O. mykiss were seen in the excavated pools downstream of the Hihn Road culvert. Fish were approximately 5-7" in size. Last year, four larger O. mykiss, measuring an estimated 9-12", were observed in this same area (J. Maugueri, personal communication). O. mykiss have been observed in the SLVWD reservoir but in 2017, the reservoir filled with sediment.

O. mykiss can be observed in two 4-5' deep pools at the culvert outlet downstream of Hihn Street, on the Felton Library property. County Public Works excavates this section of the creek to reduce flooding further upstream and these excavated pools provide habitat for resident rainbows.

No recent observations of adult steelhead are known for Bull Creek.

Several young-of-the-year steelhead were observed within Bull Creek, in the short section between the culvert and the San Lorenzo River. Young-of-the-year steelhead are often seen in tributary confluence habitats.

Passage for Steelhead Access to Bull Creek

During most of the year, Bull Creek is not accessible to steelhead due to the perched outlet, and shallow depths and steep gradient within the culvert. During very high flows, the culvert outlet would be submerged in the river, but it is unlikely that steelhead would be able to swim up the culvert due to excess velocities, the steep gradient and the total length of the culverted section.

There is a small possibility that very high flows in the San Lorenzo River could restrict the flow of Bull Creek into the river and thereby create a condition with lower velocities in the culverted section. The culvert inlet is grated which presents an additional passage challenge for upstream migration. Upstream of the project area, the San Lorenzo Valley Water District has a reservoir with a 12' high dam that is a complete barrier to steelhead.

References

Bull Creek Fishery Assessment, Santa Cruz County, 2014. D.W. ALLEY and Associates.

County of Santa Cruz personal communications
Matt Johnston, Planning. O. mykiss observation
John Maugueri, Public Works, O. mykiss observation
Betsey Lynberg, Public Works, culvert plans and gradient calculations

National Marine Fisheries Service, 2016. Final Coastal Multispecies Plan, Volume IV Central California Coast Steelhead, 2016. National Marine Fisheries Service, West Coast Region, Santa Rosa, California.

National Marine Fisheries Service. Endangered Species Act Critical Habitat.

San Lorenzo Valley Water District, Jen Michelsen, personal communication

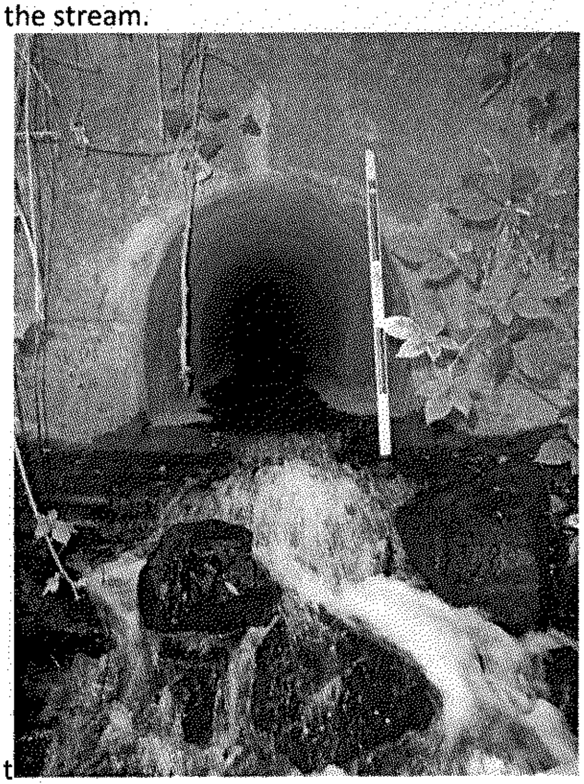
Steelhead and Coho Salmon Distribution in Santa Cruz County, 2004. Map produced by County of Santa Cruz in coordination with California Department of Fish and Wildlife and area fishery biologists.

Steelhead/Rainbow Trout (Oncorhynchus mykiss) Resources South of the Golden Gate, California Distribution Report, 2008. Center for Ecological Management and Restoration and (CEMAR). Prepared for the California State Coastal Conservancy and the Resources Legacy Fund Foundation.

The photos start at confluence and move upstream

The confluence of Bull Creek with the San Lorenzo River. Arrow points to location of culvert outlet, shown in photo below.

Outlet of Bull Creek culvert system. Culvert is 3'9" tall and 4' wide. Outlet is perched 3' above the stream.



t

ATTACHMENT 4

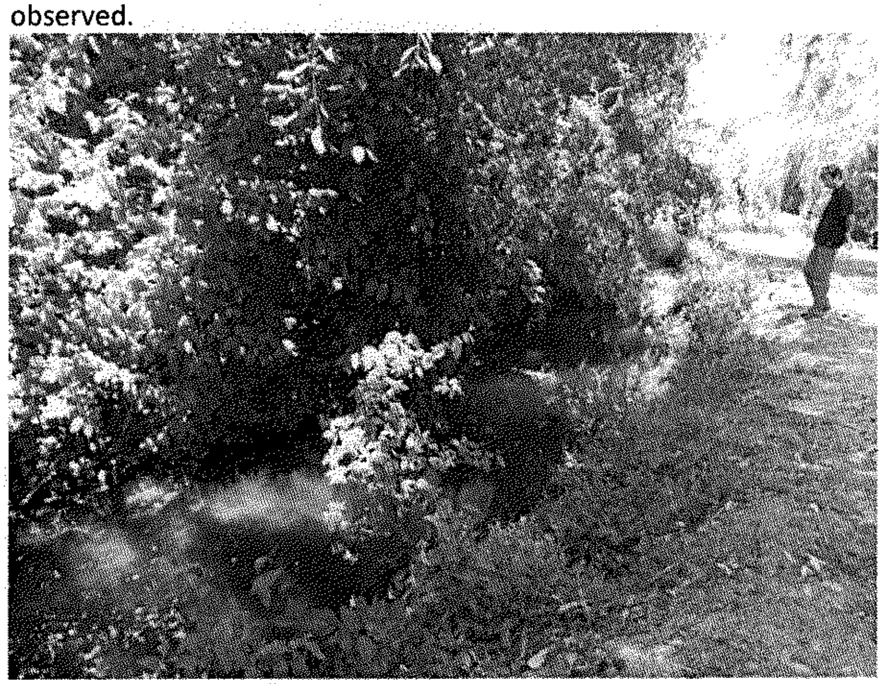
Photo shows culvert system inlet, at the downstream end of the Felton Library property. Here, Bull Creek enters a 940+' culvert system under the town of Felton. In addition to the length and gradient of the culvert, these grates (6" apart) would restrict access upstream for steelhead.

Photo shows Bull Creek within the Felton Library property where the stream is low gradient.

ATTACHMENT 4

Photo showing depth, substrate and habitat at the culvert inlet that is proposed for removal within the Felton Library property.

Bull Creek in the Felton Library property showing the deep pools where O. mykiss were observed.

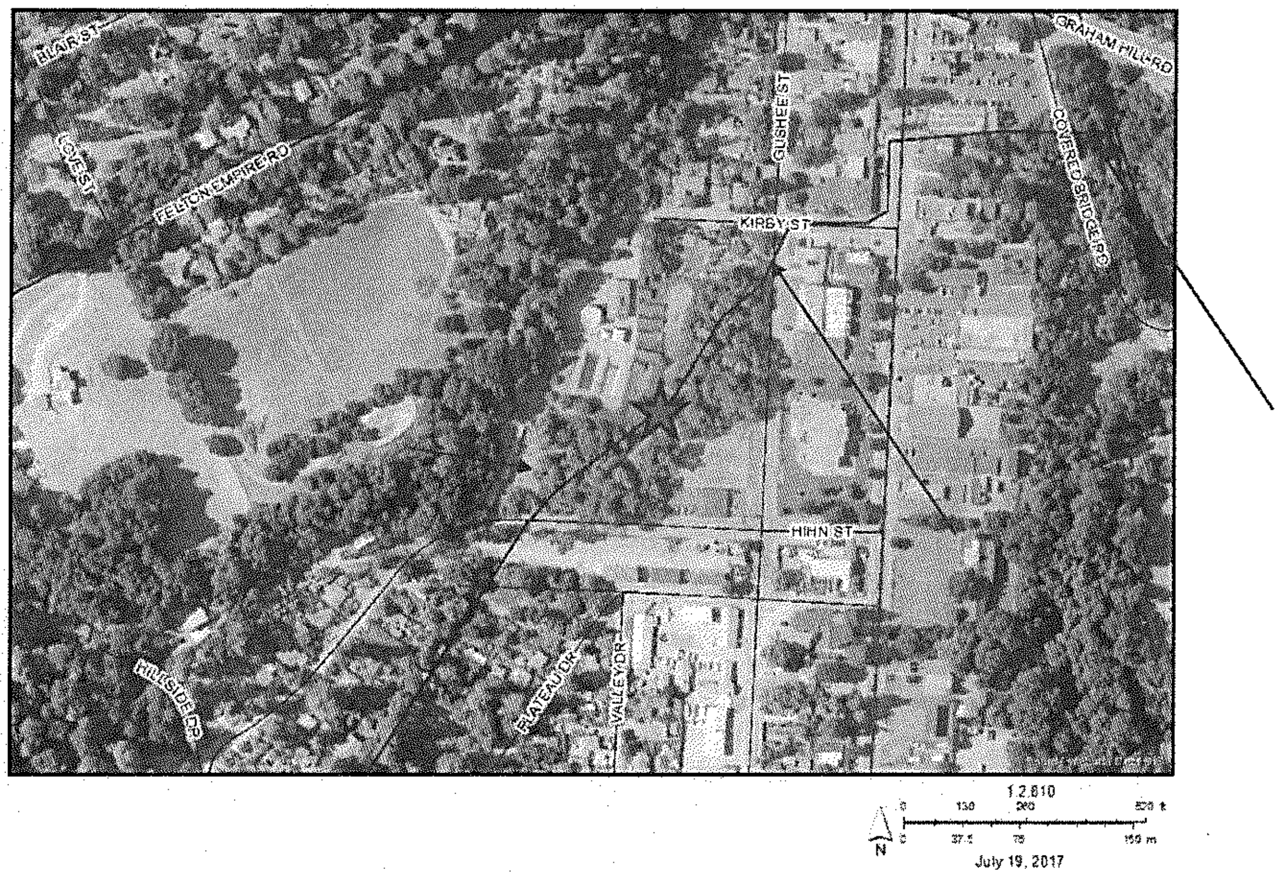


ATTACHMENT 4

Photo shows Bull Creek at Hihn Road crossing with limited pool development

ATTACHMENT 4

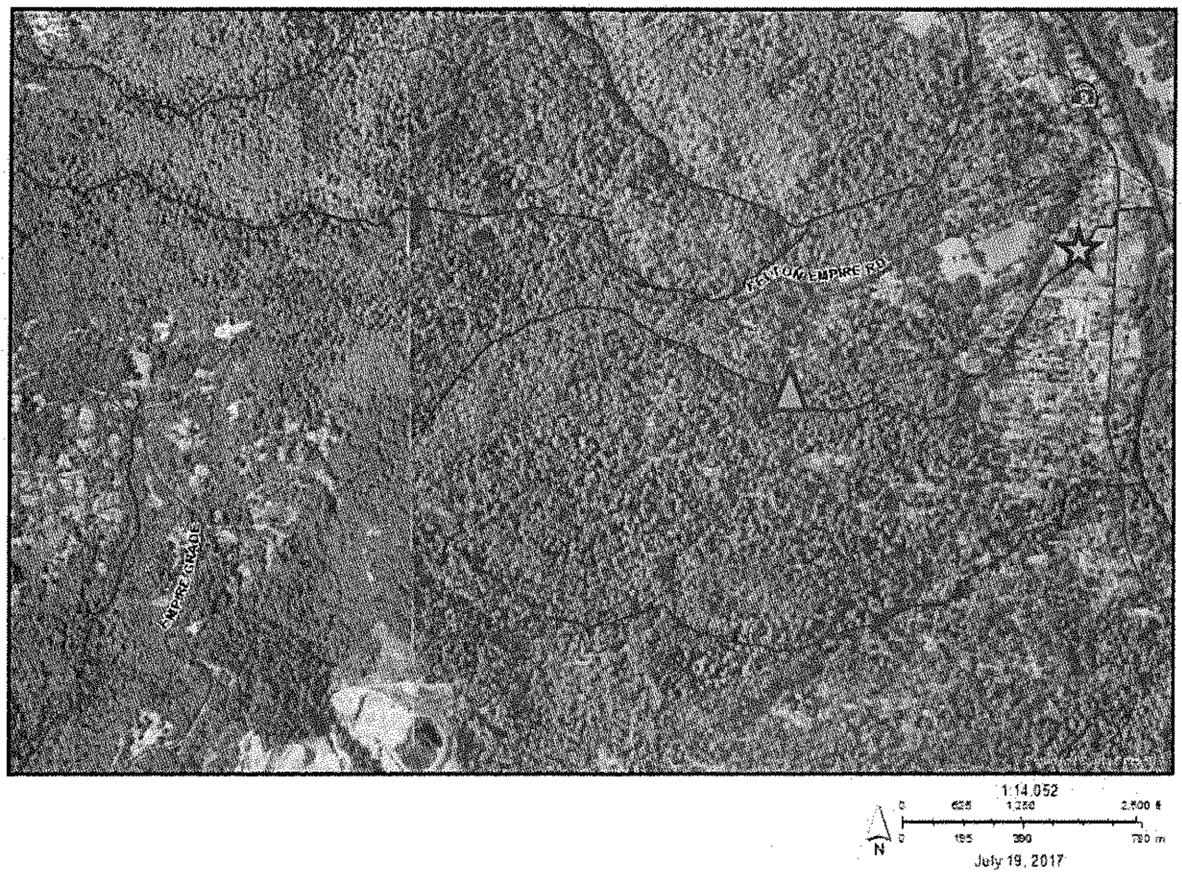
Bull Creek in Felton



Blue star shows proposed project location and red arrow shows location of O. mykiss observations on Felton Library property.
Purple arrows show upstream and downstream extent of culvert system.

ATTACHMENT 4

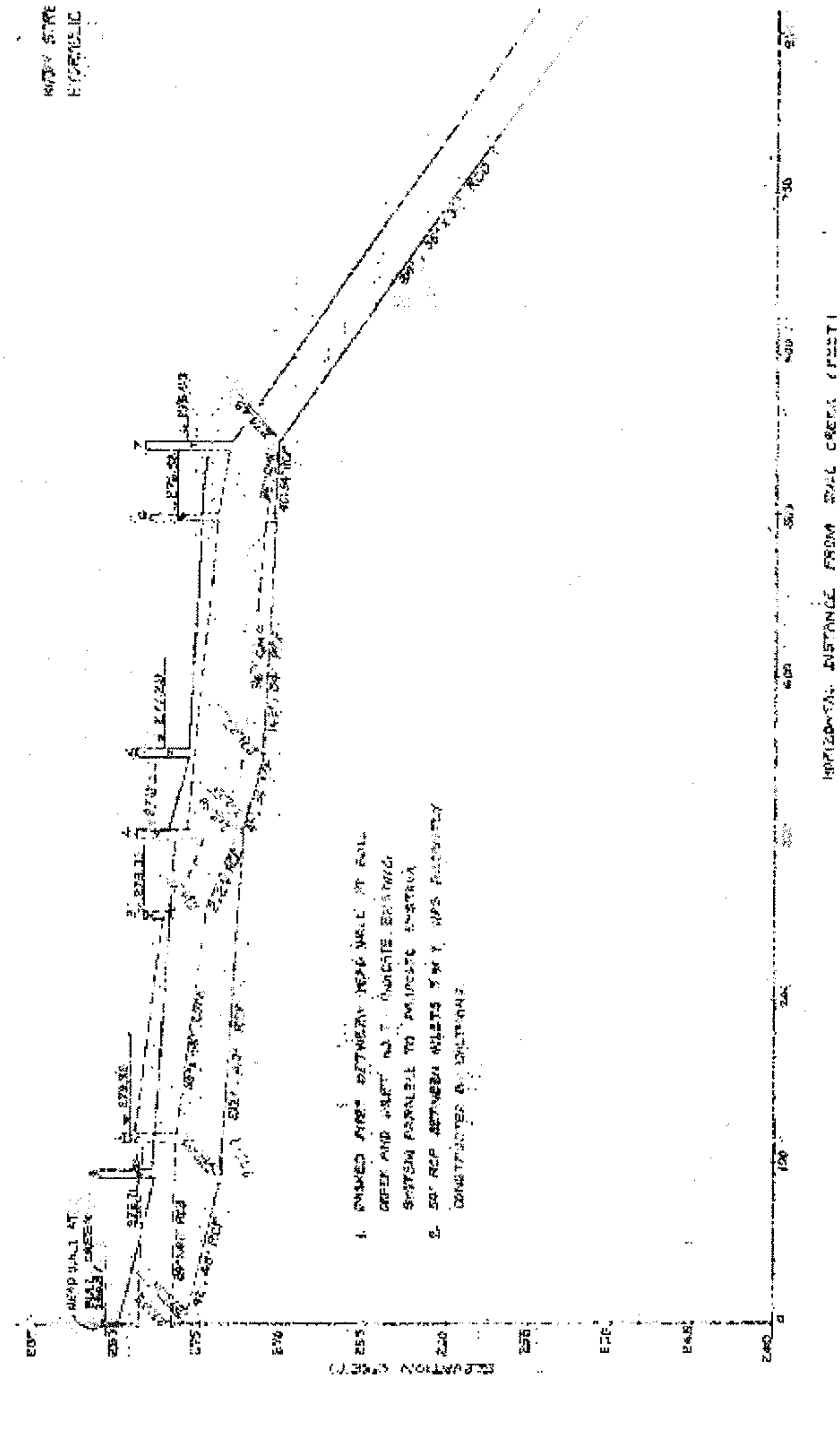
Bull Creek



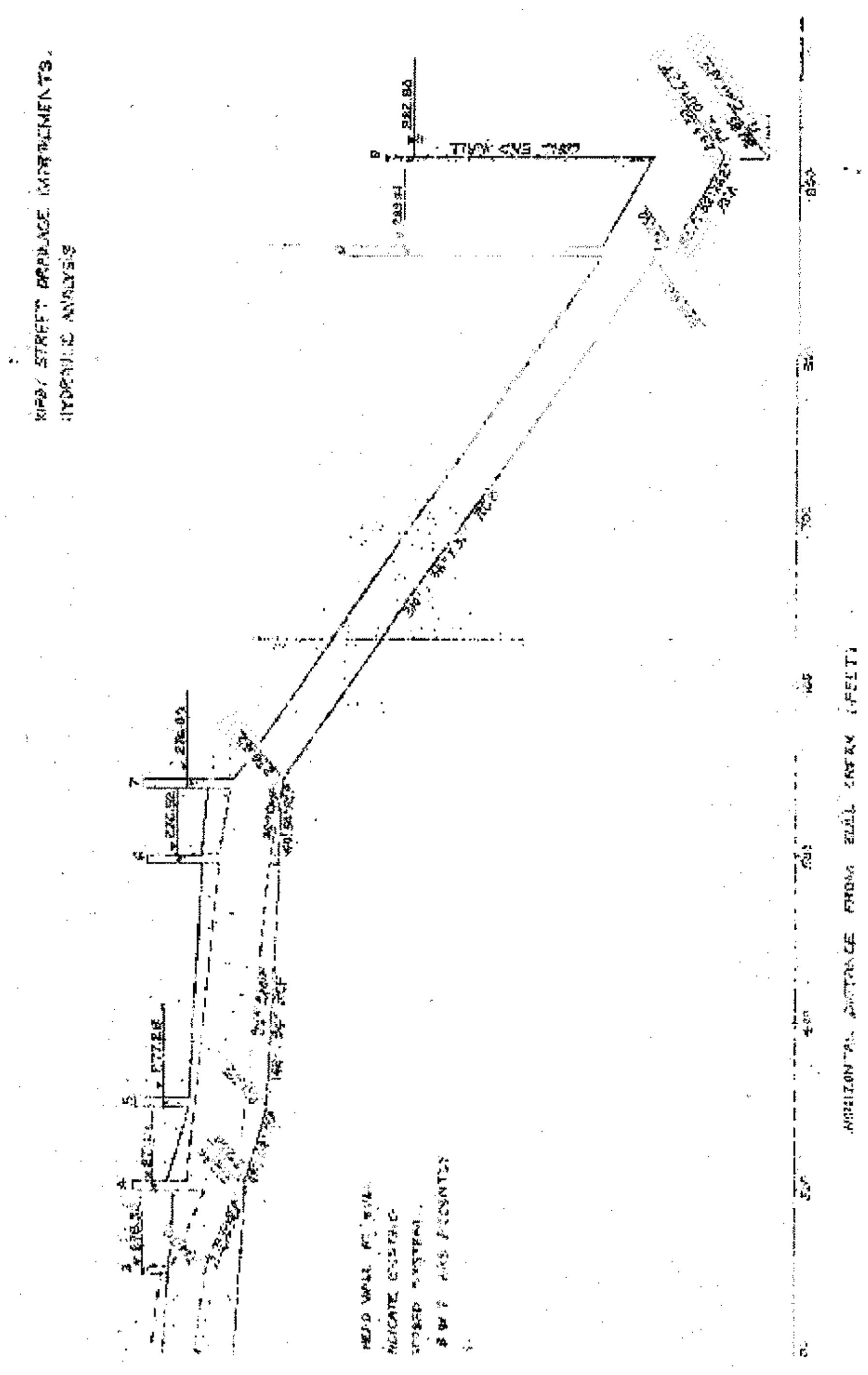
This map shows the small watershed area of Bull Creek.
Orange triangle shows approximate location of San Lorenzo Valley Water District reservoir and dam. Red star shows project location.

The following two pages are details of the culvert system.

ATTACHMENT 4



ATTACHMENT 4



ATTACHMENT 4

Revised

Tree Inventory, Assessment, and Protection

August 8, 2017

Proposed Felton Library
Gushee Street
Felton, CA 95018

Prepared for:

Santa Cruz County

Prepared By:

Richard Gessner
ASCA - Registered Consulting Arborist ® #496
ISA - Board Certified Master Arborist® WE-4341B
ISA - Tree Risk Assessor Qualified
CA Qualified Applicators License QL 104230

Monarch Consulting Arborists LLC
P.O. Box 1010
Felton, CA 95018
831. 331. 8982

ATTACHMENT 5

Table of Contents

ATTACHMENT 5

ATTACHMENT 5

Summary

The site is located along Gushee Street in Felton next to the post office and the inventory contains 65 trees composed of 6 different species with Arroyo willow (*Salix lasiolepis*) accounting for 69 percent of all specimens. Most of the trees are in fair condition with 49 fair, 13 poor, 2 good, and 1 is dead. Forty-six trees have fair suitability for retention with two good and sixteen poor along with one dead. Preserving as many trees as possible during construction while evaluating their risk upon completion would be the prudent approach to management. Nine trees, #302 through #308 and #310 and #311 will require removal while an additional three should be re-evaluated in greater detail. The three trees labeled moderate-high will require more diligent protection during construction. The remaining 53 trees should not be affected by the project and only those close to the parking lot are truly in jeopardy and most have failed and are growing horizontal. Tree #301 will need to have a more diligent protection plan including monitoring, pruning, and potentially cabling stems because it is the largest tree closest to the proposed improvements.

Introduction

Background

Santa Cruz County asked me to assess the site, trees, and proposed footprint plan, and to provide a report with my findings and recommendations to help satisfy planning requirements

Assignment

- Provide an arborist's report that includes an assessment of the trees within the project area and on the adjacent sites. The assessment is to include the species, size (trunk diameter), condition (health and structure), and suitability for preservation ratings. Affix aluminum number tags on the trees for reference on site and the plans.
- Provide tree protection specifications, guidelines, and impact ratings for trees affected by the project.

Limits of the assignment

- The information in this report is limited to the condition of the trees and site during my inspection on December 20, 2016. No tree risk assessments were performed.
- The plans reviewed for this assignment were as follows: A21, 22, 23, 25 provided by Teall Messer dated April 17, 2017 and Landscape Plan L1.0 dated March 28, 2017. No grading, drainage, or utility plans were reviewed.

ATTACHMENT 5

Purpose and use

The report is intended to identify all the trees within the plan area that could be affected by the project. The report is to be used by Santa Cruz County and their agents as a reference for existing tree conditions to help satisfy planning requirements.

Observation

Trees and Site

The site is located along Gushee Street in Felton next to the post office near the corner of Hihn Street. There is an open area with no features directly adjacent to the post office which is the primary building area. Toward the northwest Bull Creek bisects the property and the entire northern portion of the site consists of dense brush and trees primarily composed of Arroyo willow, cottonwoods (*Populus balsamifera* ssp. *trichocarpa*), and coast live oaks (*Quercus agrifolia*). No trees have been maintained on the site and it has been left unattended for some time until recently.

The largest tree to be preserved is #301 which consists of five twenty inch diameter trunks originating just above grade with one stem growing toward the proposed building.

Plans and Trees

There are eleven trees in close proximity to the proposed improvements. The plans call for the preservation of the largest tree #301 and the removal of at least nine other willows near the parking area. In addition to these nine trees there are three in close proximity to the improvements. Eight of the nine trees are growing more or less horizontal to grade toward the south where the parking lot is proposed and will interfere with construction.

Tree #301 is approximately 35 to 40 feet from the structure and there is proposed concrete paving within ten to twenty feet of the trunk on the east side.

Discussion

Tree Inventory

Santa Cruz County considered significant trees:

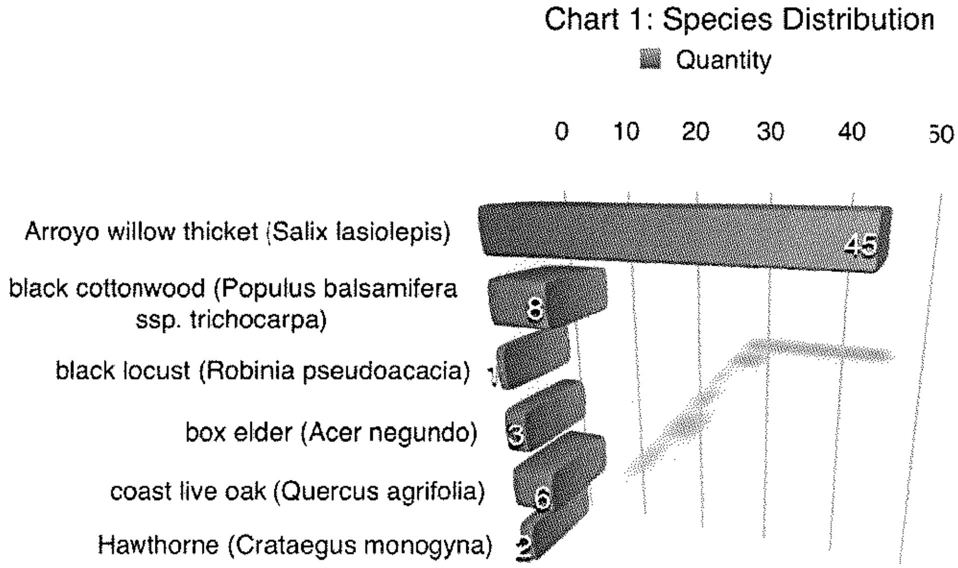
A. Outside the urban services line or rural services line, where visible from a scenic road, any beach, or within a designated scenic resource area, any tree which is equal to or greater than 40 inches d.b.h. (approximately 10 feet in circumference); any sprout clump of five or more stems, each of which is greater than 20 inches d.b.h. (approximately five feet in circumference); or, any group consisting of 10 or more trees on one parcel, each greater than 20 inches d.b.h. (approximately five feet in circumference)."

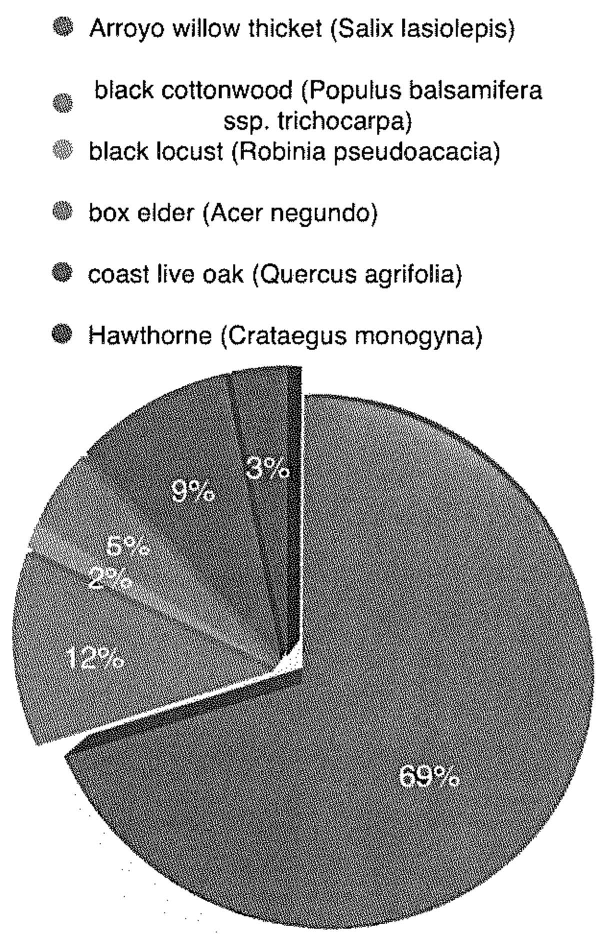
B. Outside the urban services line or rural services line, where visible from a scenic road, any beach, or within a designated scenic resource area, any tree which is equal to or greater than 40 inches d.b.h. (approximately 10 feet in circumference); any sprout clump of five or more stems, each of which is greater than 20 inches d.b.h. (approximately five feet in circumference); or, any group consisting of 10 or more trees on one parcel, each greater than 20 inches d.b.h. (approximately five feet in circumference).

C. Any tree located in a sensitive habitat as defined in Chapter 16.32 SCCC. Also see SCCC 16.34.090(C), exemption of projects with other permits.

The tree inventory contains 65 trees composed of 6 different species which are as follows: 45 Arroyo willow (*Salix lasiolepis*), 8 black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), 1 black locust (*Robinia pseudoacacia*), 3 box elder (*Acer negundo*), 6 coast live oak (*Quercus agrifolia*), and 2 Hawthorne (*Crataegus monogyna*) (Charts 1 and 2, Pg 4).

Based on the ordinance it is possible at least 19 trees fit the criteria listed as "Significant Trees"





ATTACHMENT 5

Condition Rating

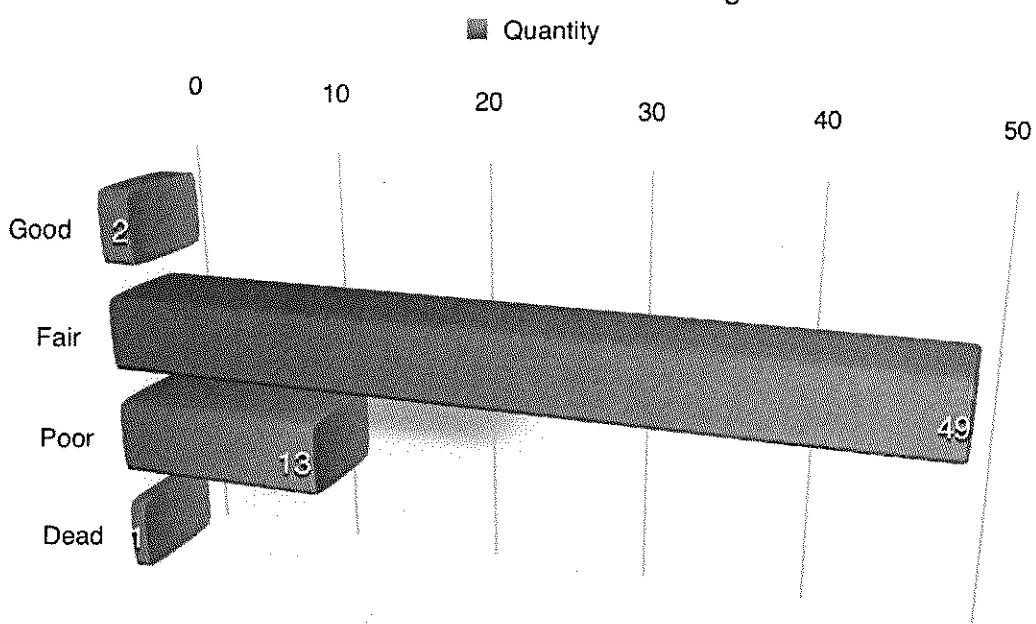
A tree's condition percentage is a determination of its overall health and structure based on five aspects: Roots, trunk, scaffold branches, twigs, and foliage. Points are totaled for each tree and converted to a percentage.

The following scale defines the condition ratings from the condition percentages:

- Exceptional = Good health and structure with significant size, location or quality.
- Good = No apparent problems, good structure and health.
- Fair = Minor problems, at least one structural defect or health concern, problems can be mitigated through cultural practices such as pruning or a plant health care program.
- Poor = Major problems with multiple structural defects or declining health, not a good candidate for retention.
- Dead/Unstable = Extreme problems, irreversible decline, failing structure, or dead.

Most of the trees are in fair condition which is to be expected of the wild riparian area. Two trees were considered to be in good condition, 49 fair, 13 poor, and 1 is dead along Bull Creek (Chart 3).

Chart 3: Condition Rating



ATTACHMENT 5

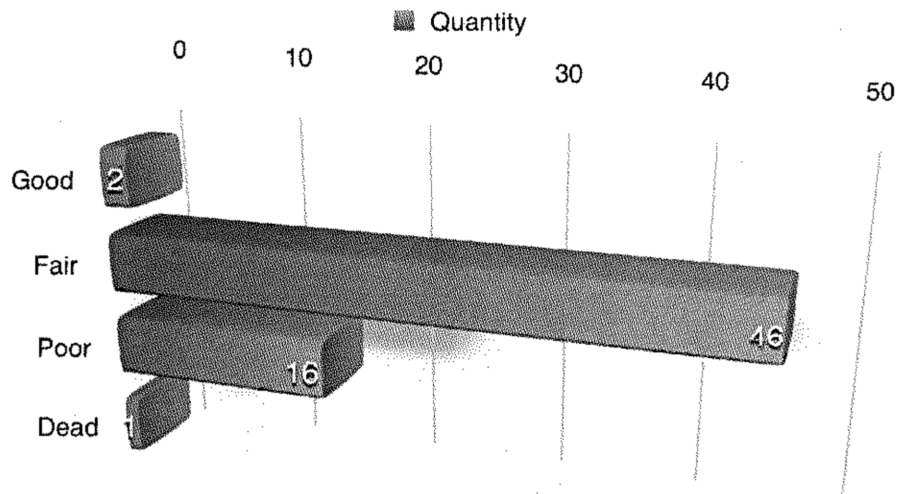
Suitability for Preservation

A tree's suitability for preservation is determined based on its health, structure, age, species characteristics, and longevity using a scale of good, fair, or poor. The following list defines the rating scale (Tree Care Industry Association, 2012):

- Good = Trees with good health, structural stability and longevity.
- Fair = Trees with fair health and/or structural defects that may be mitigated through treatment. These trees require more intense management and monitoring, and may have shorter life spans than those in the good category.
- Poor = Trees in poor health with significant structural defects that cannot be mitigated and will continue to decline regardless of treatment. The species or individual may possess characteristics that are incompatible or undesirable in landscape settings or unsuited for the intended use of the site.

Forty-six trees have fair suitability for retention, two good, sixteen poor and one is dead. Determining the suitability for preservation may not be relevant in this circumstance. Many trees have defects or conditions that would be undesirable in an urban forest setting. However, when they are part of stand or ecosystem their significance is greater as a whole. Because many trees have fair or poor suitability for retention as individuals it should not be construed as reason for removal or misinterpreted as insignificant to the site. Preserving as many as possible during construction while evaluating their associated risk after the site is developed would be the most prudent approach.

Chart 4: Suitability for Preservation



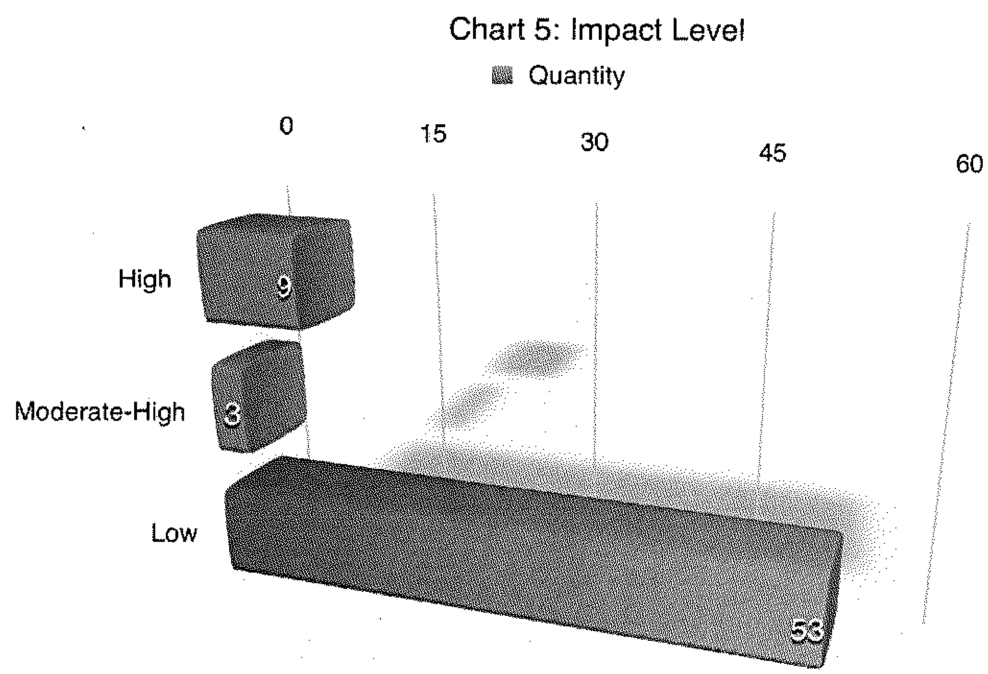
ATTACHMENT 5

Impact Level

Influence level defines how a tree may be influenced by construction activity and proximity to the tree, and is described as low, moderate, or high. The following scale defines the impact rating:

- Low = The construction activity will have little influence on the tree.
- Moderate = The construction may cause future health or structural problems, and steps must be taken to protect the tree to reduce future problems.
- High = Tree structure and health will be compromised and removal is recommended, or other actions must be taken for the tree to remain. The tree is located in the building envelope.

Nine trees, #302 through #308 and #310 and #311 will require removal while an additional three should be re-evaluated in greater detail. The three trees labeled moderate-high (#301, #309, and #312) will require more diligent protection during construction. The remaining 53 trees should not be affected by the project with only those close to the parking lot truly in jeopardy, and most have failed and are growing horizontal. The landscape plan, pathways, and proposed interpretive area will not affect any trees.



Tree Protection

There are three different tree protection schemes which are called Type I, Type II and Type III trunk protection only (Figures 1, 2, and 3). Tree protection focuses on protecting trees from damage to the roots, trunk, or scaffold branches from heavy equipment (Appendix D). The tree protection zone (TPZ) is the defined area in which certain activities are prohibited to minimize potential injury to the tree. The TPZ can be determined by a formula based on species tolerance, tree age, and diameter at breast height (DBH) (Matheny, N. and Clark, J. 1998) or as the drip line in some instances. Preventing mechanical damage to the main stems from equipment or hand tools can be accomplished by wrapping the main stem with straw wattle (Figure 3). The wattle will create a porous barrier around the trunk and prevent damage to the bark and vascular tissues underneath. This mechanical barrier will be required for all trees within the project area.

Placing fence along the north side of the proposed drive isle parking area after the required removals are performed would be the simplest approach to protection. Tree #301 will need to have a more diligent protection plan including monitoring, pruning, and potentially cabling stems because it is the largest tree closest to the proposed improvements. Type III protection and exclusion through Type I fence schemes will be required until the final landscape installation around tree #301. Trees #309 and #312 will require significant pruning and some root zone protection through fence, bridging with plywood and mulch, or other means necessary to ensure their survival.

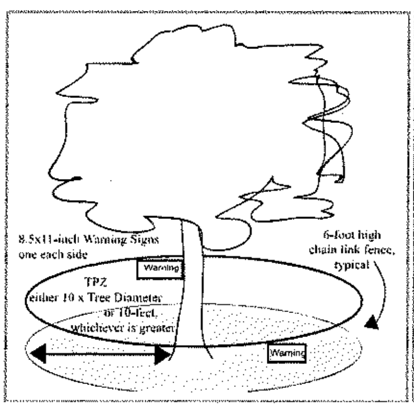


Figure 1: Type I Tree protection with fence placed at a radius of ten times the trunk diameter. Image City of Palo Alto 2006.

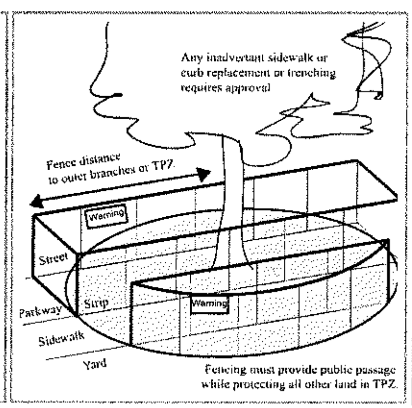


Figure 2: Type II Tree protection with fence placed along the sidewalk and curb to enclose the tree. Image City of Palo Alto 2006.

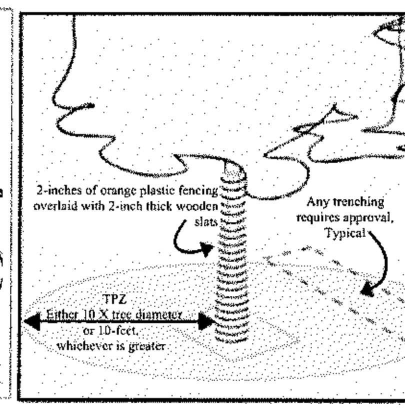


Figure 3: Type III Tree protection with trunk protected by a barrier to prevent mechanical damage. Image City of Palo Alto 2006.

Conclusion

The site is located along Gushee Street in Felton next to the post office near the corner of Hihn Street and the inventory contains 65 trees composed of 6 different species with Arroyo willow accounting for 69 percent. Most of the trees are in fair condition which is to be expected of the wild riparian area and 2 were considered to be in good condition, 49 fair, 13 poor, and 1 is dead. Forty-six have fair suitability for retention, two good, sixteen poor and one is dead. Many trees have defects or conditions that would be undesirable in an urban forest setting but when part of an ecosystem their contribution is greater as a whole. Preserving as many as possible during construction while evaluating their associated risk after the site is developed would be the most prudent approach to preservation. Nine trees, #302 through #308 and #310 and #311 will require removal while an additional three should be re-evaluated in greater detail. The three trees labeled moderate-high, #301, #309, and #312, will require more diligent protection during construction including potentially a combination of pruning for clearance, bridging with mulch and plywood, and fence. The remaining 53 trees should not be affected by the project and only those close to the parking lot are truly in jeopardy. Except for #302 which has its own structural problems the remaining highly impacted trees have failed and are growing horizontal to the ground. The landscape plan, pathways, and proposed interpretive area will not affect any trees. Placing tree protection fence along the north side of the proposed drive isle parking area after the required removals are performed would be the simplest approach to protection. Tree #301 will need to have a more diligent protection plan including monitoring, pruning, and potentially cabling stems because it is the largest tree closest to the proposed improvements. Grading, drainage, and utility plans will need to be reviewed by the project arborist for further impact assessments and this report is limited to the information provided at the time it was developed.

Recommendations

Pre-construction and Planning Phase

1. Place tree numbers and protection schemes on all the plans.

2. Tree expected to be moderately impacted #301, #309, and #312 will have tree protection schemes developed upon project approval and will consist of a combination of Type I and Type III protection. Monitoring during construction will be advised.

3. Place tree protection fence along the north side of the proposed drive isle to keep equipment and personnel outside the remaining stand of trees. This fence is too include trees #309 and #312. If grading or other soil disturbance is expected under these trees measures for protection should include supplemental watering, mulching, trunk protection through Type III protection schemes and any other mitigation measures required to help ensure their survival. Specific tree protection distances and schemes are to be developed upon the approval of the project.

4. Monitor landscape installation under tree #301 and have the tree maintained. The tree will need to have a more diligent protection plan including monitoring, pruning, and potentially cabling stems to be developed upon approval of the project. At a minimum pruning, watering, mulching, Type I and Type III protection schemes will be employed.

5. Once plans are approved prune and maintain tree #301 following written specifications according to American National Standard for Tree Care Operations: *Tree, Shrub and Other Woody Plant Management : Standard Practices: Pruning* (Part 1) 2017 and Supplemental Support Systems (Part 3) 2013. The objective should be to maintain its natural form, reduce risk, and provide building clearance. Work is to be performed by a qualified tree care contractor according to the most recent ISA Best Management Practices.

6. Refer to Appendix D for general tree protection guidelines including recommendations for arborist assistance while working under trees, trenching, or excavation within a trees drip line.

7. Copy Appendix A, B, and D of the arborist report to the final set of plans, which will serve as part of the Tree Preservation Plan.

8. Provide a copy of this report to all contractors and project managers, including the architect, civil engineer, and landscape designer or architect. It is the responsibility of the owner to ensure all parties are familiar with this document.

9. Arrange a pre-construction meeting with the project arborist or landscape architect to verify tree protection is in place, with the correct materials, and at the proper distances.

10. Arrange for the project arborist to monitor and document initial grading activity and no grading is to occur within any tree protection zone including utility hook-ups.

Construction Phase

1. Maintain tree protection fence around all trees to be retained. When the landscape is to be installed have the project arborist authorize and monitor the removal and replacement of the fence locations if necessary.

Post-Construction Phase

1. Monitor the health and structure of all trees for any changes in condition.

2. Perform any other mitigation measures to help ensure long term survival.

3. Have a Level 2: Basic Tree Risk Assessment performed to help identify any tree defects or conditions that could lead to a failure striking a target and include consequences and a risk rating.

Bibliography

American National Standard for Tree Care Operations: Tree, Shrub and Other Woody Plant Management : Standard Practices (Management of Trees and Shrubs During Site Planning, Site Development, and Construction)(Part 5). Londonderry, NH: Secretariat, Tree Care Industry Association, 2012. Print.

Dunster, Julian A., E. Thomas Smiley, Nelda Matheny, and Sharon Lilly. 2013. *Tree Risk Assessment Manual.* Champaign, Illinois: International Society of Arboriculture.

Fite, Kelby, and Edgar Thomas. Smiley. Managing trees during construction, second edition. Champaign, IL: International Society of Arboriculture, 2016.

Matheny, Nelda P., Clark, James R. Trees and development: A technical guide to preservation of trees during land development. Bedminster, PA: International Society of Arboriculture1998.

Smiley, E, Matheny, N, Lilly, S, ISA. *Best Management Practices: Tree Risk Assessment:* International Society of Arboriculture, 2011. Print

Glossary of Terms

Defect: An imperfection, weakness, or lack of something necessary. In trees defects are injuries, growth patterns, decay, or other conditions that reduce the tree's structural strength.

Diameter at breast height (DBH): Measures at 1.4 meters (4.5 feet) above ground in the United States, Australia (arboriculture), New Zealand, and when using the Guide for Plant Appraisal, 9th edition; at 1.3 meters (4.3 feet) above ground in Australia (forestry), Canada, the European Union, and in UK forestry; and at 1.5 meters (5 feet) above ground in UK arboriculture.

Drip Line: Imaginary line defined by the branch spread or a single plant or group of plants. The outer extent of the tree crown.

Mechanical damage: Physical damage caused by outside forces such as cutting, chopping or any mechanized device that may strike the tree trunk, roots or branches.

Scaffold branches: Permanent or structural branches that for the scaffold architecture or structure of a tree.

Straw wattle: also known as straw worms, bio-logs, straw noodles, or straw tubes are man made cylinders of compressed, weed free straw (wheat or rice), 8 to 12 inches in diameter and 20 to 25 feet long. They are encased in jute, nylon, or other photo degradable materials, and have an average weight of 35 pounds.

Tree Protection Zone (TPZ): Defined area within which certain activities are prohibited or restricted to prevent or minimize potential injury to designated trees, especially during construction or development.

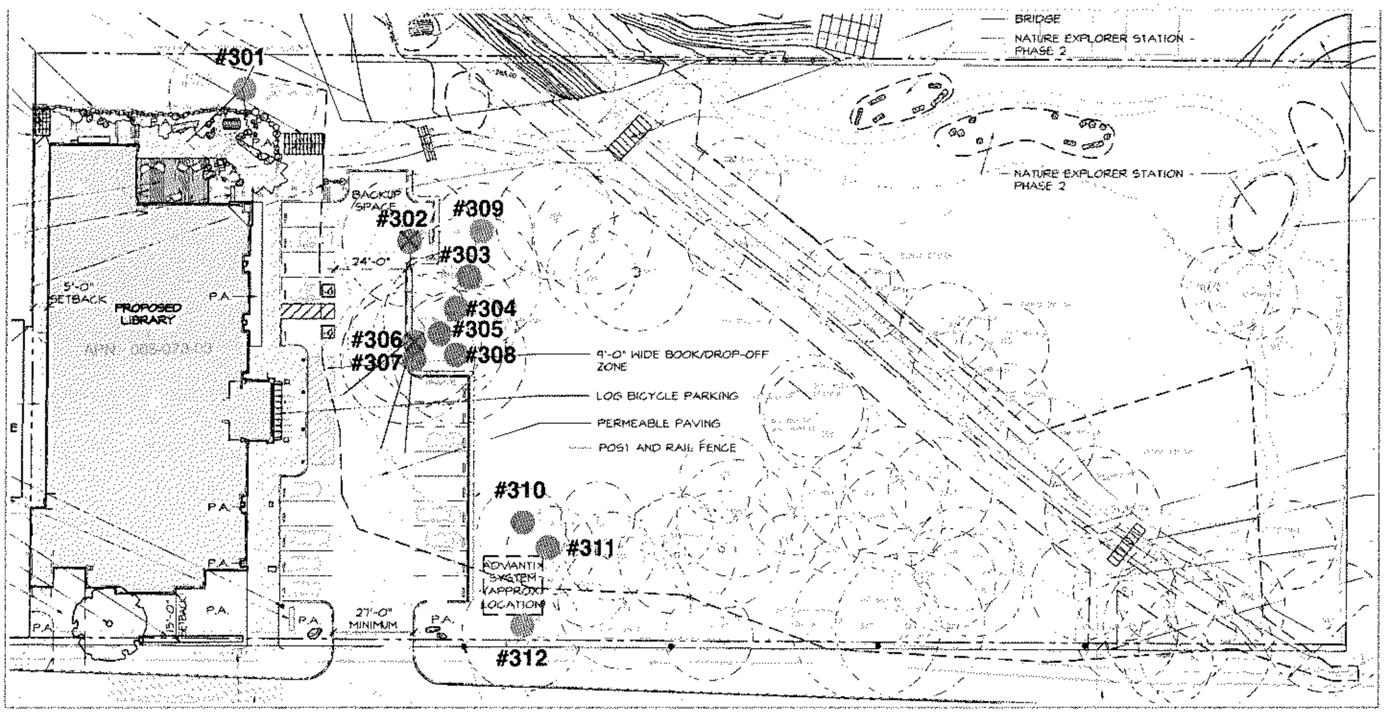
Tree Risk Assessment: Process of evaluating what unexpected things could happen, how likely it is, and what the likely outcomes are. In tree management, the systematic process to determine the level of risk posed by a tree, tree part, or group of trees.

Trunk: Stem of a tree.

Volunteer: A tree, not planted by human hands, that begins to grow on residential or commercial property. Unlike trees that are brought in and installed on property, volunteer trees usually spring up on their own from seeds placed onto the ground by natural causes or accidental transport by people. Normally, volunteer trees are considered weeds and removed, but many desirable and attractive specimens have gone on to become permanent residents on many public and private grounds.

Appendix A: Site Map

Base map taken from L1.0 plan dated March 28, 2017, not to scale.



Moderate impact High Impact

ATTACHMENT 5

Appendix B: Tree Inventory and Assessment Table

Table 1: Tree Inventory and Assessment

Tree Species	#	Trunk Diameter	~ Height	~ Crown Diameter	Condition	Suitability	Impact	Notes
Arroyo willow (*Salix lasiolepis*)	301	5 x 20	55	50	Fair	Fair	Moderate -High	Largest tree centrally located on the site.
Arroyo willow (*Salix lasiolepis*)	302	36	25	45	Poor	Poor	High	Missing top
Arroyo willow (*Salix lasiolepis*)	303	18	25	45	Poor	Poor	High	Fallen over
Arroyo willow (*Salix lasiolepis*)	304	18	25	45	Poor	Poor	High	Fallen over
Arroyo willow (*Salix lasiolepis*)	305	18	25	45	Poor	Poor	High	Fallen over
Arroyo willow (*Salix lasiolepis*)	306	18	25	45	Poor	Poor	High	Fallen over
Arroyo willow (*Salix lasiolepis*)	307	18	25	45	Poor	Poor	High	Fallen over
Arroyo willow (*Salix lasiolepis*)	308	18	25	45	Poor	Poor	High	Fallen over
Arroyo willow (*Salix lasiolepis*)	309	12	45	35	Fair	Fair	Moderate -High	Tree behind 302
Arroyo willow (*Salix lasiolepis*)	310	12	25	30	Poor	Poor	High	Fallen over
Arroyo willow (*Salix lasiolepis*)	311	12	25	30	Poor	Poor	High	Fallen over
coast live oak (*Quercus agrifolia*)	312	20	40	40	Fair	Good	Moderate -High	Gushee Street

ATTACHMENT 5

Tree Species	#	Trunk Diameter	~ Height	~ Crown Diameter	Condition	Suitability	Impact	Notes
Arroyo willow (*Salix lasiolepis*)	313	12	25	25	Fair	Fair	Low	
black cottonwood (*Populus balsamifera* ssp. *trichocarpa*)	314	18, 18, 17, 17, 10	50	45	Fair	Fair	Low	
Arroyo willow (*Salix lasiolepis*)	315	12	30	30	Fair	Fair	Low	
Arroyo willow (*Salix lasiolepis*)	316	12	25	25	Fair	Fair	Low	
black cottonwood (*Populus balsamifera* ssp. *trichocarpa*)	317	24	45	40	Fair	Fair	Low	
black cottonwood (*Populus balsamifera* ssp. *trichocarpa*)	318	12	45	25	Fair	Fair	Low	
black cottonwood (*Populus balsamifera* ssp. *trichocarpa*)	319	24	45	40	Fair	Fair	Low	
coast live oak (*Quercus agrifolia*)	320	18	45	40	Fair	Fair	Low	
coast live oak (*Quercus agrifolia*)	321	12	40	30	Fair	Fair	Low	
black locust (R*obinia pseudoacacia*)	322	21	45	30	Fair	Poor (invasive)	Low	

ATTACHMENT 5

Tree Species	#	Trunk Diameter	~ Height	~ Crown Diameter	Condition	Suitability	Impact	Notes
Hawthorne (*Crataegus monogyna*)	323	8	35	20	Fair	Poor (invasive)	Low	
Hawthorne (*Crataegus monogyna*)	324	6	35	20	Fair	Poor (invasive)	Low	
box elder (*Acer negundo*)	325	15	40	35	Fair	Fair	Low	Failed cottonwood leaning on it
box elder (*Acer negundo*)	326	18	40	35	Fair	Fair	Low	
black cottonwood (*Populus balsamifera* ssp. *trichocarpa*)	327	24	55	50	Fair	Fair	Low	At light standard on Gushee
Arroyo willow (*Salix lasiolepis*)	328	28	65	50	Fair	Fair	Low	Leans over creek
coast live oak (*Quercus agrifolia*)	329	22	55	50	Good	Good	Low	
black cottonwood (*Populus balsamifera* ssp. *trichocarpa*)	330	12	35	30	Fair	Fair	Low	
Arroyo willow (*Salix lasiolepis*)	331	15	25	20	Dead	Dead	Low	
Arroyo willow (*Salix lasiolepis*)	332	16	35	30	Poor	Poor	Low	On creek lots of decay in trunk
Arroyo willow (*Salix lasiolepis*)	333	15	35	30	Fair	Fair	Low	On creek

ATTACHMENT 5

Tree Species	#	Trunk Diameter	~ Height	~ Crown Diameter	Condition	Suitability	Impact	Notes
Arroyo willow (*Salix lasiolepis*)	334	15	35	30	Fair	Fair	Low	On creek
Arroyo willow (*Salix lasiolepis*)	335	15	35	30	Fair	Fair	Low	On creek
Arroyo willow (*Salix lasiolepis*)	336	18	35	30	Fair	Fair	Low	On creek
Arroyo willow (*Salix lasiolepis*)	337	10	35	30	Fair	Fair	Low	On creek
Arroyo willow (*Salix lasiolepis*)	338	20	35	30	Poor	Poor	Low	Fallen tree
Arroyo willow (*Salix lasiolepis*)	339	15	35	30	Fair	Fair	Low	
Arroyo willow (*Salix lasiolepis*)	340	20	45	40	Fair	Fair	Low	
Arroyo willow (*Salix lasiolepis*)	341	20	45	40	Fair	Fair	Low	
Arroyo willow thicket (*Salix lasiolepis*)	342	varies	35	30	Fair	Fair	Low	
Arroyo willow (*Salix lasiolepis*)	343	20	45	45	Fair	Fair	Low	
box elder (*Acer negundo*)	344	20	45	45	Fair	Fair	Low	
Arroyo willow (*Salix lasiolepis*)	345	20	45	45	Fair	Fair	Low	
Arroyo willow (*Salix lasiolepis*)	346	24	35	35	Fair	Fair	Low	

ATTACHMENT 5

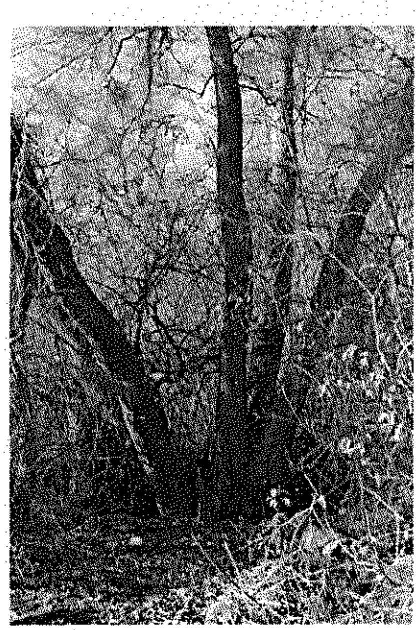
Tree Species	#	Trunk Diameter	~ Height	~ Crown Diameter	Condition	Suitability	Impact	Notes
Arroyo willow (*Salix lasiolepis*)	347	18	35	35	Fair	Fair	Low	
Arroyo willow (*Salix lasiolepis*)	348	18	35	35	Fair	Fair	Low	
Arroyo willow (*Salix lasiolepis*)	349	8	35	35	Fair	Fair	Low	
coast live oak (*Quercus agrifolia*)	350	15	35	35	Fair	Fair	Low	
Arroyo willow (*Salix lasiolepis*)	351	15	35	35	Fair	Fair	Low	
Arroyo willow (*Salix lasiolepis*)	352	12	35	35	Fair	Fair	Low	
Arroyo willow (*Salix lasiolepis*)	353	13	35	35	Fair	Fair	Low	
Arroyo willow (*Salix lasiolepis*)	354	16	35	35	Fair	Fair	Low	
Arroyo willow (*Salix lasiolepis*)	355	10	35	35	Fair	Fair	Low	
coast live oak (*Quercus agrifolia*)	356	15	35	35	Fair	Fair	Low	
Arroyo willow (*Salix lasiolepis*)	357	40	40	40	Fair	Fair	Low	Multi trunk
Arroyo willow (*Salix lasiolepis*)	358	12	35	30	Fair	Fair	Low	Leans
Arroyo willow (*Salix lasiolepis*)	359	18	45	40	Fair	Fair	Low	

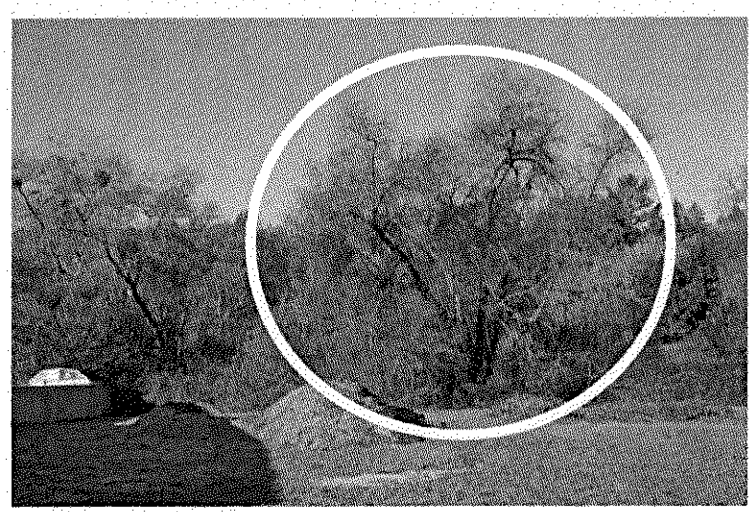
ATTACHMENT 5

Tree Species	#	Trunk Diameter	~ Height	~ Crown Diameter	Condition	Suitability	Impact	Notes
Arroyo willow (*Salix lasiolepis*)	360	18	45	40	Fair	Fair	Low	
black cottonwood (*Populus balsamifera* ssp. *trichocarpa*)	361	40	30	30	Poor	Poor	Low	
black cottonwood (*Populus balsamifera* ssp. *trichocarpa*)	362	12	30	30	Poor	Poor	Low	Lean
Arroyo willow (*Salix lasiolepis*)	363	10	30	30	Good	Fair	Low	
Arroyo willow (*Salix lasiolepis*)	364	10	30	30	Fair	Fair	Low	
Arroyo willow (*Salix lasiolepis*)	365	12	30	30	Fair	Fair	Low	Lean

ATTACHMENT 5

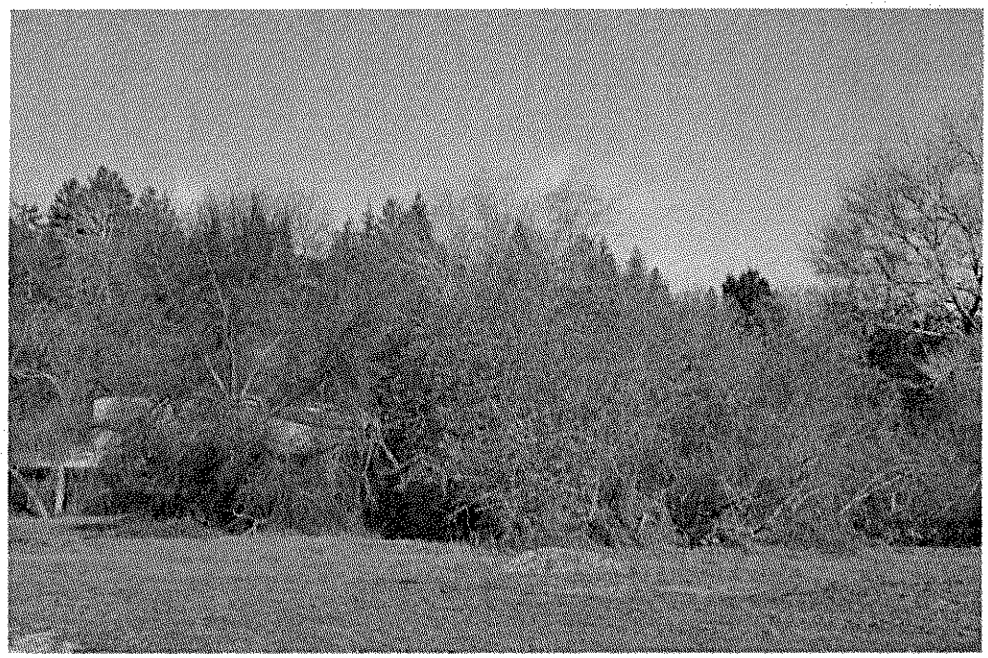
Appendix C: Photographs
C1: #301





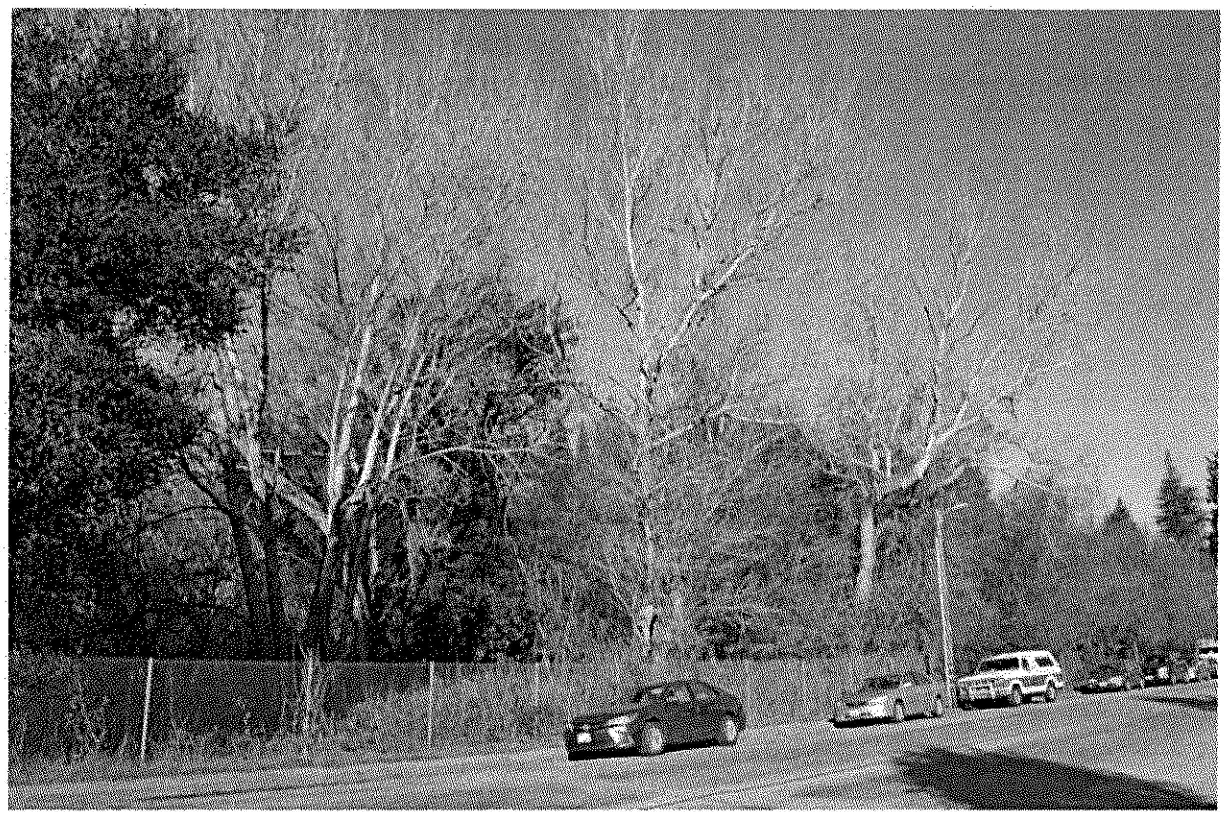
ATTACHMENT 5

C2: Willow #302 -#309



ATTACHMENT 5

C3: Cottonwoods along Gushee Street



Appendix D: Tree Protection Guidelines

16.34.105 Violations.

A. It shall be unlawful for any person to do, cause, permit, aid, abet or furnish equipment or labor to remove, cut down, trim more than one-third of the foliage of, poison, or otherwise kill or destroy any significant tree as defined in SCCC 16.34.030 within the Coastal Zone unless: (1) a development permit has been obtained and is in effect which authorizes such activity; or (2) the activity is exempt from the requirement for such a permit by reason of the provisions of SCCC 16.34.090; or (3) there was an emergency caused by the hazardous or dangerous condition of the tree which required the action to be taken immediately for the safety of life or property.

B. It shall be unlawful for any person to exercise any development permit which authorizes actions affecting significant trees without complying with all of the conditions of such permit. [Ord. 3451-A § 24, 1983].

Pre-Construction Meeting with the Project Arborist

Tree protection locations should be marked before any fencing contractor arrives.

Prior to beginning work, all contractors involved with the project should attend a pre construction meeting with the project arborist to review the tree protection guidelines. Access routes, storage areas, and work procedures will be discussed.

Tree Protection Zones and Fence Specifications

Tree protection fence should be established prior to the arrival of construction equipment or materials on site. Fence should be comprised of six-foot high chain link fence mounted on eight-foot tall, 1 7/8-inch diameter galvanized posts, driven 24 inches into the ground and spaced no more than 10 feet apart. Once established, the fence must remain undisturbed and be maintained throughout the construction process until final inspection.

The fence should be maintained throughout the site during the construction period and should be inspected periodically for damage and proper functions. Fence should be repaired, as necessary, to provide a physical barrier from construction activities.

ATTACHMENT 5

Monitoring

Any trenching, construction or demolition that is expected to damage or encounter tree roots should be monitored by the project arborist or a qualified ISA Certified Arborist and should be documented.

The site should be evaluated by the project arborist or a qualified ISA Certified Arborist after construction is complete, and any necessary remedial work that needs to be performed should be noted.

Restrictions Within the Tree Protection Zone

No storage of construction materials, debris, or excess soil will be allowed within the Tree Protection Zone. Spoils from the trenching shall not be placed within the tree protection zone either temporarily or permanently. Construction personnel and equipment shall be routed outside the tree protection zones.

Root Pruning

Root pruning shall be supervised by the project arborist. When roots over two inches in diameter are encountered they should be pruned by hand with loppers, handsaw, reciprocating saw, or chain saw rather than left crushed or torn. Roots should be cut beyond sinker roots or outside root branch junctions and be supervised by the project arborist. When completed, exposed roots should be kept moist with burlap or backfilled within one hour.

Boring or Tunneling

Boring machines should be set up outside the drip line or established Tree Protection Zone. Boring may also be performed by digging a trench on both sides of the tree until roots one inch in diameter are encountered and then hand dug or excavated with an Air Spade® or similar air or water excavation tool. Bore holes should be adjacent to the trunk and never go directly under the main stem to avoid oblique (heart) roots. Bore holes should be a minimum of three feet deep.

Timing

If the construction is to occur during the summer months supplemental watering should be applied to help ensure survival during and after construction.

ATTACHMENT 5

Tree Pruning and Removal Operations

All tree pruning or removals should be performed by a qualified arborist with a C-61/D-49 California Contractors License. Tree pruning should be specified in writing according to ANSI A-300A pruning standards and adhere to ANSI Z133.1 safety standards. Trees that need to be removed or pruned should be identified in the pre-construction walk through.

Tree Protection Signs

All sections of fencing should be clearly marked with signs stating that all areas within the fencing are Tree Protection Zones and that disturbance is prohibited. Text on the signs should be in both English and Spanish (Appendix E).

Appendix E: Tree Protection Signs

E1: English

WARNING

Tree Protection Zone

This Fence Shall not be moved without approval. Only authorized personnel may enter this area!

Project Arborist

ATTACHMENT 5

E2: Spanish

CUIDADO
Zona De Arbol Pretejido

Esta cerca no sera removida sin aprobacion. Solo personal autorizado entrara en esta area!

Project Arborist

Qualifications, Assumptions, and Limiting Conditions

Any legal description provided to the consultant is assumed to be correct. Any titles or ownership of properties are assumed to be good and marketable. All property is appraised or evaluated as though free and clear, under responsible ownership and competent management.

All property is presumed to be in conformance with applicable codes, ordinances, statutes, or other regulations.

Care has been taken to obtain information from reliable sources. However, the consultant cannot be responsible for the accuracy of information provided by others.

The consultant shall not be required to give testimony or attend meetings, hearings, conferences, mediations, arbitration, or trials by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services.

This report and any appraisal value expressed herein represent the opinion of the consultant, and the consultant's fee is not contingent upon the reporting of a specified appraisal value, a stipulated result, or the occurrence of a subsequent event.

Sketches, drawings, and photographs in this report are intended for use as visual aids, are not necessarily to scale, and should not be construed as engineering or architectural reports or surveys. The reproduction of information generated by architects, engineers, or other consultants on any sketches, drawings, or photographs is only for coordination and ease of reference. Inclusion of said information with any drawings or other documents does not constitute a representation as to the sufficiency or accuracy of said information.

Unless otherwise expressed: a) this report covers only examined items and their condition at the time of inspection; and b) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, or coring. There is no warranty or guarantee, expressed or implied, that structural problems or deficiencies of plants or property may not arise in the future.

ATTACHMENT 5

Certification of Performance

I Richard Gessner, Certify:

That I have personally inspected the tree(s) and/or the property referred to in this report, and have stated my findings accurately. The extent of the evaluation and/or appraisal is stated in the attached report and Terms of Assignment;

That I have no current or prospective interest in the vegetation or the property that is the subject of this report, and I have no personal interest or bias with respect to the parties involved;

That the analysis, opinions and conclusions stated herein are my own;

That my analysis, opinions, and conclusions were developed and this report has been prepared according to commonly accepted Arboricultural practices;

That no one provided significant professional assistance to the consultant, except as indicated within the report.

That my compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause of the client or any other party, nor upon the results of the assessment, the attainment of stipulated results, or the occurrence of any other subsequent events;

I further certify that I am a Registered Consulting Arborist® with the American Society of Consulting Arborists, and that I acknowledge, accept and adhere to the ASCA Standards of Professional Practice. I am an International Society of Arboriculture Board Certified Master Arborist®. I have been involved with the practice of Arboriculture and the care and study of trees since 1998.

Richard J. Gessner

ASCA Registered Consulting Arborist® #496
ISA Board Certified Master Arborist® WE-4341B
ISA Tree Risk Assessor Qualified
CA Qualified Applicators License QL 104230

Copyright

ATTACHMENT 5

Archaeological Reconnaissance Report
for a proposed new library on Gushee Street, Felton
Santa Cruz County, California
APN 065-073-03

For
Teall Messer

By

Robert L. Edwards, A.A., B.A., M.A. & R.P.A.
Principal and Consulting Archaeologist
and
Charr Simpson Smith, A.A., A.S. B.A. and
Archaeological Technology Certificate, CCATP

A.A.C.C., Archaeological Associates of Central California
P.O. Box 310, Soquel, CA 95073-0310
Email: robedwardsaacc@gmail.com, phone 831-246-0907

July 2012

Sites: Negative
Acreage: 2+ acres
UTMGs: Zone 10 ^{5}82160/^{41}00300
Quad Map: Felton 7.5' USGS
Project No.:AACC 12-05-46

ATTACHMENT 6

MANAGEMENT SUMMARY

The archival research and the surface reconnaissance do not indicate the presence of an archaeological site on the proposed project parcel. No archaeological impact can be predicted and the proposed development should not be held up on the basis of archaeological concerns.

INTRODUCTION

AACC was contacted by Mr. Teall Messer to carry out an Archaeological Reconnaissance report required for a permit from the County Planning department prior to the proposed new library in Felton, California. The Archaeological Reconnaissance consisted of: 1) archival research at AACC and the Northwest Regional Information Office of the California Historical Resources Information System at Sonoma State University in Rohnert Park, CA, 2) doing a surface field survey on the parcel, 3) evaluation of the field findings, 4) evaluation of the project impacts, and 5) management recommendations, all written in a report.

LOCATION

The subject parcel (APN 065-073-03) is located in the Santa Cruz Mountains in Felton on Gushee Street (adjacent to the north of the U.S. Post Office). The parcel is located on the Felton 7.5 minute USGS quad map in the Zayanta Land Grant. The UTMG location is Zone 10, ^{5}82160/^{41}00300.

NATURAL SETTING: Biological

The biological setting includes grassland or coastal prairie, [which] occurs along the California coast from Santa Cruz northward (Barbour 1977)" and "central coast riparian scrub (Roper 1993)." Coastal prairie is typically characterized by "low grasses and thistle with few shrubs and no trees (op.cit.). The many riparian corridors contain rich vegetation, i.e. a collection of plants that "require abundant water year round (Warrick 1982)." Typically the vegetation includes ferns, moss, and various trees including oaks, buckeye, maple, hazelnuts, and willows.

The native vegetation has been altered throughout the historic period. One factor is the introduction of foreign species of vegetation including grasses, trees and flowering plants. "Almost one third (31%) of the total number of 553 species of vascular plants growing with out cultivation in the Santa Cruz mountains are introduced (Gordon 1977)." The second factor is change in vegetation due to a documented climate change. According to a palynological analysis of sediment extracted from the Elkhorn Slough area a change is indicated in the relative pollen index of arboreal and non-arboreal types. "In the arboreal record there is noted decline of redwood pollen in favor of increasing values of oak and pine pollen at ca. 1740 years B.P. (West in Roper 1993)." According to Roper's article these shifts may indicate "...climatic changes producing a warmer-drier climatic regime along the coast, potentially linked to interior cooling which would reduce a pattern of summer coastal fog which favors redwood growth (Op.Cit.:35)" or the change may signify a shift in stream flow and changes in riparian environments. The transformation of natural lands to agriculture has been great especially on or near archaeological sites.

Around this area a great number of animal species can be found. "About 330 species occur including 250 species of birds, 56 mammals, 8 reptiles, 13 amphibians excluding all marine species (Roper 1993:23). "Species that are no longer present in this area include the grizzly bear, wolves, tule elk, pronghorn antelope, Guadalupe fur seals, and jaguar (Gordon 1977). Some species that were almost hunted to extinction but are now making a come back include gray whales, sea otters, elephant seals, and mountain lions (Ibid.). Some species that were present in aboriginal times have become more numerous include black-tailed deer sea lions, cottontail rabbit, coyote, raccoon, Meadow-mice, and ground squirrels (Ibid.). Other species that have been introduced to this area are the common mouse, Norway rat, Virginia opossum, gray squirrel, Russian boar, muskrat, and the golden beaver.

NATURAL SETTING: General biological

The geological setting for most of the land in this Santa Cruz County area is occupied by the

Santa Cruz Mountains and its drainages. Most of the watersheds are small and have small alluvial flood plains cutting through marine terraces. The San Lorenzo River is the largest drainage in the Santa Cruz Mountains. Elevations decrease from a high of 3,200 feet down towards the ocean (US Department of Agriculture, 1968).

Marine terraces that hug the coastline of the Santa Cruz County were formed during the Pleistocene epoch and then uplifted by tectonic activity. At 3,000 to 5,000 years BP ocean levels stabilized. The coastline is defined by two sedimentary rock formations, Santa Cruz Mud stone and Monterey Formation (Roper 1993).

The soil for the parcel is defined as: Soquel Loam, 2 to 9 percent slopes. This very deep, moderately well drained alluvial soil. Elevation ranges from 20 to 1,000 feet. Typically the surface layer is very dark grayish brown and brown, medium acid and slightly acid loam about 21" thick (Soil Survey of Santa Cruz County, California, 1979 by the Soil Conservation Service, page 41).

The climate in Santa Cruz County consists of a dry season and a wet season. The dry season extends from May to October, and the wet season extends from November to April. The precipitation rate is lowest along the coast and highest in the inland mountains. Annual average rainfall ranges from twenty to fifty inches. The winter winds blow from north to south. The summer winds blow from west and northwest to the east and brings in fog, which usually dissipates during the day (Op. Cit.). The specific location is in a riparian corridor/floodplain of the San Lorenzo River.
1

CULTURAL SETTING

The first signs of human occupation in this region appear to be approximately 8500- 10,000 years ago in Scotts Valley. Evidence of dense occupation of the Santa Cruz coast (documented to date), does not appear until about 6000 BP. Based on data from the nearby Coast, this area has been inhabited for 5800 years. Living in an area of considerable ecological diversity allowed the early inhabitants of the north Monterey Bay region to have a hugely varied diet. They relied most heavily on foods collected in the inter-tidal region. The local archaeological middens contain shell from California mussel, black turban, limpet, barnacle, olivella, brachipods, dogwinkles and other rocky shore mollusk species (Ibid.). However, the inhabitants also traveled inland for plant foods like acorns, grass, and flower seeds, buckeye, roots and berries. They hunted terrestrial animals such as elk, deer, rabbit, gopher, marine resources, and fished freshwater streams.

Due to the highly mobile lifestyles of both of both foragers and collectors, it is to be expected that they would not burden themselves with heavy non-portable possessions. This observation is borne out by the artifacts found at local village sites of both earlier and later periods (Hylkema 1991: 7ff). The earlier inhabitants of the Santa Cruz coast relied on stones, shells, animal bones, and plants for equipment. Baskets were made to serve a wide variety of purposes, as cooking vessels, storage containers, water carriers and seed-gathering devices. Before about 1000 A.D., they made arrowheads and other tools from animal bone and antler, from the local Monterey chert, and from Franciscan chert received in trade from the Santa Clara Valley (Hylkema 2003:270), and from obsidian quarried in Casa Diablo and the Bodie Hills on the east side of the Sierra Nevada, and from Napa and Clear Lake north of the San Francisco Bay (Roper 1993:321).

Using the concepts developed by Binford in 1980, two basic subsistence strategies were practiced in this region. During the earlier phase (5800 bp~ to 1000 to 2000 bp), the residents were foragers who lived in small groups and moved from site to site throughout the inland and coastal ecosystems within their territories to take advantage of food resources as they became available. They would then settle into a camp or village where they would process and eat the harvests, as well as carry on all the other activities of daily life. Some camps or temporary villages would be revisited time and time again, resulting in a build-up of refuse consisting of many types of artifacts, including food debris, tools and lithic debris from tool-making, trade items, and burials (Hylkema 1991:15).

ATTACHMENT 6

It has further been proposed that at least 2000 years ago, a new group of people entered the area that followed a somewhat different collector subsistence strategy. This correlates in time to a rise in oak pollens found in sediment cores taken from Elkhorn Slough, indicating that oak trees became more prevalent in the coastal region between 1700 and 2000 years ago, attracting communities who relied more on acorns as a staple food (Roper 1993:308). While both foragers and collectors were quite mobile, collectors tended to establish more long-term villages as bases to maintain acorn storage facilities. The communities became more sedentary and grew in population (Hylkema, personal communication). Members of the community traveled from more permanent sites to seasonal task-specific camps to harvest other resources as they became available, but would then return to the village once the harvest was complete to process the food. The seasonal camps might be revisited year after year, but would be expected to contain debris only from particular seasonal activities, rather than the full compliment of artifacts generated by daily village life in a permanent site (Hylkema 1991:21).

As proposed by Gary Breschini in 1981, it appears that the early foragers may have been members of Hokan speaking groups who are thought to have occupied the area until the entry of Penutian speaking collectors. Whether the change indicates the replacement of one people by another, or the adoption of new technologies by one people from another, is still under discussion (Hylkema, personal communication).

Whatever the mechanism for the change, in the northern portion of the Monterey Bay coastal area where fewer oak trees were present, foraging continued to be the optimal subsistence strategy at least until 1000 A.D., and may have persisted in isolated pockets until the arrival of the Spaniards in 1770's (Hylkema 1991:25). The growing separation of the coastal cultures and the inland acorn-based cultures was evidenced by the decreasing amount of imported materials and the increasing reliance on local materials for tools. After about 1000 A.D., no new Franciscan chert is found (Hylkema, personal communication).

RESEARCH DESIGN

At this level of preliminary reconnaissance (King, et., 1973) a lengthy discussion of the whys and wherefores of research designs and the theoretical significance of the data (positive or negative) produced by this small scale study is at the least inefficient if not somewhat pretentious. Suffice it to say that there is a broadly drawn research question to which the data gathered by this and similar small scale studies can be applied, provided the data meets minimal standards and is deposited at a scientific repository for utilization as a larger body of data. This question deals with the prehistoric patterns and changes in patterns prehistorically of the population, and in the settlement locations and resource utilization of the native peoples of the area.

> *"Why are archaeological sites located where they are and why do the locations of the archaeological sites representing different time periods differ (King, C. & L. 1973)?"*

This data is further refined in this area by the planning agencies requirement for such studies when the parcel meets some of the following criteria: near streams, at the edge of foothills, near the edge of marshes, and where known, near exploited prehistoric resource areas. These requirements increase the chance of finding evidence of the resource utilization over a purely random sample of an area.

One example of such use of this type of data is the Masters thesis (San Francisco State University 1982) by Judith Bergthold on "Prehistoric Settlement and Trade Models in the Santa Clara Valley".

RESEARCH METHODS

After consulting the extensive files of AACC, Edwards performed a limited records search for the referenced Project at the Northwest Information Center (NWIC: File No. 12-0058). The research included an examination of maps and reports located at the California Historical Resources Information System (CHRIS) NWIC. Since the subject parcel is located in an urban setting a 2-block radius from the project location was used to search for documented cultural resources. The archival research revealed that no archaeological sites lie within the search radius.
In 2000, CalTrans performed an archaeological survey for asphalt-concrete overlay with shoulder backing on portions of State Route 9, one block from the Project, with negative results (Wheeler & Wilson 2000). In July 2004, an archaeological reconnaissance was performed for the proposed San Lorenzo Valley Trail Alignment alternative from Boulder Creek to Santa Cruz, also with negative results in the research radius (Clark 2004). A 2008 report was performed for the proposed installation of antennae and other cellular equipment on the Felton Firehouse also with negative results (Losee 2008).

The HPDF lists no National Register buildings on Gushee Street or within the 2-block radius. One ca. 1910 building, located at 175 Kirby Street is listed on the HPDF with a status code of "552" or *Individual property eligible for local listing under local ordinance."* Located two blocks of the Project is the original Felton Presbyterian Church and Historic property known as the Faye G. Belardi Memorial and now serving as a library (OHP 013209/Hist. Surv. 5018-0002, see References). It was listed on the National Register on 6 April 1978 as the "Felton Presbyterian Church" (NRHP Code 1S, or *Individual property listed in the NR by the Keeper).*

A general surface reconnaissance (King etal. 1973) of the project area was conducted by the authors. Two surveyors were on the parcel from 10:40 to 11:50 am (or 1.67 person hour) investigation. Bull Creek enters the parcel near the southwest corner running in a curved route to the northeastern end of the parcel. A gravel road runs from the southern end of the parcel (next to the Post Office) crossing a culvert containing Bull Creek to the northwestern end of the parcel.

Several exposures of rodent back dirt in the southeast corner and along the northwestern edge of the property. indicated a dark gray brown soil, which is not typical midden/site soil for this environment. There was limited visibility of the soil in much of the parcel as the parcel appears to have been extensively used as a fill area. This is evidenced by much lighter soils, mounds with asphalt and decomposed granite and piles of cut trees and dead grasses. The parcel contained many mature willow trees, a few oak trees as well as extensive willow brush. The area to the north of the culvert also appears to be a level flood plain with much less fill.

REPORT OF FINDINGS

The archival research and the surface reconnaissance do not indicate the presence of cultural resources on property. No archaeological impact can be predicted and the proposed development should not be held up on the basis of archaeological concerns.

Given the alluvial formation and that there is extensive fill, it is recommended that should any buried cultural resources are discovered, work should be immediately suspended and a qualified archaeological consultant be contacted .

REFERENCES

Barbour, M.G.
1977 *Terrestrial Vegetation of California.* John Wiley & Sons, Inc. CA

Bergthold, Judith C.
1982 Prehistoric Settlement and Trade Models in the Santa Clara Valley, California. Masters Thesis, San Francisco State University, August.

ATTACHMENT 6

Clark, Matthew R.
2004 "An Archaeological Reconnaissance of The Proposed San Lorenzo Valley Trail Alignment Alternatives, Boulder Creek-Santa Cruz, Santa Cruz County, California." Report on file at the Northwest Regional Office of the California Historical Resources Inventory System, S-28809.

Edwards, Robert,
1969 "Use of the Universal Transverse Mercator Grid for Archaeological Survey" in American Antiquity, April.

Edwards, Rob and Mark G. Hylkema
2008 Personal Communication, lecture 6/16/2008.

Gordon, Burton L.
1977 *Monterey Bay Area: Natural History and Cultural Imprints.* Pacific Grove, CA: Boxwood Press. 2nd edition.

Hylkema, Mark G.
1991 "Prehistoric Native American Adaptations Along the Central California Coast of San Mateo and Santa Cruz Counties." A Thesis presented to the Faculty of the Department of Social Science, San Jose State University.

2003 "Tidal Marsh, Oak Woodlands, and Cultural Florescence in the Southern San Francisco Bay Region" in The Journal of California and Great Basin of Anthropology.

King, Chester, King, L.
1973 "Research Design for the San Francisco Bay Area", Bay Area Archaeological Cooperative Newsletter.

King, Tom, et al
1979 "Recommended Procedures for Archaeological Impacts Evaluation." Society for California Archaeology.

Losee, Carolyn
2008 "Cultural Resources Investigation for AT&T Wireless Project, #1466 "Felton 131 Kirby Street, Felton, Santa Cruz Co. 95017 (sic) EAB1 Project #61082126." Letter Report on file at the Northwest Regional Office of the California Historical Resources Inventory System, S-34931.

Roper, C. Kristina
1993 "Archaeological Data Recovery Excavation at CA-SCR-38/123, Wilder Ranch, Santa Cruz, California."

U.S. Dept. of Agriculture
1979 "Soil survey of Santa Cruz County, California." U.S. Government Printing Office.

Wheeler, Tomas and Kelda Wilson
2000 "Archaeological Survey Report, CalTrans." Report on file at the Northwest Regional Office of the California Historical Resources Inventory System, S-22825.

APPENDIX

Rob Edwards Vitae

Map 1: Location Map: Felton Quadrangle (USGS 7.5')

Map 2: APN Map with highlighted surveyed areas

Aerial View Project Area

ATTACHMENT 6

ROBERT L. EDWARDS, A.A., B.A., M.A. & R.P.A.
Principal and Consulting Archaeologist
A.A.C.C., Archaeological Associates of Central California
P.O. Box 310, Soquel, CA 95073-0310
Email: robedwardsaacc@gmail.com, phone 831-246-0907

EDUCATION:

A.A. City College of San Francisco, 1961
B.A. San Francisco State College, 1966
M.A. University of California, Davis 1969
Additional Graduate Study and Technical Training 1969 - 1997

PROFESSIONAL CERTIFICATIONS:

Register of Professional Archaeologist: accredited 1998 TO PRESENT
Society of Professional Archaeologists: accredited 1976 with expertise in Archaeological Field Research, Theoretical or Archival Research, Archaeological Administration, Cultural Resources Management, Museology, and Teaching.
Board of Governors, California Community College - Life Credential in Anthropology, 1971

MAJOR CLIENTS FOR RESEARCH AND PUBLIC ARCHAEOLOGY:

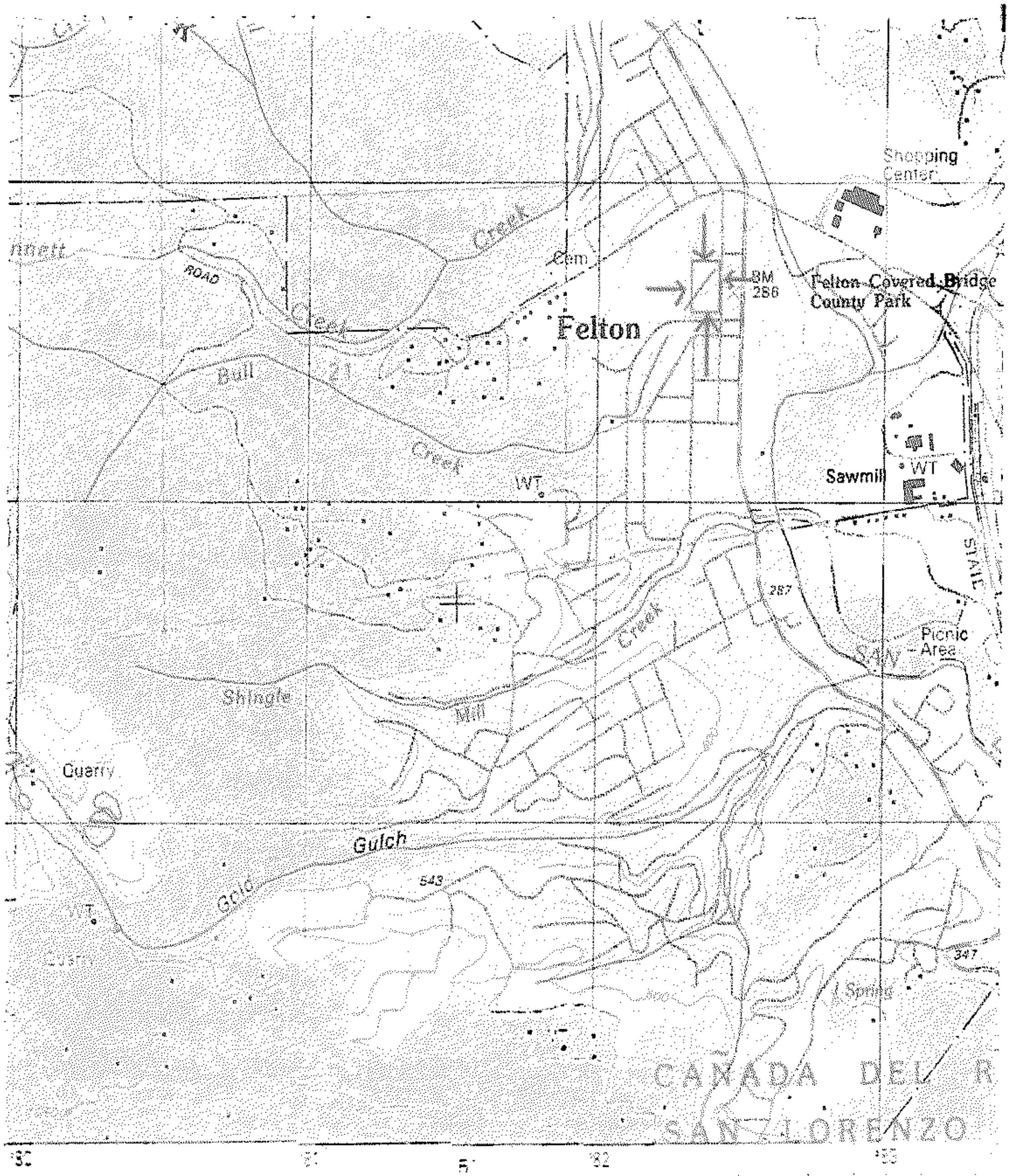
2008	BLM/State Parks work on Santa Cruz Coast Dairies Ranch
2006-07	Presidio Trust, Excavation of the Spanish/Mexican Era Chapel and Sacristy, San Francisco Presidio.
2005	Redman Foundation, Redman - Hirahara House foundation, Japanese American site
2001-04	California Parks Department, Ano Nuevo State Reserve, Cascade Ranch, and Quiroste Valley excavations
2000	Cabrillo College Facilities Department, CA-SCR-20
1996-99	Golden Gate National Park Association and Presidio Trust, Excavation of the Spanish/Mexican Era Chapel Foundation, San Francisco Presidio.
1994-97	U.S. Forest Service - Pfeiffer Beach Prehistoric Test Excavation
1993,95,97	U.S. Forest Service - Upper San Antonio River Valley Archaeological Survey for historic and prehistoric resources.
1993-94	California American Water Company, Monterey Spanish Presidio Salvage
1992-97	Holy Cross Church - Archaeology and Project Design, Santa Cruz Mission
1991	Archaeological Consulting - Prehistoric Excavation Rancho San Carlos
1989	Survey and Mapping of the Jose Joaquin Castro Adobe/San Andreas House.
1988-89	U.C. Santa Cruz - Archaeological Investigations, CA-SCR-160
1988	California Department of Parks and Recreation - Mexican Era and Prehistoric Excavation, Wilder Ranch
1986 '87	California Department of Parks and Recreation - Spanish Era Excavations, Santa Cruz Mission State Historic Park.
1981-84	Tefertiller Family Trust, Lost Adobe Site, Santa Cruz.
1975-79	California Department of Parks and Recreation - Excavation Fort Ross State Historic Park
1974	Sonoma State University (and local Indian group) - Mostin site, Clear Lake
1972	Sonoma State University - three areas in Sonoma County
1971	Brown Bulb Corporation, CA-SCR-20

ATTACHMENT 6

PROFESSIONAL MEMBERSHIPS AND SERVICE:

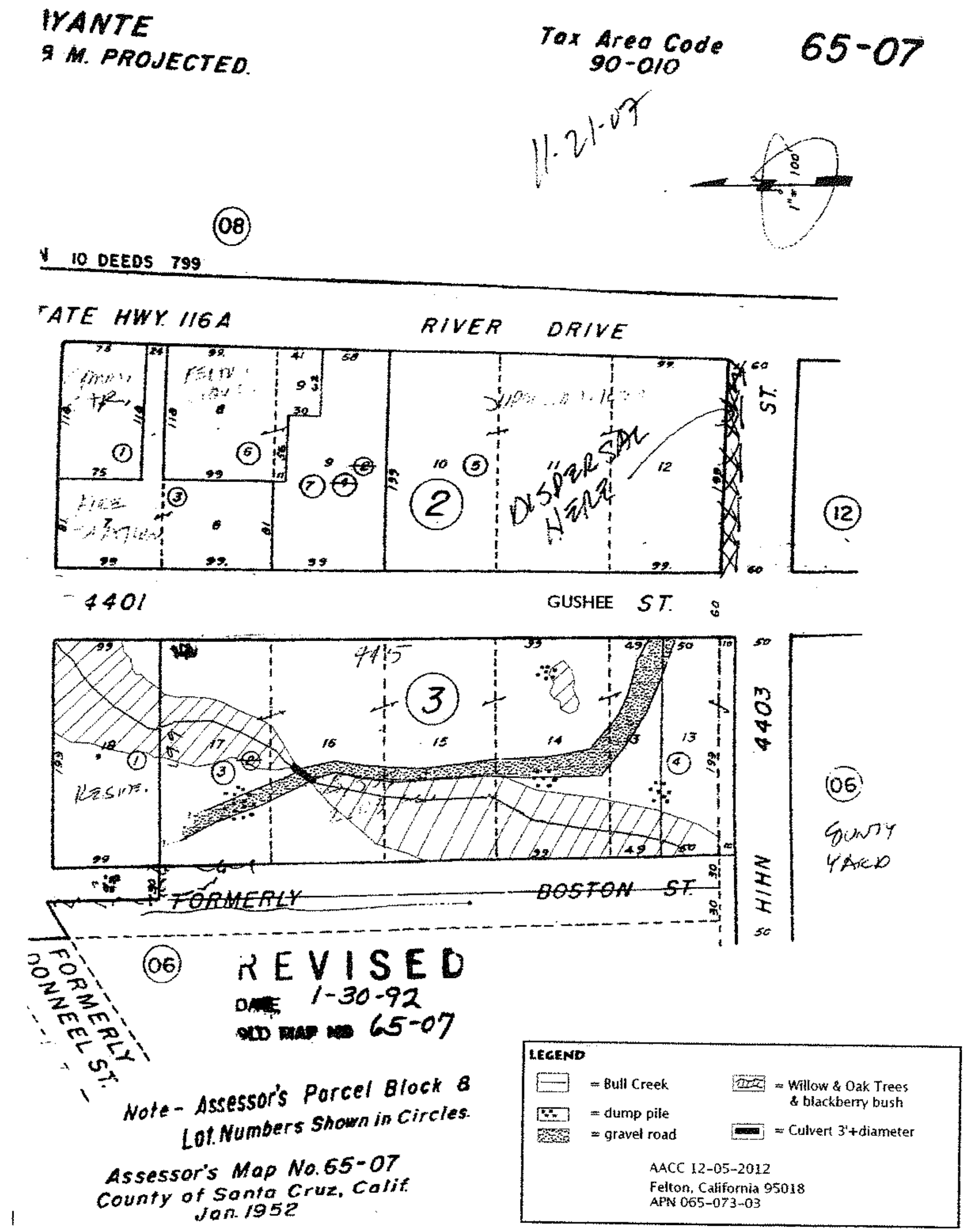
Society for Anthropology in Community Colleges (1978 - to Present): President 2007
California Mission Studies Association (1983-Present): Director (1987-1989)
Society of Professional Archaeologists (1976-1998): Standards Board Alt. (1978-'79)
Santa Cruz Archaeological Society (1972 - Present): founder, and Professional Advisor
American Anthropological Association (1970-Present): Fellow since 1975
Society for California Archaeology (1966 - Present): Founding Member, Vice President (1969-'70), President (1975-'76), Past President (1976-'79) Secretary (1982-'83), Regional Clearing House Coordinator (1971-1982).
Society for American Archaeology (1963-Present): Committee on Public Archaeology (1975-'80), Com. on Cultural Resource Management Standards, Arlie House (1975)

ATTACHMENT 6

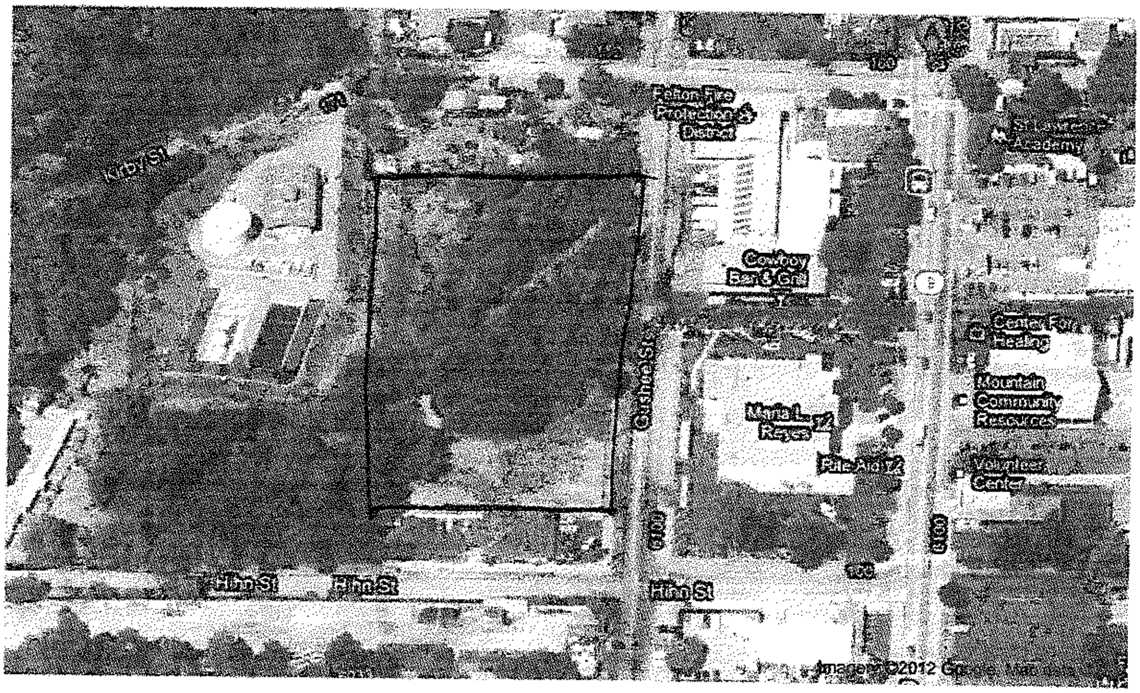


Map 1: Location Map
Felton 7.5' USGS Quad

ATTACHMENT 6



Map 2: Assessors Parcel Map
065-073-03



APN 065-073-03

Aerial View Project Area

ATTACHMENT 6

Pacific Crest Engineering Inc. www.4pacific-crest.com

444 Airport Blvd, Suite 106
Watsonville, CA 95076
Phone: 831-722-9446
Fax: 831-722-9158

May 29, 2017

Project Number 1720-SZ40-J53

Betsey Lynberg
Santa Cruz County Department of Public Works
701 Ocean Street, Room 420
Santa Cruz, CA 95060

Subject: **Geotechnical Investigation Report Update**
Felton Branch Library
Gushee Street
Felton, California
APN 065-073-03

Reference: Geotechnical report title "Geotechnical Investigation for Felton Branch Library Site, Gushee Street, Felton, California, APN 065-073-03" prepared by Bauldry Engineering, Inc. and dated December 12, 2003.

Dear Ms. Lynberg,

Pacific Crest Engineering Inc. is currently providing the Geotechnical Engineer of Record services for the subject Library Project. Bauldry Engineering, Inc., the former Geotechnical Engineer of Record, prepared a Geotechnical Investigation Report for the subject project in December of 2003. At the time the Bauldry Engineering report was prepared the project consisted of a new library building with adjacent parking on the south side of the site, a warehouse structure with adjacent parking on the north end of the site, an access road, and the replacement of the existing Bull Creek culvert with a new culvert.

Since the 2003 geotechnical investigation report was written, the project has been modified. The proposed warehouse and parking lot on north of Bull Creek are no longer part of the project and the culvert will be removed and replaced with a small pre-manufactured pedestrian bridge rather than a new culvert. Supplemental recommendations for the new pedestrian bridge will be provided once the loading and other details have been determined.

To prepare this geotechnical update we reviewed the referenced Geotechnical Investigation Report, visited the site, reviewed the current proposed conceptual plans and discussed the project with Teall Messer and other members of the design team.

PROJECT VIABILITY

1. Based on our recent site reconnaissance and our review of the documents prepared by Bauldry Engineering, Inc., it is our opinion that the project site has not changed significantly and the findings and recommendations of the Bauldry Engineering Geotechnical Investigation Report remain applicable.

ATTACHMENT 7

2. *All recommendations of the Geotechnical Investigation Report prepared by Bauldry Engineering, Inc. not amended herein shall be adhered to during the design and construction of the project.*

3. From a Geotechnical Engineering standpoint, the project may be developed as proposed. Provided our recommendations are followed, the proposed library can be designed and constructed to an "ordinary" level of seismic risk and performance, which is defined as follows:

   "Ordinary Risk": Resist minor earthquakes without damage: resist moderate earthquakes without structural damage, but with some non-structural damage: resist major earthquakes of the intensity or severity of the strongest experienced in California without collapse, but with some structural damage as well as non-structural damage. In most structures it is expected that structural damage, even in a major earthquake, could be limited to reparable damage. (Source: Meeting the Earthquake Challenge, Joint Committee on Seismic Safety of the California Legislature, January 1974).

4. The ground shaking and seismic design section of the Bauldry Engineering, Inc. report should be updated as follows and incorporated into the structural design of the project:

GROUND SHAKING AND SEISMIC DESIGN

1. Ground shaking will be felt on the site. Structures founded on thick soft soil deposits are more likely to experience more destructive shaking, with higher amplitude and lower frequency, than structures founded on bedrock. Generally, shaking will be more intense closer to earthquake epicenters. Thick soft soil deposits large distances from earthquake epicenters, however, may result in seismic accelerations significantly greater than expected in bedrock. Structures built in accordance with the latest edition of the California Building Code have an increased potential for experiencing relatively minor damage which should be repairable.

2. It is anticipated that the new library building will have a fundamental period of less than 0.5 seconds. This must be verified by the Project Structural Engineer. If this assumption is incorrect, significant additional geotechnical and geology studies may be required for this site.

3. The saturated, loose to medium dense sands underlying the site have a potential for liquefaction resulting in a Site Class F designation. Section 20.3.1 of ASCE 7-10 allows the following exception for structures overlying Site Class F soils. "For structures having fundamental periods of vibration equal to our less than 0.5s, site response analysis is not required to determine spectral accelerations for liquefiable soils. Rather, a site class is permitted to be determined in accordance with Section 20.3 and the corresponding values of F_a and F_v determined from Tables 11.4-1 and 11.4-2" of ASCE 7-10.

4. The rationale for the above exception is that during an earthquake, the soil will respond differently before and after the earthquake shaking occurs. Before the earthquake, the soil profile has not liquefied and may be considered to possess the behavioral characteristics of the Soil Profile Type that best describes the soil in its non-liquefied state. For non-liquefied soil, it is expected that short period accelerations will be quite high. After liquefaction occurs, the soil will soften and result in a reduction of the short period ground motion and spectral accelerations, whereas the longer period spectral response may increase dramatically.

ATTACHMENT 7

5. The seismic design values provided in the table below were derived or taken from the 2016 CBC and are applicable for structures having a fundamental period of vibration (T_{fp}) equal to our less than 0.5s. The following seismic design parameters for Site Class D are applicable for the proposed library provided that it has a fundamental period of vibration equal to or less than 0.5s. Structures having a fundamental period of vibration greater than 0.5s will require supplemental design criteria and may require a site-response analysis.

6. Selection of seismic design parameters should be determined by the project structural designer. The site coefficients and seismic ground motion values shown in the table below are developed based on CBC 2016 incorporating the ASCE 7-10 standard, and the project site location.

The 2016 CBC Seismic Design Parameters ($T_{fp} \leq 0.5s$)

Design Parameter (See Note 1)	**Specific to Site ASCE 7-10**
Site Class	D: Stiff Soil
Mapped Spectral Acceleration for Short Periods	$S_S = 1.500$ g
Mapped Spectral Acceleration for 1-second Period	$S_1 = 0.600$ g
Short Period Site Coefficient	Fa = 1.0
1-Second Period Site Coefficient	Fv = 1.5
MCE Spectral Response Acceleration for Short Period	$S_{MS} = 1.500$ g
MCE Spectral Response Acceleration for 1-Second Period	$S_{M1} = 0.900$ g
5% Damped Spectral Response Acceleration for Short Period	$S_{DS} = 1.400$ g
5% Damped Spectral Response Acceleration for 1-Second Period	$S_{D1} = 0.600$ g
Seismic Design Category (See Note 2)	D

Note 1: Design values were obtained using the Ground Motion Parameter Calculator at the USGS website: https://geohazards.usgs.gov/secure/designmaps/us/signup.php on May 24, 2017

Note 2: The Seismic Design Category assumes a structure with Risk Category I, II or III occupancy as defined by Table 1604.5 of the 2016 CBC. Pacific Crest Engineering Inc. should be contacted for revised Table 2 seismic design parameters if the proposed structure has a different occupancy rating than that assumed.

7. Structures built in accordance with the latest edition of the California Building Code for Seismic Zone 4 may be damaged during a large magnitude earthquake, but should not collapse. The recommendations of this report are intended to reduce the potential for structural damage to an acceptable risk level, however strong seismic shaking could result in architectural damage and the need for post-earthquake repairs. It should be assumed that exterior improvements such as pavements, slabs, sidewalks or patios will need to be repaired or replaced following strong seismic shaking.

Pacific Crest Engineering Inc. appreciates the opportunity to provide our services, and would be pleased to answer any questions you may have. We can be reached at 831-722-9446.

Sincerely,

PACIFIC CREST ENGINEERING INC.

Brian D. Bauldry, G.E., P. E
Vice-President – Geotechnical Group
G.E. 2479
Exp. 12/31/18

Elizabeth M. Mitchell, G.E.
President\Principal Geotechnical Engineer
G.E. 2718
Exp. 12/31/18

Copies: Client, Teall Messer
e-Copies: Client, Teall Messer

ATTACHMENT 7

COUNTY OF SANTA CRUZ

PLANNING DEPARTMENT
701 OCEAN STREET, 4TH FLOOR, SANTA CRUZ, CA 95060
(831) 454-2580 FAX: (831) 454-2131 TDD: (831) 454-2123
KATHLEEN MOLLOY PREVISICH, PLANNING DIRECTOR

SOILS ENGINEER TRANSFER OF RESPONSIBILTY

APN: 065-073-03 DATE: 2/21/17
OWNER: SANTA CRUZ COUNTY
PROJECT LOCATION: Gushee STREET
FELTON, CA

PROJECT DESCRIPTION:
NEW FELTON BRANCH LIBRARY

Our firm is taking over the above referenced project as the project soils engineer of record.

We have reviewed the original geotechnical work for this project. Completed work reviewed to date is as follows (detail all reports including author, title, date and project number):
"Geotechnical Investigation for Felton Branch Library, Gushee Street, Felton, California APN 065-073-03" Bauldry Engineering, Inc., December 21, 2003, Project 0259-SZ951-H31

Based upon our review, we offer our professional opinions as follows (check where applicable):

X We concur with all of the technical conclusions and recommendations.

___ We do not agree with or support geotechnical conclusions or recommendations as detailed on the attached report (attach new conclusions and recommendations and all new supporting data and reasoning).

Please read prior to signature
By signing below, we agree to accept responsibility within our area of technical competency for approval of this project upon completion of the work.

SIGNED: Brian Bauldry
(Apply California State-registered civil or soils engineer's signature and wet stamp here)

REGISTERED PROFESSIONAL ENGINEER BRIAN D. BAULDRY No. 2479 GEOTECHNICAL STATE OF CALIFORNIA

RETURN TO: ___

C:\Documents and Settings\PLN112\Local Settings\Temporary Internet Files\OLK1E\Soils Engr Trans Resp-2010.doc

ATTACHMENT 7

GEOTECHNICAL INVESTIGATION
FOR
FELTON BRANCH LIBRARY
GUSHEE STREET
FELTON, CALIFORNIA
APN 065-073-03

FOR
SANTA CRUZ CITY AND COUNTY PUBLIC LIBRARY SYSTEM
SANTA CRUZ, CALIFORNIA

BY
BAULDRY ENGINEERING
CONSULTING GEOTECHNICAL ENGINEERS
0259-SZ951-H31
DECEMBER 2003

ATTACHMENT 7

TABLE OF CONTENTS

ATTACHMENT 7

0259-SZ951-H31
December 12, 2003

Anne Turner
Director
Santa Cruz City and County Public Library System
1543 Pacific Avenue
Santa Cruz, CA 95060

Subject: Geotechnical Investigation for Felton Branch Library Site
Gushee Street
Felton, California
APN 065-073-03

Dear Ms. Turner,

In accordance with your authorization, we have performed a geotechnical investigation for the Felton Branch Library site, which is located in Felton, California.

The attached report presents our geotechnical investigation including conclusions and recommendations for the design and construction of the project. Please call us if you have any questions regarding the contents of this report.

Very truly yours,

Bauldry Engineering

Brian D. Bauldry
Principal Engineer
G.E. 2479
Exp. 12/31/06

Daleth Foster
Senior Engineer
C.E. 57965
Exp. 6/30/06

Engineering/Projects/0259/0259 GI
Copies: 8 to Santa Cruz City and County Public Library System
C/O Teall Messer Architecture

ATTACHMENT 7

GEOTECHNICAL INVESTIGATION

PURPOSE OF INVESTIGATION

The purpose of our investigation is to provide geotechnical recommendations for the design and construction of the proposed development, which consists of a new library building with adjacent parking on the south end of the site, a warehouse structure with adjacent parking on the north end of the site, and an access road and new culvert, which crosses Bull Creek and connects the two developments.

SCOPE OF SERVICES

This report describes the geotechnical investigation and presents results, including recommendations, for the proposed development. Our scope of services for this project has consisted of:

1. Discussions with Teall Messer, the project architect; and Richard Beale, the project planner.
2. Review of the following maps and reports:
   a. Topographic Map prepared by Ward Surveying dated October 9, 2002.
   b. Site Plan, Grading and Drainage Plan prepared by Ifland Engineers dated July 2, 2003.
   c. Aerial photos for the site dated January 17, 1940, prepared for the US Army Corps of Engineers at a scale of 1:10,200.
   d. Geologic Map of Santa Cruz County, California, Brabb, 1989.
   e. Preliminary Landslide Deposits in Santa Cruz County, California, Cooper-Clark, 1975.
   f. Map Showing Quaternary Geology and Liquefaction Potential of Santa Cruz County, California, Dupré, 1975.
   g. USGS 7.5 Minute Topographic Map, Felton Quadrangle.
3. Field exploration including the drilling, sampling and logging of 7 test borings to depths ranging from 20½ to 30½ feet below the ground surface.
4. Laboratory analysis of retrieved soil samples.
5. Engineering analysis of the field and laboratory results.
6. Preparation of this report documenting our investigation and presenting recommendations for the design of the project.

SITE DESCRIPTION

Location

The project site is located on the west side of Gushee Street between Hihn Street and Kirby Street in Felton, California. The Assessors Parcel Number is 065-073-03.

Proposed Development

The proposed project includes the construction of:

1. An approximately 8,800 square foot library building on the south end of the site, with an adjacent 18 space parking lot.

2. An approximately 1,700 square foot warehouse structure on the northwest corner of the site, with an adjacent 4 space parking lot and fire truck turn around.

3. A 12 space parking lot, and sidewalk, curb and gutter improvements along Gushee Street.

4. A paved roadway connecting the two structures aligned along the western border of the parcel.

5. A new culvert for the Bull Creek crossing.

Both structures will be designed with concrete slab-on-grade floors that will support relatively heavy loads. The site will be re-graded with roughly 600 cubic yards of cut and approximately 330 cubic yards of fill.

Site Topography and Setting

The project site, which is approximately 2 acres in size, is located on a very gently sloped alluvial river terrace on the west side of the San Lorenzo River. Bull Creek, a tributary to the San Lorenzo River, diagonally crossed the parcel. The creek enters the site at the middle of its western boundary and exits the site at its northeast corner. The slopes on the site dip very gently toward the creek channel, which is incised about 3 to 4 feet below the surrounding grades.

The historical aerial photos reviewed for this project show that in 1940 the main channel entered the site in roughly the same location. The location where the creek exits the site, however, has been moved about 100 feet north of its 1940 location on Gushee Street. The gentle drainage swale surrounding the channel was roughly 100 to 125 feet in width prior to backfilling, which was apparently performed to level the site. No structures were visible on the site in the 1940 aerial photos.

The site is currently vegetated with willows and riparian vegetation. The building site for the library structure is currently a construction yard with a baserock surface, and the building site for the warehouse is vegetated with grasses and small vegetation. There are currently no structures on the site.

Earth Materials
The project site is mapped on the USGS Geologic Map of Santa Cruz County (Brabb 1989) as being underlain by a thin veneer of Holocene Alluvium blanketing sandstone bedrock of the Miocene Lompico Formation. The Lompico Formation is described as a thickly bedded, medium to fine grained, arkosic sandstone. The native earth materials encountered in our test borings are consistent with this description.

Our test boring revealed that variable thicknesses of fill have been placed on the site. The man made fill encountered in our borings varied from 1½ to 5½ feet in thickness. The fill consisted of loose to medium dense silty sand and firm to stiff sandy silt, which often contained asphalt, organics and other construction debris. The native soil below the fill formed a fining upward sequence with a basal layer of medium dense to dense gravelly sand. The upper section of this sequence consisted of a loose to medium dense silty sand, which may be susceptible to liquefaction. The upper 3 to 5 feet of surface soil generally consisted of sandy silt to silty sand with minor sandy clay layers. Silty sandstone bedrock of the Lompico Formation was encountered at depths ranging between 14 and 22½ feet below the ground surface.

We encountered a drain field consisting of ¾ inch gravel in boring 3A to a depth of 4½ feet, where the boring was abandoned. We understand that this gravel is part of a subdrain that has not been completed and does not have a discharge point.

Groundwater
Groundwater was encountered at a depths ranging between 4 and 10 feet below the ground surface at the time of our subsurface investigation, which was performed in October during the driest time of the year.

The table below summarizes the information that is detailed on the boring logs included in Appendix A of this report.

Summary of Subsurface Findings

Earth Material	B-1	B-2	B-3	B-4	B-5	B-6	B-7
FILL Silty SAND, Sandy SILT	None Apparent	None Apparent	0-2 ft	0-5½ ft	0-2 ft	0-2 ft	0-1½ ft
NATIVE Silty SAND, Sandy SILT, Silty CLAY	0-8 ft	0-8 ft	2-11 ft	5½ - 11½ ft	2-11½ ft	2-4 ft	1½ - 4½ ft
Gravelly SAND and Sandy GRAVEL	8-14 ft	8-14 ft	11-18 ft	11½ - 18½ ft	11½ - 22½ ft	4- 14½ ft	4½ - 11½ ft
BEDROCK Silty SANDSTONE Lompico Formation	14- 25½ ft	14- 20½ ft	18- 20½ ft	18½ - 25½ ft	22½ - 30½ ft	14½ - 20½ ft	
Boring Termination Depth	25½ ft	20½ ft	20 ½ ft	25 ½ ft	30 ½ ft	20 ½ ft	11 ½ ft
Groundwater Depth (ft)	8½ ft	7 ft	4 ft	4 ft	9 ft	10 ft	9 ft

ATTACHMENT 7

DISCUSSION OF GEOTECHNICAL HAZARDS

Hazards associated with seismic events in Santa Cruz County include ground shaking, surface ground rupture, liquefaction, and seismically induced slope instabilities.

Seismic Shaking and UBC Design Parameters

The site is located in a seismically active region. Mapped active or potentially active faults that may significantly affect the site are listed in the following table. The fault distances are based on a review of the document titled "Maps Of Known Active Faults Near-Source Zones In California And Adjacent Portions Of Nevada" prepared by the California Department of Conservation Division of Mines and Geology and published February 1998.

Fault	Seismic Source Type	Distance to Source (kilometers)
San Andreas	A	15
San Gregorio	A	15
Zayante	B	10

The project should be designed assuming that significant seismic shaking will occur during the lifetime of the project. In general, seismic shaking will be more intense closer to earthquake epicenters, however, amplification and attenuation of seismic shaking can occur as a result of the topography of the site, and as a result of the geometry and density of the earth material underlying the site. Structures built in accordance with the latest edition of the Uniform Building Code for Seismic Zone 4 may be damaged during a large magnitude earthquake, but should not collapse. The following values for seismic design at the project site were derived or taken from the 1997 UBC.

1997 UBC Seismic Design Parameters

Seismic Zone	Zone 4
Seismic Zone Factor	$Z = 0.4$
Soil Profile Type	Stiff Soil (S_D)
Near Source Factor N_a	$N_a = 1.0$
Near Source Factor N_v	$N_v = 1.0$
Seismic coefficient C_a	$C_a = 0.44$
Seismic coefficient C_v	$C_v = 0.64$

Liquefaction

Liquefaction is a phenomenon that can occur in loose to medium dense, saturated, granular soil that is subject to seismic accelerations. The earth materials underlying are composed of alluvial deposits overlying sandstone bedrock. The loose to medium dense silty sand encountered between depths of approximately 4 and 8 feet may be susceptible to liquefaction in the event of strong seismic shaking. The results of our analysis, which are based on the work of Seed (Recent Advances in Soil liquefaction Engineering: A Unified and Consistent Framework, Seed et al., 2003) indicate that there is a high potential for liquefaction of this soil stratum in the event of intense seismic shaking and saturated conditions.

Liquefaction occurs when the soil grains are cyclically accelerated such that they begin to loose contact, allowing pressurized pore water to flow between soil grains. The pressurized groundwater can flow up towards the ground surface, further acting to lift the grains apart. The soil, which derives its strength from point-to-point contact between grains, can become fluidized, resulting in lower shear strengths and bearing capacities. When the cyclic accelerations cease the water pressure dissipates and the grains settle in a new packing structure, frequently resulting in ground surface settlement. Settlement can be differential due to the presence of non-homogeneous earth materials and due to differential densification and dewatering processes. Liquefaction induced bearing failure and differential ground settlement can damage structures, pavements and utilities.

We analyzed the potential for liquefaction to occur on the site using the following assumptions and criteria:

1. An estimated mean peak ground accelerations of 0.5 g.
2. A 7.9 Magnitude earthquake occurring on the San Andreas fault.
3. A groundwater table of 4 feet below the ground surface.

We analyzed the potential for the ground surface settlement due to liquefaction. Our settlement potential analysis was performed using the criteria recommended by Seed et. al. (2003). Our analysis was performed for finished grade elevations using maximum accelerations of 0.5 g.

The results of our analysis indicate that there is >95% potential for liquefaction to occur in the soil encountered between approximately 4 to 8 feet below the ground surface if saturated and subject to intense seismic shaking. Total ground surface settlement could range between ½ inch to 1 inch. Up to 2/3 of the seismically induced settlement could act differentially across the site.

It must be cautioned that geotechnical modeling of liquefaction and liquefaction induced settlement is an inexact and evolving science. The mathematical models contain many simplifying assumptions, not the least of which are isotropy and homogeneity of the soil strata. The probabilities generated by our liquefaction analyses show the tendency of soil behavior. Soil with a high probability of liquefaction may not deform, but is more likely to deform than soil with a low probability of liquefaction.

Slope Stability

The potential for landsliding to affect the site is low as the site is relatively level and the slopes surrounding the site are gentle.

Surface Ground Rupture from Faulting

The investigation for the potential for ground surface rupture to affect the site was outside our scope of services for this project. The project site is located about 1000 feet from a mapped trace of the Ben Lomond Fault, which has an unclassified activity level, and over 6 miles from the traces of faults determined to be potentially active or active. The risk associated with surface ground rupture is considered to be acceptable with a 50 foot minimum building setback from an active fault trace, as documented by a detailed fault investigation. A detailed fault investigation was outside our scope of services for this project.

CONCLUSIONS AND RECOMMENDATIONS

PRIMARY GEOTECHNICAL ISSUES

1. Site Viability

The results of our investigation indicate that from a Geotechnical Engineering standpoint the property may be developed as proposed. It is our opinion that, provided our recommendations are followed, the proposed library structure, warehouse building, parking lots and access road can be designed and constructed to an "ordinary" level of seismic risk and performance as defined below:

> **"Ordinary Risk"**: Resist minor earthquakes without damage: resist moderate earthquakes without structural damage, but with some non-structural damage: resist major earthquakes of the intensity or severity of the strongest experienced in California without collapse, but with some structural damage as well as non-structural damage. In most structures it is expected that structural damage, even in a major earthquake, could be limited to reparable damage. (Source: Meeting the Earthquake Challenge, Joint Committee on Seismic Safety of the California Legislature, January 1974)

If the property owner desires a higher level of performance for this project, supplemental design and construction recommendations will be required.

2. Primary Geotechnical Constraints

Based on our field and laboratory investigations, it is our opinion that the primary geotechnical issues associated with the design and construction of the proposed project are the following:

a. **Removal of Artificial Fill Soil**. The Bull Creek drainage swale, which once crossed the property, has been filled to form level ground. Our review of the 1940 aerial photos indicates that the channel has been realigned to exit the property about 100 feet north of its 1940 location. The 1940 drainage swale surrounding the channel appears to have been roughly 100 to 125 feet in width prior infilling of the swale. We encountered up to 5½ feet of man made fill adjacent to the channel, and up to 1½ to 2 feet of man made fill away the channel area.

   We recommend that the fill be removed from the area proposed for development to reduce the potential for damage to site improvement due to settlement. The thickest fill section that we encountered was directly adjacent to the active creek channel.

   Grading adjacent to the creek channel will require that the work be performed during the driest time of the year. Additionally, dewatering of the site, including the construction of subsurface drains in the area of the original swale, may be constructed prior to fill removal to help minimize the potential for subsurface saturation. The drains should be located up-gradient (west) of the area of fill

ATTACHMENT 7

removal. If the subsurface drains discharge into Bull Creek, the design should ensure that the drain fields are not back-saturated during high creek flow.

The existing drain field, which is located in the area of boring 3A, appears to be non-functioning. This subdrain may need to be removed if it cannot be improved to function adequately.

b. **Groundwater Conditions and Surface Drainage**. Groundwater was encountered at depths ranging between 4 to 10 feet below the ground surface during the driest time of the year. The groundwater on the site appears to be fed both by Bull Creek and by surficial runoff from adjacent slopes. It is likely that the groundwater table rises to within a few feet of the ground surface over portions of the site during the wettest time of the year.

   The northwest property boundary lies at the base of a gentle slope. Upslope developments in this area discharge surface water just above the proposed access road. We encountered groundwater 4 feet below the ground surface in this area during the driest time of the year.

   We recommend that a subsurface drain line be installed along the northwest property boundary to intercept the shallow subsurface water. If the subsurface drain discharges into Bull Creek, the design should ensure that the drain fields are not back-saturated during high creek flow.

c. **Liquefaction and Ground Surface Settlement**. The soil encountered between approximately 4 and 8 feet below the ground surface has a high potential for liquefaction in the event of saturated conditions and intense seismic shaking. We have estimated that up to ½ to 1 inch of settlement could act across the building sites, and up to 2/3 of this settlement could be differential. Differential settlement can result in damage to structures, pavements and utilities.

   In order to minimize the potential for liquefaction of the subsurface soil to impact the structures, we recommend that structures be founded on a structural mat foundation system that is designed to span voids and settle uniformly. We recommend that flexible utility connections be constructed to reduce the potential for damage to utilities in the event of differential settlement. Minor damage to pavements should be anticipated in the event of strong seismic shaking.

POST REPORT SERVICES

3. Plan Review

Bauldry Engineering should review the grading, drainage, foundation and retaining wall plans during their preparation and prior to contract bidding to insure that the recommendations of this report have been included, and to provide additional recommendations, if needed.

4. Construction Observation and Testing

A representative of Bauldry Engineering must provide field observation and testing during construction to allow us to form an opinion regarding the adequacy of the site preparation,

ATTACHMENT 7

the acceptability of fill materials, and the extent to which the foundation, retaining wall, drainage, and earthwork construction, including the degree of compaction, comply with the specification requirements.

Any work related to foundation, drainage, retaining wall, earthwork construction, or grading performed without the full knowledge of, and not under the direct observation of Bauldry Engineering, the Geotechnical Engineer, will nullify the recommendations contained in this report.

5. Notification and Preconstruction Meeting
Bauldry Engineering should be notified at least four (4) working days prior to any site clearing and grading operations on the property in order to observe the stripping and disposal of unsuitable materials, and to coordinate this work with the grading contractor. During this period, a pre-construction meeting should be held on the site, with at least the owner's representative, the architect, the grading contractor, a county representative and one of our engineers present. At this time, the project specifications and the testing and construction observation requirements will be outlined and discussed.

EARTHWORK AND GRADING RECOMMENDATIONS

6. Initial Site Preparation
The initial site preparations will consist of the removal of trees as required, including rootballs and debris. Abandoned septic tanks and leaching lines found in the construction area must be completely removed. Tank demolition debris and deleterious soil, as designated by the Geotechnical Engineer in the field, must be removed from the site. Any voids created during the demolition procedures must be backfilled with properly compacted approved native soil or import fill.

NOTE: Any abandoned wells encountered shall be capped in accordance with the requirements of the County Health Department. The strength of the cap shall be equal to the adjacent soil and shall not be located within 5 feet of a structural footing.

7. Stripping
Following the site demolition surface vegetation and organically contaminated topsoil should be stripped from the area to be graded. This organic rich soil may be stockpiled for future landscaping. The required depth of stripping will vary with the time of year and must be based upon visual observations of the Geotechnical Engineer. It is anticipated that the depth of stripping may be 2 to 4 inches.

8. Removal of Existing Fill Soil
Following the stripping, the upper 4 feet of artificial fill should be removed from the area to be graded, or as recommended by the Geotechnical Engineer in the field. This fill material may be stockpiled for reuse as engineered fill if approved by a representative of Bauldry Engineering. If the fill is acceptable to be reused as engineered fill, all debris and deleterious material must be removed. It is likely that much of the material removed from site, and specifically from the channel area, will be wet to saturated. Moisture conditioning operations should be anticipated.

9. Subgrade Preparation

The soil exposed in the building areas should be removed to a minimum depth of 48 inches below existing grade. The earth materials exposed at the base of the excavation should be scarified, moisture conditioned and compacted. The excavated soil may then be placed in thin lifts. There should be a minimum of 30 inches of engineered fill under all foundation elements. Fill sections should be of relatively uniform thickness below the building footprint. Recompacted sections should extend 5 feet beyond all building areas.

The excavation and recompaction in the roadway and parking areas should extend to a minimum depth of 18 inches below the original ground surface, and up to 48 inches if underlain by fill. The roadway and parking area recompaction should result in a minimum of 12 inches of recompacted material below Class 2 Aggregate Base sections. Recompacted sections should extend 5 feet beyond all pavement areas.

10. Compaction Requirements

The minimum compaction requirements are outlined in the table below:

Minimum Compaction Requirements

Percent of Maximum Dry Density	Location
95%	1) All aggregate base and subbase in pavement areas 2) The upper 8 inches of subgrade in pavement areas 3) All utility trench backfill in pavement areas
90%	All remaining native soil and fill material
The maximum dry density will be obtained from a laboratory compaction curve run in accordance with ASTM Procedure #D1557. This test will also establish the optimum moisture content of the material. Field density testing will be in accordance with ASTM Test #D2922.	

11. Moisture Conditioning

The moisture conditioning procedure should result in soil with a moisture content of 1 to 3 percent over optimum at the time of compaction. If the soil is dry water may need to be added. Due to proximity to the creek, the native soil and artificial fill existing on the site may require a diligent and active drying and/or mixing operation to uniformly reduce the moisture content to the levels required to obtain adequate compaction. Additionally, the base of excavations may require stabilization treatments prior to placement of fill sections. Significant moisture conditioning should be anticipated.

12. Engineered Fill Material

The site soil and/or imported fill may be used as engineered fill for the project as indicated below. Samples of any proposed imported fill planned for use on this project should be submitted to the Geotechnical Engineer for appropriate testing and approval not less than 4 working days before the anticipated jobsite delivery.

Re-use of the soil existing on the site will require the following:

a. Thorough mixing and moisture conditioning of approved native and artificial fill soil.
b. Segregation of expansive soil during excavation and removal of the expansive soil from the construction area under the continuous observation of the Geotechnical Engineer.
c. Removal of organics, deleterious material, and cobbles larger than 2 inches in size.

All imported engineered fill material should meet the criteria outlined below.

a. Granular, well graded, with sufficient binder to allow utility trenches to stand open
b. Minimum Sand Equivalent of 20 and Resistance "R" Value of 30
c. Free of deleterious material, organics and rocks larger than 2 inches in size
d. Non-expansive with a Plasticity Index below 12

13. Cut and Fill Slope Height and Gradient

Cut and fill slopes shall not exceed a 2:1 (horizontal to vertical) gradient and a 5 foot vertical height unless specifically reviewed by the Geotechnical Engineer. All fill slopes should be constructed with engineered fill meeting the minimum density requirements of this report.

14. Fill Slope Keyways

Fill slopes should be keyed into the native slopes with a 10 foot wide base keyway that is sloped negatively at least 2% into the bank. The depth of the keyways will vary, depending on the materials encountered. It is anticipated that the depth of the keyways may be 3 to 6 feet, but at all locations shall be at least 2 feet into firm material. Subsequent keys may be required as the fill section progress upslope. The Geotechnical Engineer will designate keys in the field. See Appendix A, Keyway Detail for general construction details.

15. Subsurface Drainage

Our recommended cut and fill slope gradients assume that the soil moisture is a result of precipitation penetrating the slope face, and not a result of subsurface seeps or springs, which can destabilize slopes with hydrostatic pressure. All groundwater seeps encountered during construction should be adequately drained to maintain stable slopes at the recommended gradients. Drainage facilities may include subdrains, gravel blankets, rock-filled surface trenches or horizontal drains. The Geotechnical Engineer will determine the drainage facilities required during the grading operations.

FOUNDATIONS – STRUCTURAL MAT

16. Plan Review

We request an opportunity to review the grading plans and structural details during the design and prior to completion to determine if supplemental recommendations will be required.

17. General Description of Foundation

It is our opinion that a structural mat foundation, designed to resist differential settlement and span liquefaction induced voids, is an appropriate foundation system to support the proposed structure. The structural mat should be designed using the following criteria:

ATTACHMENT 7

a. The structural mat should be constructed over a minimum of 30 inches of adequately compacted engineered fill placed in accordance with the EARTHWORK AND GRADING RECOMMENDATONS Section of this report.

b. The structural mat foundation should be designed to span a 5 foot void appearing anywhere under the structure, as designed by the Project Structural Engineer in accordance with applicable UBC or ACI Standards.

c. The perimeter of the structural mat should embed a minimum depth of 18 inches below grade.

d. The allowable bearing capacity of the structural mat foundation is 1,800 psf for dead plus live load with a 1/3rd increase for seismic or wind load. In computing the pressures transmitted to the soil by the footings, the embedded weight of the footing may be neglected.

e. The coefficient of vertical subgrade reaction (K_{VI}) for a structural mat constructed to the criteria outlined above is 75 tons per ft^3.

f. A representative of Bauldry Engineering must observe footing excavations and the structural mat subgrade before the steel is placed and concrete is poured to insure bedding into proper material.

g. The Project Structural Engineer should provide recommendations for slab thickness, reinforcement, doweling and crack control devices.

18. Moisture Control – Capillary Break

The structural mat should be underlain by the following section: a 4-inch minimum thickness of ¾ inch clean crushed rock (capillary break), overlain by a water proof membrane, overlain by a 2-inch layer of moist sand. We do not recommend the use of sand or Class 2 baserock for capillary break material. The upper sand layer will assist in equalizing the concrete curing rate and will help protect the waterproof membrane.

19. Subgrade Saturation

It is important that the subgrade soils be thoroughly moisture conditioned prior to concrete placement. Requirements for pre-wetting the subgrade soil will depend on soil type and seasonal moisture conditions, and will be determined by the Geotechnical Engineer at the time of construction.

REPLACEMENT OF BULL CREEK CULVERT

20. General Description

The Bull Creek crossing will be upgraded with a new 60 inch reinforced concrete culvert. We understand that the culvert will be designed with headwalls and wingwalls. The headwalls and wingwalls will act to retain the embankment and reduce slope erosion, and will provide structural stability to the culvert and serve as a counterweight to offset buoyant forces.

ATTACHMENT 7

21. Construction Issues
The following construction issues should be anticipated during the construction of the Bull Creek crossing:

a. Construction of the concrete headwalls and wing walls will likely require excavation below the flow line of Bull Creek. Dewatering and/or rerouting of the creek may be required during construction.

b. The foundation for the concrete headwalls and wingwalls should be embedded into firm material below the flowline of the creek. As indicated by the soils encountered in boring 4, advanced adjacent to the creek, firm material may be encountered several feet below the creek flowline.

c. The foundation must be embedded below the scour depth a determined during construction by the Geotechnical Engineer.

SITE RETAINING WALLS AND LATERAL PRESSURES
22. Retaining Walls General
We understand that low retaining walls may be incorporated into the project. It is our understanding that no retaining walls are proposed to be incorporated into the buildings. The following recommendations should be incorporated into the design and construction of site retaining walls:

23. Retaining Wall Foundations
Spread Footings: Retaining walls may be founded on a spread footing foundation system. The base of all footings should extend a minimum of 18 inches below design finish grade. The footings should be bedded into firm native soil or engineered fill.

Retaining wall footings in accord with the preceding conditions may be designed for the following allowable bearing capacities. Should the footing dimensions vary significantly from those provided below, supplemental design criteria should be provided.

Retaining Wall Footings

Footing Width	Embedment Depth	Bearing Capacity
3 feet	18 inches	1,800 psf
4 feet	18 inches	2,100 psf
5 feet	18 inches	2,400 psf
6 feet	18 inches	2,700 psf

Design for a "coefficient of friction" of 0.30 between the base of the foundation and the soil.

The piers should contain steel reinforcement as determined by the Project Structural Engineer.

24. Lateral Pressures
Retaining walls should be fully drained and designed using the following criteria:

a. When walls are free to yield an amount sufficient to develop the active earth pressure condition (about ½% of height), design for active earth pressures as listed below. When walls are restrained at the top design for at-rest pressures.

Slope of Backfill	Active Earth Pressure	At-Rest Earth Pressure
Horizontal	40 psf/ft of depth	55 psf/ft of depth
2:1 (H:V)	55 psf/ft of depth	80 psf/ft of depth

Should the slope behind the retaining walls be other than those outlined above, the active earth or at-rest pressures for the particular slope angle may be obtained by interpolation.

b. Design for passive earth pressures of 275 psf/ft of depth. Ignore passive pressure in the top 12 inches of soil adjacent to the face of the footing.

c. For live or dead loads that transmit a force to the wall refer to the Surcharge Pressure Diagram included in Appendix A.

d. Retaining walls should be designed, as applicable, for the lateral seismic forces listed in the following table. The resultant seismic force on the wall acts at a point 0.6H up from the base of the wall. H is the height of the retained soil in feet. Lateral seismic forces are based on the Mononobe-Okabe method of analysis.

Restraint Condition	Resultant Seismic Force (lbs.)
Free to Yield (active pressure condition)	$7\ H^2$
Non-Yielding (at-rest pressure condition)	$20\ H^2$

25. Retaining Wall Drains
The lateral pressures given above are based on fully drained conditions. We recommend the retaining wall drain be constructed incorporating the criteria numerated below, as shown on the Retaining Wall Drain Detail included in Appendix A.

a. The permeable material should meet the State of California Standard Specification Section 68-1.025, Class 1, Type A.

b. The permeable material should be a minimum of 12 inches in width and should extend to within 12 inches of the ground surface.

c. Mirafi 140 filter fabric, or equivalent, should be placed horizontally over the top of the permeable material and then compacted native soil placed to the ground surface.

ATTACHMENT 7

d. A 4-inch diameter rigid perforated plastic or metal drainpipe should be placed 3 inches above the base of the permeable material.

e. The drain line and should be discharged to an approved location away from the footing area.

26. Surface Drainage Above Retaining Walls
Water should not be allowed to flow over the top of retaining walls. A lined "V"-ditch should be constructed where necessary adjacent to and along the top of walls to collect surface runoff from the slope. The "V"-ditch should transport the collected water to a sold pipe that discharges into a natural drainage swale away from the wall and other structures.

27. Compaction of Backfill
The area behind the wall and permeable material should be compacted with approved soil to a minimum relative dry density of 90%.

UTILITY TRENCHES
28. Utility Trench Set Backs
Utility trenches that are parallel to the sides of the building should be placed so that they do not extend below a line with a 2:1 (horizontal to vertical) gradient extending from the bottom outside edge of all footings.

29. Utility Trench Backfill
Trenches may be backfilled with the native materials or approved import granular material with the soil compacted in thin lifts to a minimum of 95% of its maximum dry density in paved areas and 90% in other areas. Jetting of the trench backfill should be carefully considered as it may result in an unsatisfactory degree of compaction.

30. Shoring
Trenches must be shored as required by the local agency and the State of California Division of Industrial Safety construction safety orders.

UTILITY CONNECTIONS
31. Utility lines connected to structures should be designed to mitigate potential damage resulting from the liquefaction induced settlement. Utility lines should be provided with flexible connections able to accommodate differential settlement of 2 inches.

SURFACE DRAINAGE
32. Surface Grades and Storm Water Runoff
Water must not be allowed to pond on building pads, parking areas or adjacent to foundations. Final grades should slope away from foundations such that water is rapidly transported to drainage facilities.

Concentrated surface water should be controlled using lined ditches, catch basins, and closed conduit piping, or other appropriate facilities, and should be discharged at an

ATTACHMENT 7

approved location away from structures and graded areas. We recommend that concentrated storm water runoff systems be provided with energy dissipators that minimize erosion. Concentrated storm water must not be discharged on fill. Storm water may be discharged into Bull Creek or onto the lower elevations of the undeveloped portion of the site.

33. Roof Discharge
All roof eaves should be guttered, with the outlets from the downspouts provided with adequate capacity to carry the storm water away from the structures and graded areas. Concentrated roof runoff should be transported in a closed conduit that discharges at an approved location. Concentrated roof runoff may be discharged into Bull Creek or onto the lower elevations of the undeveloped portion of the site. Discharge locations should be a minimum of 20 feet from the structures or fill slopes. Roof runoff should be discharged using energy dissipators, or other facilities, that minimize erosion. Ruff runoff must not be discharged on or adjacent to the fill.

34. Protection of Cut and Fill Slopes
Cut and fill slopes shall be constructed so that surface water will not be allowed to drain over the top of the slope face. This may require berms or curbs along the top of fill slopes and surface drainage ditches above cut slopes.

35. Maintenance and Irrigation
The building and surface drainage facilities must not be altered, and there should be no modifications of the finished grades at the project site without first consulting Bauldry Engineering, the Project Geotechnical Engineer.

Irrigation activities at the site should not be done in an uncontrolled or unreasonable manner. We recommend that landscaping be done with native and drought tolerant plants.

36. Percolation Pits
Due to the relatively high groundwater table, we do not recommend that use of percolation pits as a discharge method on this site.

SUBSURFACE DRAINAGE

37. Subsurface Drainage Recommendations
Groundwater was encountered at depths ranging between 4 to 10 feet below the ground surface during the driest time of the year. The groundwater on the site appears to be fed both by Bull Creek and by surficial runoff from adjacent slopes. It is likely that groundwater table rises to within a few feet of the ground surface over portions of the site during the wettest time of the year.

The northwest property boundary lies at the base of a gentle slope. Upslope developments in this area discharge surface water just above the proposed access road. We encountered groundwater 4 feet below the ground surface in this area during the driest time of the year.

We recommend that a subsurface drain line be installed along the northwest property boundary to intercept the shallow subsurface water. If the subsurface drain discharges into bull creek, the design to ensure that the drain fields are not back-saturated during high creek flow.

Subsurface drainage may also be required to reduce the potential for groundwater during removal of the existing artificial fill material in the area surrounding bull creek.

The subdrain should be constructed in accordance with the recommendations numerated below, as shown on the attached subdrain detail.

a. The drain line should be a minimum of 4 feet deep, or 12 inches into a less permeable material such as the clay strata or bedrock surface, whichever is deeper. The drain line should be installed with a gradient to insure gravity flow.

b. Place a 6-inch diameter perforated metal or rigid plastic pipe approximately 3 inches above the bottom of an 18-inch wide subdrain trench. The perforated pipe should be placed with perforations down and should be placed upon a minimum thickness of bedding of 3 inches.

c. Should fill be placed over the existing grade, the trenches shall be backfilled with permeable material to the surface. In areas of natural contour, the permeable material shall be backfilled within 12 inches of the surface. A geotextile filter fabric equivalent to Mirafi 140 should then be placed over the subdrain materials prior to the placement of fill soils.

d. The permeable backfill materials for the subdrains should meet the California Standard Specifications, Section 68-1.025, Class 1, Type A. The permeable backfill will not require compaction testing; however, the backfilling operations should be done in a good workmanlike manner.

e. Trenches must be shored as required by the local agency and the State of California Division of Industrial Safety construction safety orders.

f. Subdrain construction should originate and progress from the point of discharge to allow accumulations of water flow from the trench and to insure a gradient that will allow gravity flow

g. If the subdrain discharges into Bull Creek care should be taken in the outlet design to ensure that the outlet pipe is not clogged with silt and/or that the drain field is not back-saturated during high creek flow.

h. The Geotechnical Engineer must observe the subdrain materials and subdrain configuration prior to backfilling the subdrain trench. Drains constructed without the observation of Bauldry Engineering will nullify the recommendations contained in this report.

PAVEMENT DESIGN

38. Laboratory Testing Pavement Subgrade Soil

The soils that will comprise the pavement subgrade will in all likelihood be the light brown silty fine sand to sandy silt predominating on the site. The "R" Value result for the surface soil collected from the site is 16. We have use an "R" Value of 16 for design of the pavement sections noted below. This must be verified in the field and, if necessary, modifications made to these tentative sections.

39. Recommended Asphalt Pavement Sections

For design purposes, the following traffic indices are suggested:

a. Parking stalls T.I. = 4½
b. Traffic aisles T.I. = 5
c. Truck usage areas T.I. = 6½*

*This value may be modified by the project Civil Engineer after obtaining detailed information on the truck traffic that will use this facility.

Using CALTRANS Design Procedure and a 20 year design life, the following pavement sections are suggested:

Recommended Pavement Sections

Material	Traffic Index		
	4 ½	5	6 ½
Asphalt Concrete	3 in	3 in	3 in
Class 2 Aggregate Base, R=78 min	8 in	8 in	14 in

40. Access Road Pavement

The access road between the library and warehouse parking lots is proposed to be paved with a load bearing cellular mat product, such as Grasspave or equivalent, that can be vegetated with grass. We recommend that this product be placed over Class 2 Aggregate Base compacted to a minimum of 95% of its maximum dry density. The following aggregate base sections were calculated using an R-Value of 16.

Recommended Thickness of Aggregate Base below Grasspave or Equiv.

	Traffic Index		
	4 ½	5	6 ½
Class 2 Aggregate Base, R=78 min	14 in	16 in	20 in

ATTACHMENT 7

41. General Pavement Recommendations

To have the selected pavement sections perform to their greatest efficiency, it is very important that the following items be adhered to:

a. Properly moisture condition the subgrade and compact it to a minimum of 95% of its maximum dry density, at a moisture content 1-3% over the optimum moisture content.

b. Provide sufficient gradient to prevent ponding of water.

c. Use only quality materials of the type and thickness (minimum) specified. All baserock must meet CALTRANS Standard Specifications for Class 2 Aggregate Base, and be angular in shape.

d. Compact the base and subbase uniformly to a minimum of 95% of its maximum dry density.

e. Place the asphaltic concrete only during periods of fair weather when the free air temperature is within prescribed limits.

f. Maintenance should be undertaken on a routine basis.

ATTACHMENT 7

FIELD AND LABORATORY METHODS

Seven 6-inch diameter test borings were drilled on October 24, 2003. The drilling method used was hydraulically operated continuous flight augers. An engineer from Bauldry Engineering was present during all field operations to log the soil encountered, to choose soil sampling types and locations, and to supervise the field operations.

Relatively undisturbed soil samples were obtained from test borings by driving a split spoon sampler 18 inches into the ground. We selected samplers with 3 inch and 2 inch outside diameters and have designated these respectively as "L" and "T" on the boring logs. The samplers were driven using a 140 pound down hole safety hammer released with a 30 inch vertical free fall. The number of hammer blows was recorded in the field for each 6 inch drive. The total blow count for the bottom 12 inches is reported as the standard penetration test value (SPT "N") on the boring logs. All standard penetration test data has been normalized to a 2 inch outside diameter sampler to approximate the SPT "N" value.

The laboratory testing program was developed to help in evaluating the bearing capacity, settlement characteristics, swell potential, liquefaction potential and pavement design parameters. Laboratory tests performed include:

1. Moisture Density relationships in accordance with ASTM test D2937.
2. Unconfined Compression tests in accordance with ASTM test D2166.
3. Gradation tests in accordance with ASTM test D422.
4. Atterberg Limits tests in accordance with ASTM test D4318, Method B.
5. "R" Value tests in accordance with California test 301.

The results of the laboratory tests are presented on the boring logs opposite the sample tested.

Appendix A contains the Site Plan showing the locations of the test borings, and the test boring logs presenting the soil profiles, sample locations, SPT "N" values and laboratory test data for each sample. Contacts between earth materials on the logs are approximate, as the actual transition may be gradational.

ATTACHMENT 7

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The recommendations of this report are based upon the assumption that the soil conditions do not deviate from those disclosed in the borings. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that planned at the time our report was written, our firm should be notified so that supplemental recommendations can be given.

2. This report is issued with the understanding that it is the responsibility of the owner, or his representative, to insure that the information and recommendations contained herein are called to the attention of the Architects and Engineers for the project and incorporated into the plans, and that the necessary steps are taken to insure that the Contractors and Subcontractors carry out such recommendations in the field.

3. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural process or the works of man, on this or adjacent properties. In addition, changes in applicable or appropriate standards occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be nullified, wholly or partially, by changes outside of our control. This report should therefore be reviewed in light of future planned construction and then current applicable codes.

4. This report was prepared upon your request for our services in accordance with currently accepted standards of professional Geotechnical Engineering practice. No warranty as to the contents of this report is intended, and none shall be inferred from the statements or opinions expressed.

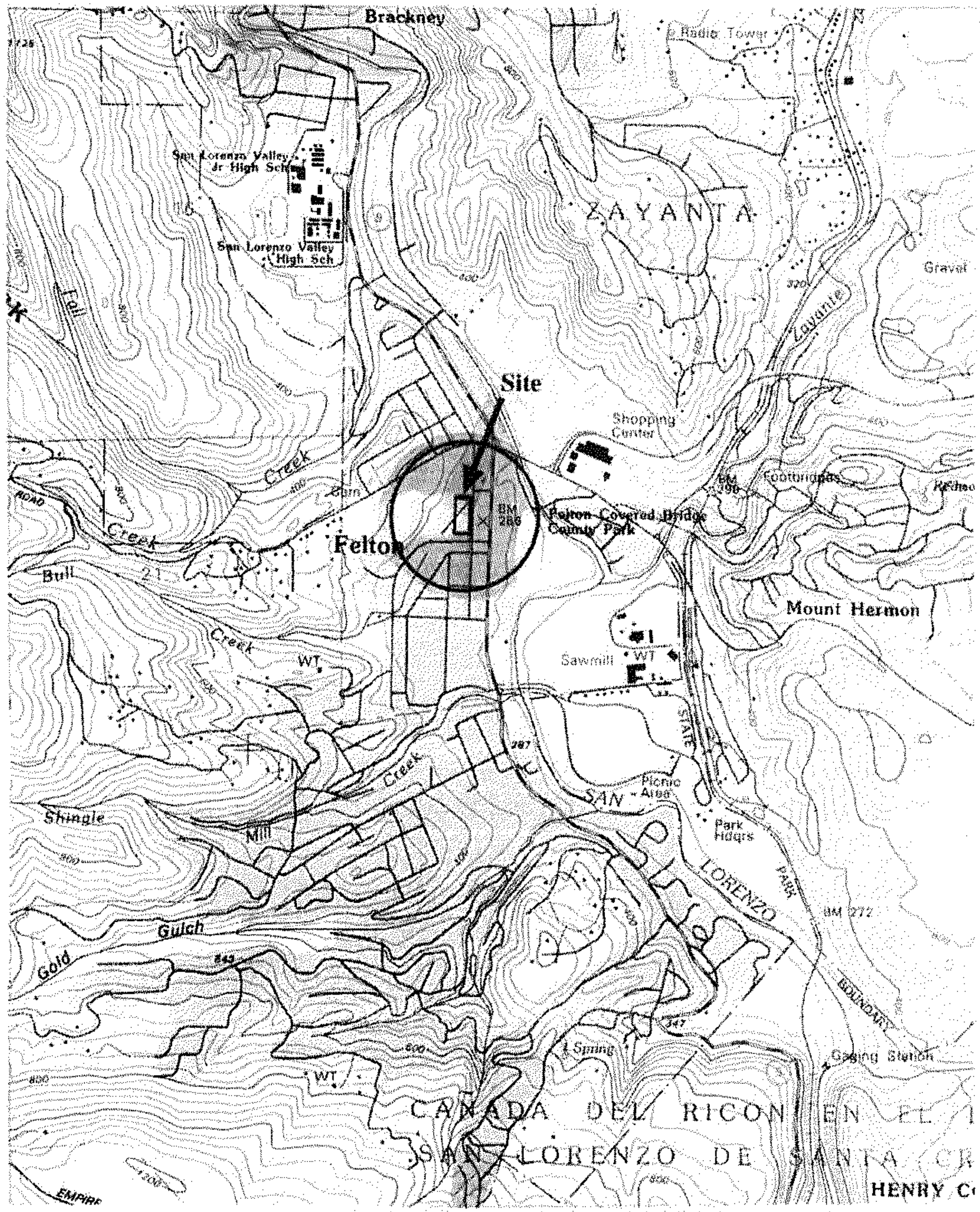
5. The scope of our services mutually agreed upon for this project did not include any environmental assessment or study for the presence of hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site.

ATTACHMENT 7

APPENDIX A

Regional Site Plan
Site Plan Showing Test Borings
Boring Log Explanation
Log of Test Borings
Atterberg Limits
R-Value
Keyway Detail
Retaining Wall Drain Detail
Surcharge Pressure Diagram
Subdrain Detail
Liquefaction Analysis

PROJECT NO. 0259-SZ951-H31	REPORT DATE: December 12, 2003



Scale 1" = 2000'

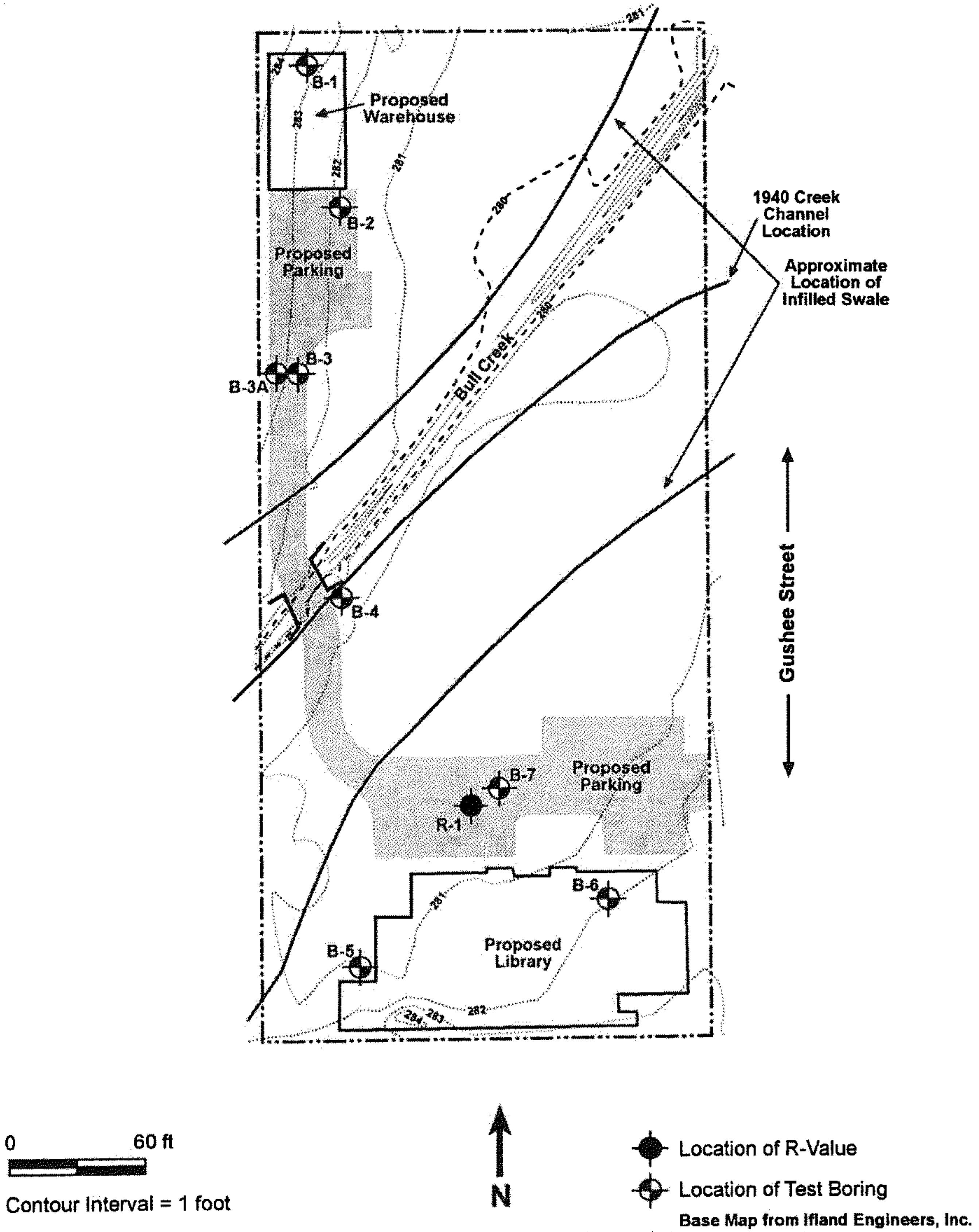
N

Base Map from U.S. Department of the Interior Geological Survey

Bauldry Engineering	Figure No. 1 Regional Site Plan

ATTACHMENT 7

PROJECT NO. 0259-SZ951-H31	REPORT DATE: December 12, 2003



Bauldry Engineering	Figure No. 2 Site Plan Showing Test Borings

ATTACHMENT 7

PROJECT NO. 0259-SZ951-H31 REPORT DATE: December 12, 2003

BORING LOG EXPLANATION

Logged By ____ Date Drilled ________ Boring Diameter ____ Boring No. ___

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density, p.c.f.	Moisture % of Dry Wt.	MISC. LAB RESULTS
			Ground water elevation	Note: All blows/foot are normalized to 2" outside diameter sampler size					
	1-1 L		Soil Sample Number Soil Sampler Size/Type L = 3" Outside Diameter M = 2.5" Outside Diameter T = 2" Outside Diameter ST = Shelby Tube BAG = Bag Sample						

UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D2488-84

PRIMARY DIVISIONS			GROUP SYMBOLS	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN #200 SIEVE SIZE	**GRAVELS** MORE THAN HALF OF COARSE FRACTION IS LARGER THAN #4 SIEVE	**CLEAN GRAVELS** (LESS THAN 5% FINES)	GW	Well graded gravels, gravel sand mixture, little or no fines.
			GP	Poorly graded gravels or gravels-sand mixtures, little or no fines.
		GRAVELS (MORE THAN 12% FINES)	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN #4 SIEVE	**CLEAN SANDS** (LESS THAN 5% FINES)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS (MORE THAN 12% FINES)	SM	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE	**SILTS AND CLAYS** LIQUID LIMIT IS LESS THAN 50%		ML	Inorganic silts and very fine clayey sand or silty sand, with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly, sandy, silty or lean clays
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Organic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils

RELATIVE DENSITY

SANDS AND GRAVELS	BLOWS/FOOT
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

CONSISTENCY

SILTS AND CLAYS	BLOWS/FOOT
VERY SOFT	0 - 2
SOFT	2 - 4
FIRM	4 - 8
STIFF	8 - 16
VERY STIFF	16 - 32
HARD	OVER 32

Bauldry Engineering FIGURE NO. 3 Boring Log Explanation

ATTACHMENT 7

JOB NO. 0259-SZ951-H31	REPORT DATE: December 12, 2003

Logged By DF   Date Drilled 10/24/03   Boring Diameter 6"SS   Boring No. 1

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density, p.c.f.	Moisture % of Dry Wt.	MISC. LAB RESULTS
1	1-1 L		Brown Sandy SILT to Silty SAND, very fine sand, sparse gravel, damp, medium dense	ML-SM	11		104.4	7.4	46% passing #200 sieve
3	1-2 T				21			11.2	52% passing #200 sieve
4–5			Yellowish brown Sandy Silty CLAY, granitic sand, moist, stiff	CL					
5–6	1-3 L		Light gray Silty SAND, very fine sand, iron oxide staining, very moist, loose	SM	9			18.8	
8			▼ (groundwater)						
9–14	1-4 L		Interbedded Sandy Silty Gravel and cemented fine grained Silty SAND, gravel is composed of angular granitics and rounded sandstone and mudstone to 1", sand is wet, gravels are saturated, dense	SM-GM	38			20.7 22.9	
15	1-5 L		Gray Silty SANDSTONE, very fine grained, micaceous, friable, wet		50/6"			23.7	
20	1-6 T		Gray Silty SANDSTONE, very fine grained, micaceous, friable, wet		50/ 4.5"			23.1	

Bauldry Engineering   FIGURE NO. 4   Log of Test Borings

ATTACHMENT 7

JOB NO. 0259-SZ951-H31 REPORT DATE: December 12, 2003

Logged By DF Date Drilled 10/24/03 Boring Diameter 6"SS Boring No. 1

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density, p.c.f.	Moisture % of Dry Wt.	MISC. LAB RESULTS
24									
25	1-7 T		Gray Silty SANDSTONE, very fine grained, slightly micaceous, friable, wet		50/4"			21.9	
26			Boring Terminated at 25 1/2'						
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									

Bauldry Engineering FIGURE NO. 5 Log of Test Borings

ATTACHMENT 7

JOB NO. 0259-SZ951-H31 REPORT DATE: December 12, 2003

Logged By DF Date Drilled 10/24/03 Boring Diameter 6"SS Boring No. 2

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density, p.c.f.	Moisture % of Dry Wt.	MISC. LAB RESULTS
1	2-1 L		Brown Sandy SILT to Silty SAND, very fine sand, mottling, slightly cemented, dry to slightly damp	ML-SM	18		107.8	7.1	
3	2-2 T		Grayish brown Sandy SILT to Silty SAND, mottling, dry to slightly damp, slightly cemented, dense		48			7.4	40% passing #200 sieve
5	2-3 L		Gray Silty SAND, fine grained, iron oxide staining at 6 1/2', wet	SM	15		111.0	19.9	
10	2-4 L		Gray SAND with gravels and cobbles, silty sand lenses, arkosic sand, granitic, sandstone and mudstone cobbles, saturated, dense	SW-SM	50/ 5.5"		107.3	20.5	
15	2-5 T		Gray Silty SANDSTONE, fine grained, micaceous, friable, moist		50/5"			20.9	
20	2-6 T		Gray Silty SANDSTONE, very fine grained, micaceous, friable, moist		50/2"			20.0	
21			Boring Terminated at 20 1/2'						

Bauldry Engineering FIGURE NO. 6 Log of Test Borings

ATTACHMENT 7

JOB NO. 0259-SZ951-H31	REPORT DATE: December 12, 2003

Logged By DF   Date Drilled 10/24/03   Boring Diameter 6"SS   Boring No. 3

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density, p.c.f.	Moisture % of Dry Wt.	MISC. LAB RESULTS
0–2.5	3-1 L		FILL Dark brown Sandy SILT to Silty SAND, fine sand	ML-SM	4			21.0	30% passing #200 sieve
2.5–4.5	3-2 T		NATIVE - Gray and brown mottled Silty SAND, sparse gravel, mottling, wet with saturated areas, medium dense	SM	9			12.5	26% passing #200 sieve
4.5–8.5	3-3 L		Gray and brown Silty SAND with pockets of sandy silt, mottling, moist to wet, loose	SM	12		118.2	12.6	32% passing #200 sieve
8.5–11	3-4 L		Gray Silty SAND, very fine sand, micaceous, saturated, medium dense	SM	21		123.3	14.2	13% passing #200 sieve
11–18			Gray Gravelly Silty SAND, gravels to 2", saturated, medium dense	SM-GW					
	3-5 T		Gray Gravelly Silty SAND, coarse grained sand, subangular granitic sand and gravel to 1/4", rounded sandstone and mudstone gravel, saturated, dense		40			14.9	
18–20.5	3-6 T		Dark gray Silty SANDSTONE, fine grained, micaceous		50/4"			24.5	
			Boring Terminated at 20 1/2'						

Bauldry Engineering   FIGURE NO. 7   Log of Test Borings

ATTACHMENT 7

JOB NO. 0259-SZ951-H31 REPORT DATE: December 12, 2003

Logged By DF Date Drilled 10/24/03 Boring Diameter 6"SS Boring No. 3A

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density, p.c.f.	Moisture % of Dry Wt.	MISC. LAB RESULTS
			FILL	SM					
1	3A-1 L		Dark brown Silty SAND with granitic gravel and organics, wet, very loose						
2					5				
3	3A-2 T		3/4" Gravel						
4			Hole caving		13				
5			Boring Terminated at 4 1/2'						
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									

Bauldry Engineering FIGURE NO. 8 Log of Test Borings

ATTACHMENT 7

JOB NO. 0259-SZ951-H31	REPORT DATE: December 12, 2003

Logged By DF   Date Drilled 10/24/03   Boring Diameter 6"SS   Boring No. 4

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density, p.c.f.	Moisture % of Dry Wt.	MISC. LAB RESULTS
0–2.5	4-1 L		FILL Brown Silty SAND, asphalt debris, organics as wood chips, moist, loose	SM	10		91.0	23.6	
2.5–5.5	4-2 T		Dark brown Sandy SILT to Silty SAND, fine sand, faint structureless mottling, no clay films on fine gravel, wet, very loose	ML-SM	1			42.7	
5.5–7.5	4-3 L		NATIVE - Brownish gray Silty Gravelly CLAY, abundant organics as rootlets, remnant desicated clay clasts, iron oxide staining along saturated fractures, saturated, soft to firm	CL-CH	5			42.7	
7.5–11.5	4-4 L		Gray Sandy SILT to Silty SAND, slightly cohesive, very fine sand No sample retrieved	ML-SM	12				
11.5–18.5	4-5 T		Gray brown Silty SAND with gravel, well graded, subangular granitic sand, rounded mudstone and sandstone gravel to 1/2", saturated, medium dense Rocky drilling 13' to 18'	SM-GW	23			17.0	
18.5–23.5	4-6 T		Gray Silty SANDSTONE, fine grained, micaceous, friable, wet		50/5"			22.2	

Bauldry Engineering	FIGURE NO. 9	Log of Test Borings

ATTACHMENT 7

JOB NO. 0259-SZ951-H31	REPORT DATE: December 12, 2003

Logged By DF Date Drilled 10/24/03 Boring Diameter 6"SS Boring No. 4

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density, p.c.f.	Moisture % of Dry Wt.	MISC. LAB RESULTS
24									
25	4-7 T		No sample retrieved		50/6"				
26			Boring Terminated at 25 1/2'						
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									

Bauldry Engineering FIGURE NO. 10 Log of Test Borings

ATTACHMENT 7

JOB NO. 0259-SZ951-H31	REPORT DATE: December 12, 2003

Logged By DF   Date Drilled 10/24/03   Boring Diameter 6"SS   Boring No. 5

Depth, ft.	Sample No.	SOIL DESCRIPTION	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density, p.c.f.	Moisture % of Dry Wt.	MISC. LAB RESULTS
0–2	5-1 L	FILL Brown Silty SAND with gravel	SM	9		87.9	25.8	63% passing #200 sieve
2–4.5	5-2 T	NATIVE - Black Sandy Clayey SILT, very fine sand, moist, firm Gray Silty CLAY, desiccation structure and clay clasts, iron oxide stained silt in ubiquitous fractures, moist	MH-ML	8	15		35.1	42% passing #200 sieve
4.5–11.5	5-3 L	Light gray Silty SAND, very fine grained, micaceous, wet, medium dense	SM	13		100.2	23.4	
	5-4 L	Light gray Silty SAND, fine grained, wet, dense		35			18.4	
11.5–22.5		Gray Gravelly Silty SAND with cobbles	SM					
	5-5 T	Gray and orange Silty SAND with gravel, well graded granitic sand, rounded gravel of sandstone and mudstone, saturated, medium dense		26			18.2	11% passing #200 sieve
	5-6 T	Gray and orange Silty SAND with gravel, well graded granitic sand, rounded gravel of sandstone and mudstone, saturated, medium dense		24			14.0	11% passing #200 sieve
22.5–23.5		Gray Silty SANDSTONE, dense						

Bauldry Engineering   FIGURE NO. 11   Log of Test Borings

ATTACHMENT 7

JOB NO. 0259-SZ951-H31	REPORT DATE: December 12, 2003

Logged By DF Date Drilled 10/24/03 Boring Diameter 6"SS Boring No. 5

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density, p.c.f.	Moisture % of Dry Wt.	MISC. LAB RESULTS
24									
25									
26			Gravel lense 26' - 27'						
27									
28									
29			Gray Silty SAND on auger tip						
30	5-7 T		No sample retrieved		50/6"				
31			Boring Terminated at 30 1/2'						
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									

Bauldry Engineering FIGURE NO. 12 Log of Test Borings

ATTACHMENT 7

JOB NO. 0259-SZ951-H31 REPORT DATE:

Logged By DF Date Drilled 10/23/03 Boring Diameter 6"SS Boring No. 6

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density, p.c.f.	Moisture % of Dry Wt.	MISC. LAB RESULTS
0–2	6-1 L		FILL Brown Sandy SILT to Silty SAND, organics as wood chips, damp, loose	SM-ML	10		99.9	9.2	48% passing #200 sieve
2–4	6-2 T		NATIVE Mottled brown and gray Sandy SILT/Silty SAND, very fine sand, structureless mottling, moist, loose	SM-ML	7			11.9	48% passing #200 sieve
4–14 1/2	6-3 L		Light gray Sandy SILT grading to arkosic medium grained SAND with gravel at 6 1/2', very moist, medium dense	SM	14		98.4	9.2	
			Rocky drilling 7' - 8'						
	6-4 L		Gray and orange Silty Gravelly SAND, well graded sand, rounded gravel of granite, sandstone and schist to 1 1/2", very moist, dense		39		122.9	13.3	
			Rocky drilling 13' - 14 1/2'						
14 1/2–20 1/2	6-5 T		Dark gray Silty SANDSTONE, fine grained, micaceous, friable, very moist		50/4"			22.4	
			Smooth drilling						
	6-6 T		Dark gray Silty SANDSTONE, fine grained, micaceous, friable, very moist		50/6"			25.1	
			Boring Terminated at 20 1/2'						

Bauldry Engineering FIGURE NO. 13 Log of Test Borings

ATTACHMENT 7

JOB NO. 0259-SZ951-H31 REPORT DATE: December 12, 2003

Logged By DF Date Drilled 10/23/03 Boring Diameter 6"SS Boring No. 7

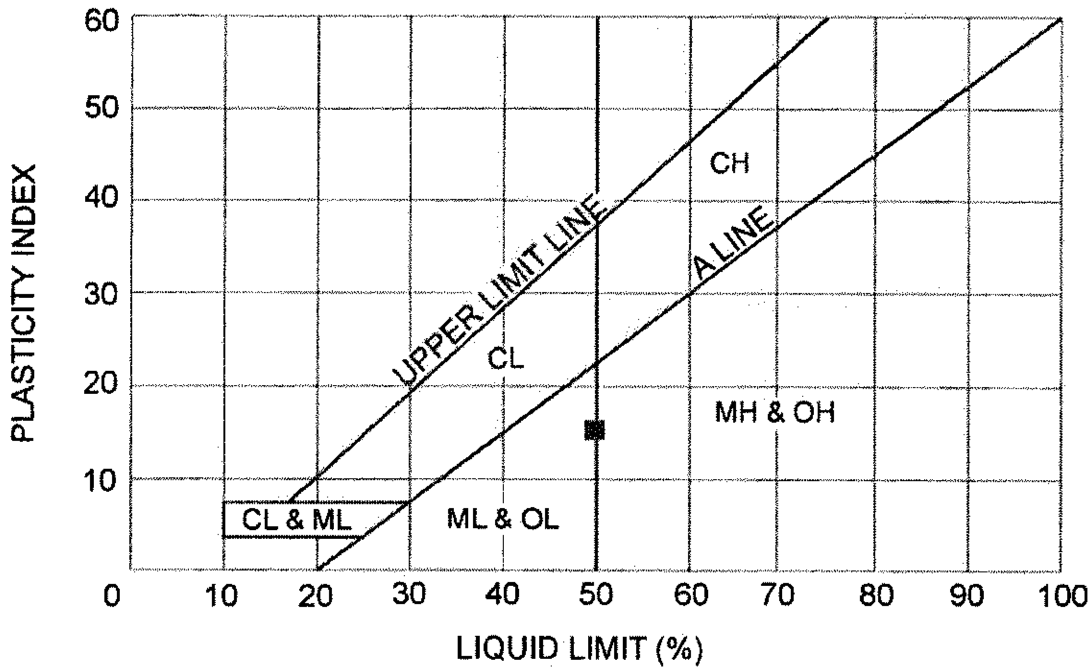
Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density, p.c.f.	Moisture % of Dry Wt.	MISC. LAB RESULTS
1	7-1 L		FILL Dark brown Sandy SILT to Silty SAND	SM-ML					
2			NATIVE Light gray Silty SAND, very fine sand, iron oxide nodules, moist	SM	8			13.1	
3	7-2 T		Very light gray fine grained Silty SAND, slightly indurated, very moist, medium dense		15			11.3	
4									
5	7-3 L		Very light gray Silty SAND with gravel, well graded sand, rounded gravel of sandstone and mudstone to 1 1/2", moist, medium dense	SM					
6					15			7.1	
7									
8									
9			▼						
10	7-4 T		Light gray well graded SAND with silt and gravel, saturated, medium dense						
11					21			14.6	
12			Boring Terminated at 11 1/2'						
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									

Bauldry Engineering FIGURE NO. 14 Log of Test Borings

ATTACHMENT 7

ATTERBERG LIMITS - ASTM D4318

PLASTICITY CHART



SYMBOL	SAMPLE #	LL (%)	PL (%)	PI
	5-2	50	35	15

ATTACHMENT 7

R-value Test Report (Caltrans 301)

Job No.:	389-029	Date:	11/08/03	Initial Moisture,	12.4%
Client:	Bauldry Engineering	Tested	MD	R-value	16
Project:	Felton Library - 0259	Reduced	MJ		
Sample	R-1 @ 0-5'	Checked	DC	Expansion Pressure	35 psf
Soil Type:	Dark Brown Sandy CLAY near CLAY with Sand				

Specimen Number	A	B	C	D
Exudation Pressure, psi	786	375	233	
Prepaired Weight, grams	1200	1200	1200	
Final Water Added, grams/cc	2.3	68	82	
Weight of Soil & Mold, grams	3048	3117	3140	
Weight of Mold, grams	2081	2101	2095	
Height After Compaction, in.	2.3	2.45	2.57	
Moisture Content, %	12.7	18.8	20.1	
Dry Density, pcf	113.0	105.7	102.5	
Expansion Pressure, psf	249.4	51.6	25.8	
Stabilometer @ 1000				
Stabilometer @ 2000	82	125	128	
Turns Displacement	3.01	3.18	3.83	
R-value	39	18	15	

Remarks:

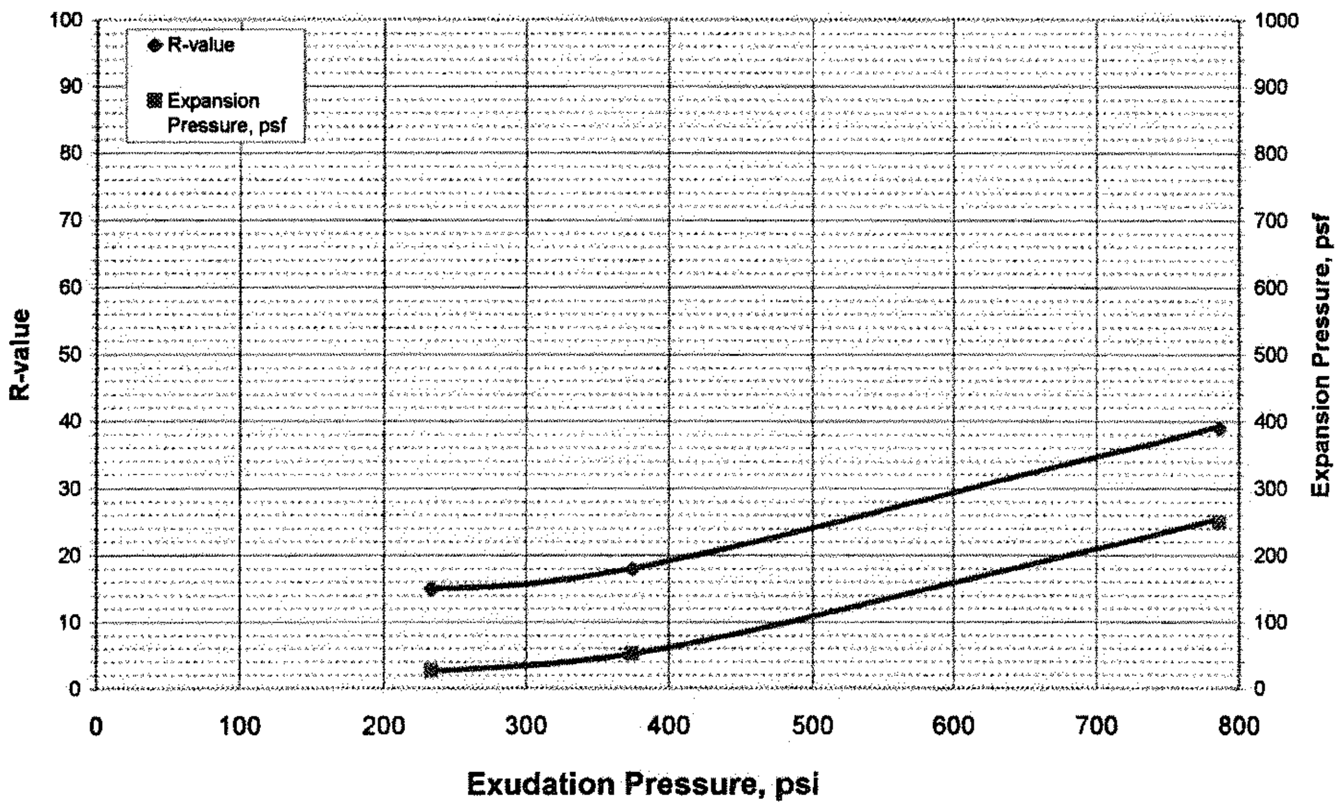
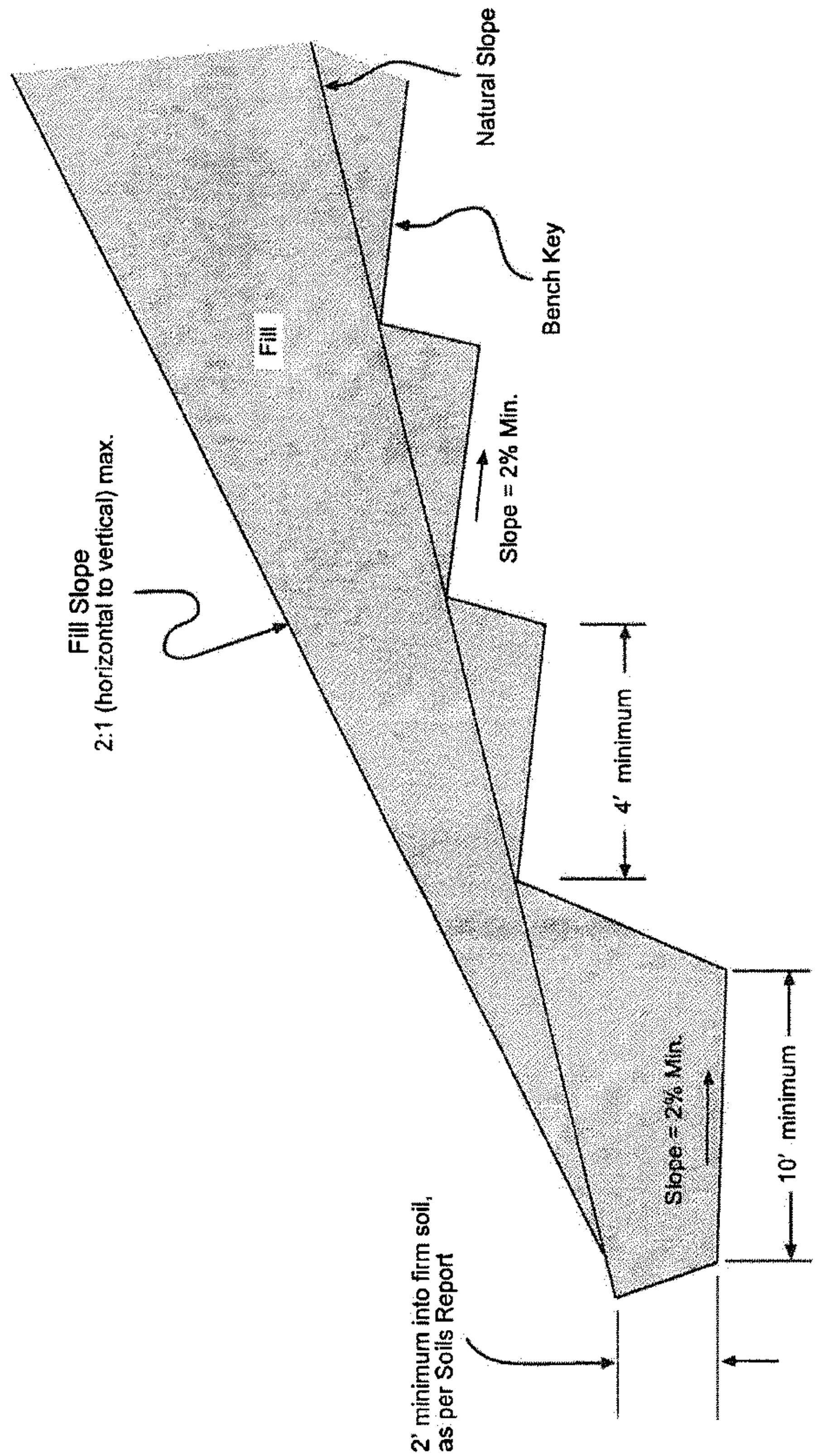


Figure No. 16

ATTACHMENT 7

PROJECT NO. 0259-SZ951-H31	REPORT DATE: December 12, 2003

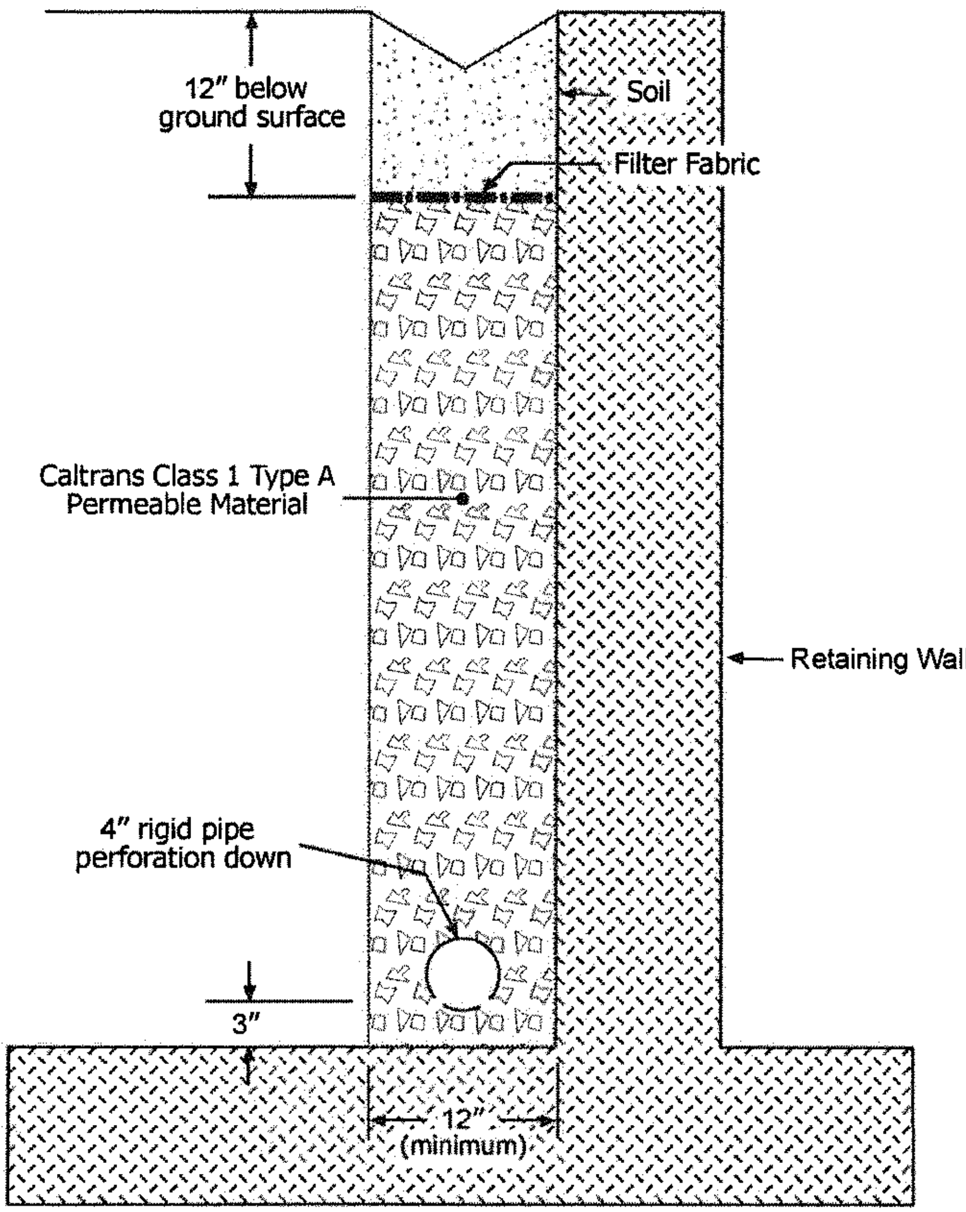


TYPICAL KEY AND BENCHES
not to scale

Bauldry Engineering	Figure No. 17 Keyway Detail

ATTACHMENT 7

PROJECT NO. 0259-SZ951-H31	REPORT DATE: December 12, 2003

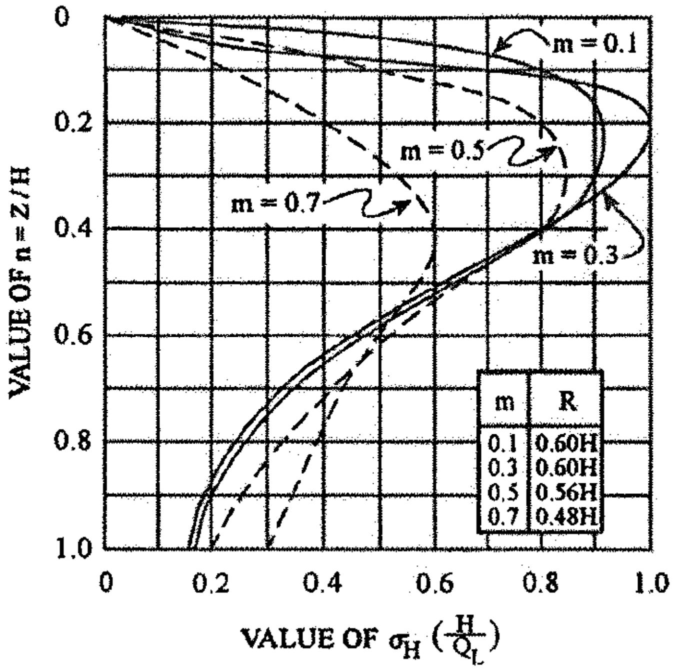


Bauldry Engineering	Figure No. 18 Retaining Wall Drain Detail

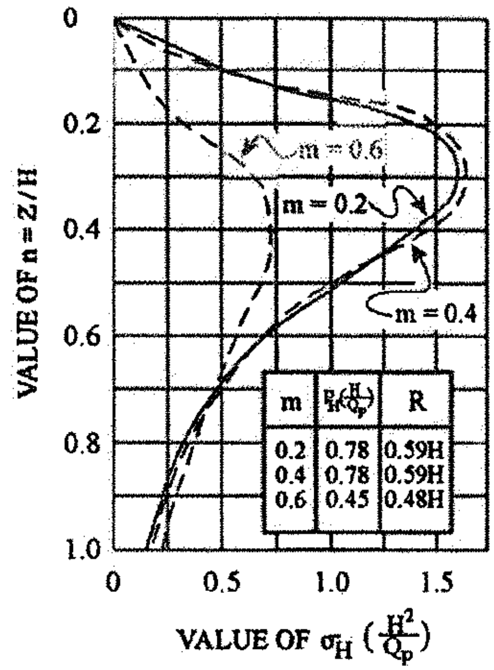
ATTACHMENT 7

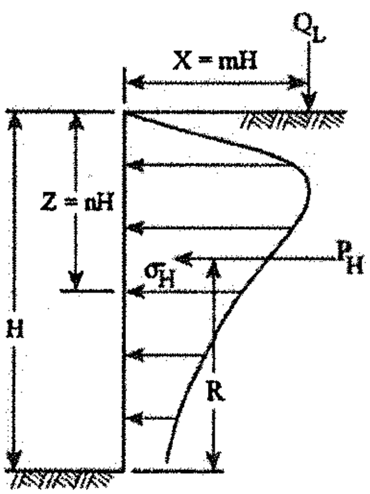
PROJECT NO. 0259-SZ951-H31	REPORT DATE: December 12, 2003

LINE LOAD



POINT LOAD





FOR m ≦ 0.4:

$$\sigma_H \left(\frac{H}{Q_L}\right) = \frac{0.20\,n}{(0.16 + n^2)^2}$$

$$P_H = 0.55\,Q_L$$

FOR m > 0.4:

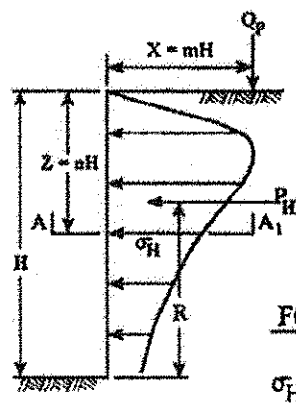
$$\sigma_H \left(\frac{H}{Q_L}\right) = \frac{1.28\,m^2 n}{(m^2 + n^2)^2}$$

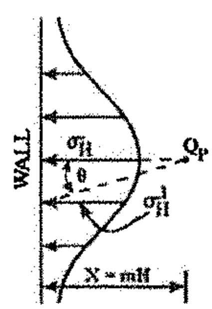
$$\text{RESULTANT } P_H = \frac{0.64\,Q_L}{(m^2 + 1)}$$

PRESSURES FROM LINE LOAD Q_L

(BOISSINESQ EQUATION MODIFIED BY EXPERMENT)

REFERENCE: Design Manual
NAVFAC DM-7.02
Figure 11
Page 7.2-74





SECTION A-A_1

FOR m ≦ 0.4:

$$\sigma_H \left(\frac{H^2}{Q_P}\right) = \frac{0.28\,n^2}{(0.16 + n^2)^3}$$

FOR m > 0.4:

$$\sigma_H \left(\frac{H^2}{Q_P}\right) = \frac{1.77\,m^2 n^2}{(m^2 + n^2)^3}$$

$$\sigma_H^1 = \sigma_H \cos^2(1.1\,\theta)$$

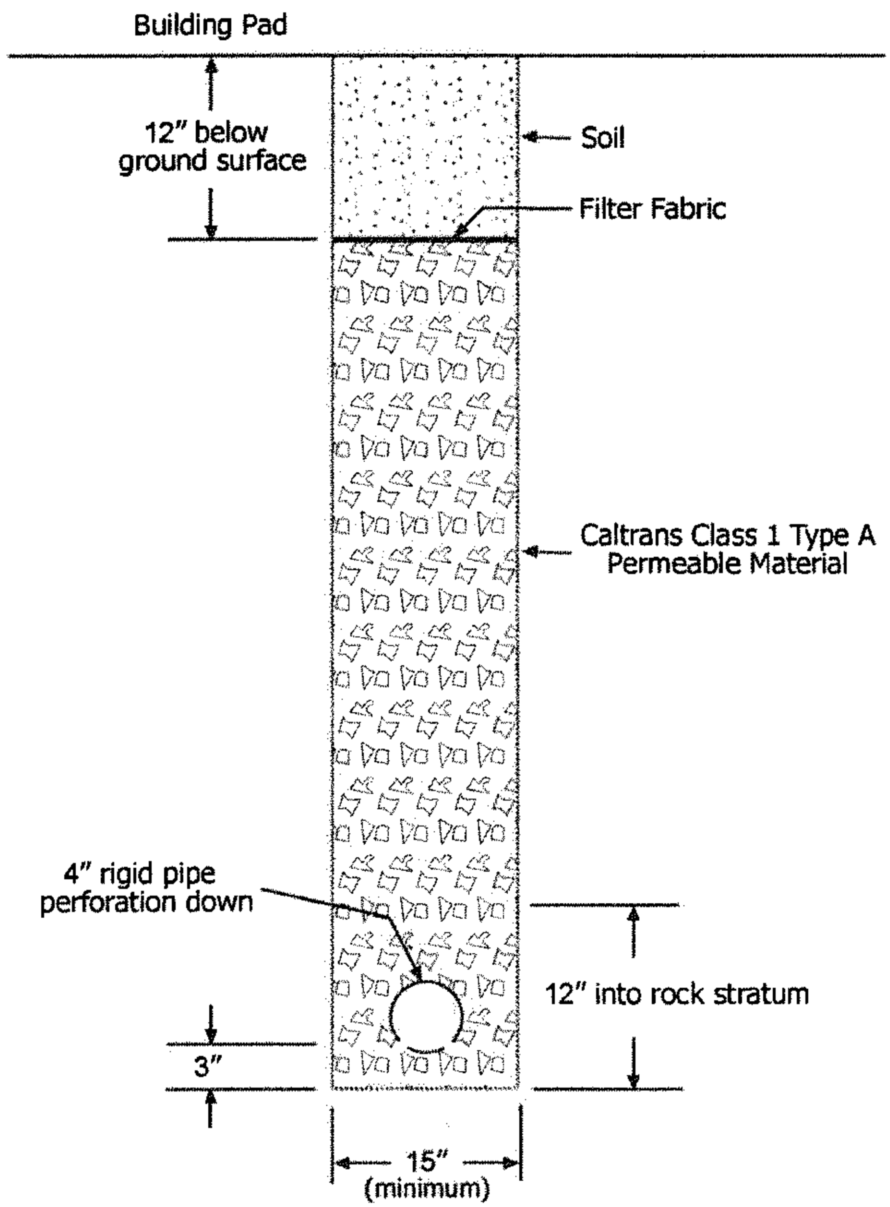
PRESSURES FROM POINT LOAD Q_P

(BOISSINESQ EQUATION MODIFIED BY EXPERMENT)

Bauldry Engineering	Figure No. 19 Surcharge Pressure Diagram

ATTACHMENT 7

PROJECT NO. 0259-SZ951-H31	REPORT DATE: December 12, 2003



Bauldry Engineering	Figure No. 20	Subdrain Detail

ATTACHMENT 7

Liquefaction Analysis (Based on Seed et al. 2003)

DATA

Boring Number	Top of Liquefiable Layer (ft)	Base of Liquefiable Layer (ft)	Total Soil Unit Weight (average) (psf)	% Fines in Soil	N (Blows/ft)	*Sampler Configuration Lined Sampler = 0 Unlined Sampler = 1	Depth to Groundwater (Field Conditions) (ft)	Peak Ground Acceleration a_{max}/g	Earthquake Magnitude M_w	**Soil Shear Wave Velocity $V_{s,40 ft}$ (ft/sec)
1	5.5	8.5	115	32	9	0	8	0.5	7.9	500
2	4.0	8.0	115	32	15	0	8			

*Used to Calculate correction factor Cs associated with sampler configuration (Table 1, Seed et al., 2003)
** Average soil shear wave velocity in the upper 40 ft soil column, used to calculate rd (Eq. 2, Seed et al. 2003)

TABLE 1
Overburden Stress (OS), Effective Overburden Stress (EOS) and Pore Pressure (U)

Boring Number	Mid-Point Liquefiable Layer (ft)	Total Unit Weight (psf)	OS (psf)	Water Column above mid-point Liq Layer (ft)	Pore Pressure (psf)	EOS (psf)
1	7.0	115	805	0.0	0	805
2	6.0	115	690	0.0	0	690

TABLE 2
Correction of N to $(N_1)_{60}$ and $(N_1)_{60\text{-}cs}$

Boring Number	N (Blows/ft)	Cor Factor C_N	N_1 (Blows/ft)	Correction Factors C_R	C_S	C_B	C_E	$(N_1)_{60}$ (Blows/ft)	Cor Factor C_{fines}	$(N_1)_{60\text{-}cs}$ (Blows/ft)
1	9	1.60	14	0.80	1.00	1.05	1	12	1.26	15
2	15	1.60	24	0.80	1.00	1.05	1	20	1.21	24

C_N Correction factor to normalize N to effective overburden pressure of 1 atmosphere, resulting in N1 (Eq. 4(b), Seed et al., 2003)
C_R Correction for Rod Lengths (Figure 9, Seed et al. 2003)
C_S Correction for sampler configuration (Table 1, Eq. T-1, Seed et al. 2003)
C_B Correction for borehole diameter (Table 1, Seed et al. 2003)
C_E Correction for hammer energy efficiency ratio (Table 1, Seed et al. 2003)
C_{fines} Correction for presence of non-plastic fines (Figure 4, Eq. 7, Seed et al. 2003)

Felton Branch Library
12/9/2003, 12:15 PM
Page 1 of 1

Figure No. 21

ATTACHMENT 7

TABLE 3

Cyclic Stress Ratio for In-situ Soil and Design Earthquake (CSReq or CSR) and $CSReq_{M=7.5,1atm}$

Boring Number	Mid-Point Liquefiable Soil Layer (ft)	OS (psf)	EOS (psf)	r_d (*1)	(a)max/g	CSReq (*2)	DWF_M (*3)	$(N_1)_{60\text{-}cs}$ (Blows/ft)	f (*4)	$K_{\sigma'}$ (*5)	$CSReq_{M=7.5,1atm}$
1	7.0	805	805	0.954	0.50	0.310	1.00	15	0.68	1.00	0.31
2	6.0	690	690	0.962	0.50	0.313	1.00	24	0.72	1.00	0.31

(*1) rd = Nonlinear shear mass participation factor (Eq. 2, Figure 8, Seed et al., 2003)
(*2) CSR = Cyclic stress ratio induced in soil by design earthquake, CSR = 0.65 ((a)max/g) (rd) (OS/EOS), (Eq. 1, Seed et al. 2003)
(*3) DWF_M = Magnitude correlated duration weighting factor as a function of $(N_1)_{60}$ (Figure 13, Seed et al. 2003)
(*4) f = Used in calculation of Ko': "f ~ 0.6 to 0.8 (as N1,60,CS varies from 1 to 40 blows/ft.)" (Eq. 10, Seed et al. 2003)
(*5) $K_{\sigma'}$ = Correction factor effective stress, recommended when EOS>2 atmospheres (Figure 14, Seed et al. 2003)

TABLE 4

Deterministically derived Factor-of-Safety Against Liquefaction, % Probability of Liquefaction, and Factor-of-Safety Against Liquefaction Induced Surface Damage

Boring Number	$(N_1)_{60}$ (Blows/ft)	% Fines in Soil	CRR (CSR liq) (*1)	CSR ($CSReq_{M=7.5,1atm}$) (*2)	Safety Factor Against Liquefaction (*3)	Probability of Liquefaction (%) (*4)	Cumulative Thickness of Liquefiable Soil Layers (meters)	Cumulative Thickness of Non-Liquefiable Surface Layer (feet)	Required Thickness of "Surface Layer" to Resist Surface Damage (meters) (*5)	Safety Factor Against Surface Damage	Susceptibility Liq Induced Deformation
1	12	32	0.11	0.31	0.35	>95	4.00	4.00	2.50	0.53	Yes
2	20	32	0.22	0.31	0.70	>95	4.00	4.00	2.50	0.53	Yes

(*1) Threshold Cyclic Stress Ratio (CRR - Cyclic Resistance Ratio) for $N_{1,60}$ associated with empirical soil liquefaction (Figure 17, Seed et al. 2003)
(*2) Cyclic Stress Ratio for in-situ soil and design earthquake, corrected for earthquake magnitude and atmospheric pressure
(*3) Safety Factor Against Liquefaction =CRR/CSR
(*4) % Probability of Liquefaction (Figure 16, Seed et al. 2003)
(*5) (Figure 52, Seed et al. 2003, after Ishihara, 1985)

TABLE 5

Liquefaction Induced Vertical Ground Surface Settlement

Boring Number	Thickness Liquefiable Layer (ft)	$(N_1)_{60\text{-}cs}$ (Blows/ft)	CSR $CSReq_{M=7.5,1atm}$	Susceptibility Liq Induced Deformation	% Volumetric Stain (*1)	Liquefaction Induced Settlement (inches) (*1)	% Volumetric Stain (*2)	Liquefaction Induced Settlement (inches) (*2)
1	3.0	15	0.31	Yes	2.0	0.72	2.5	0.90
2	4.0	24	0.31	Yes	1.0	0.48	1.3	0.62

(*1) % Volumetric Strain (Tokimatsu and Seed, 1984)
(*2) % Volumetric Strain (Figure 53 (a) Seed et al. 2003, presenting Wu, 2003)

TABLE 6

Settlement Results

Boring Number	Mid-Point Liquefiable Layer (ft)	Thickness Liquefiable Layer (ft)	Susceptibility to Ground Surface Settlement from Liquefaction	Probability of Liquefaction (%)	Estimated Settlement (inches) (*1)	Estimated Settlement (inches) (*2)
1	7.0	3.0	Yes	>95	0.7	0.9
2	6.0	4.0	Yes	>95	0.5	0.6

(*1) % Volumetric Strain (Tokimatsu and Seed, 1984)
(*2) % Volumetric Strain (Seed et al. 2003, presenting Wu, 2003))

Felton Branch Library
12/9/2003, 12:15 PM

Figure No. 22

ATTACHMENT 7

COUNTY OF SANTA CRUZ | Planning Department

MEMORANDUM

Date: 8/2/2017

To: Annette Olson, Project Planner

From: Carolyn Burke, Senior Civil Engineer, Environmental Planning

Re: Felton Library REV171066 Soils Report Review

The soils report identified the presence of loose and potentially liquefiable soils beneath the proposed development envelope, as well as potentially high groundwater conditions. These geotechnical constraints will be addressed through the removal and replacement of all loose soils with compacted engineered fill, construction of a mat slab or similar type of foundation able to tolerate differential settlements, and the installation of subsurface drainage facilities to direct groundwater away from the proposed structure and associated utilities. Provided these features are included in the final project design, the identified geologic constraints at the site will not result in a significant impact.

ATTACHMENT 8

COUNTY OF SANTA CRUZ | Planning Department

MEMORANDUM

Date:

To: Annette Olson, Project Planner

From: Cheryl Wong, Environmental Health Services

Re: Septic System for the Felton Library

The discretionary permit is complete. For the building application process an approved Sewage Disposal Permit is required with a Public Works Encroachment Permit. The sewage disposal application will also require water usage estimates, Onsite Sewage Service Program contract, signed acknowledgement letter, completed water conservation form, fees and plot plans (meeting all setbacks). If you have questions, please contact Cheryl Wong at 831-454-3219.

ATTACHMENT 9

ATTACHMENT 9

PROJECT DESCRIPTION AND WASTEWATER FLOW DESIGN BASIS:

A roughly 9,600 square- foot public library facility is proposed to be constructed in downtown Felton, California to serve the greater San Lorenzo Valley Community. The library is proposed to be constructed on a vacant parcel that is intersected by Bull Creek, a small tributary drainage to the San Lorenzo River.

The proposed onsite wastewater treatment system is designed to accommodate wastewater flows from the public restroom which is proposed to have 5 toilets, 1 urinal and three hand-wash sinks. A small sink is also proposed to be included in the public meeting program room which seats up to 80 people. No kitchen is proposed at the facility.

The library is expected to be open to the public 5 to 6 days per week for a total of 40 hours per week with a maximum peak of 160 people onsite over the course of a day. During a peak use day, up to 45 people are expected to spend 30 min to 2 hours in the library (excluding visitors that are on site briefly to pick-up or drop off materials). Up to 30 people (children) are expected to be on site for the Nature Explore program area. These visitor will use the library rest room facilities. Staff/Employees and volunteers make up the remaining 5 people in the peak site occupancy of 160. The meeting/program room is expected to be used for library programs or community meetings 2-4 times per week. The expected use of the meeting/program room is included in the maximum peak occupancy of 160 people.

The proposed onsite wastewater system is designed/sized to accommodate peak (max) daily wastewater flows as high as 1,280 Gallons Per Day (GPD) based on 160 people with an anticipated wastewater flow rate of 8 gpd/person (which is conservative based on EPA guidelines published in 2002 providing studies conducted in 1994-1998. see Table 3-4: Typical wastewater flow rates from commercial sources). The system is designed to handle peak flows for up to a 3 day duration. An average wastewater flow of 500 GPD is used for design basis.

Any food and/or drink service for any special events at the site shall be prepared offsite by a licensed caterer with food preparation done at an approved kitchen. All special event food service plates, utensils, etc., shall be imported onto the site and cleaned and sanitized offsite. In addition, portable toilets may be required for any special, single day events at this site with greater than 320 anticipated attendees.

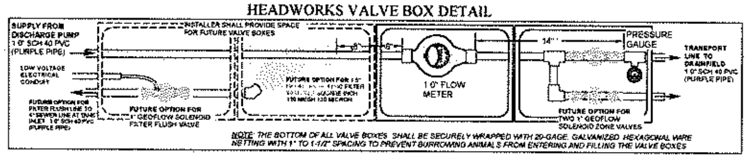
A flow meter is specified to be installed on the treated wastewater filtrate discharge line. If the system is ever found to be failing to function properly, it can easily be assessed if the above system design flow parameters have been exceeded and if corrective action is needed. The system has been designed with multiple levels of redundant conservatism based on relatively out-dated flow data from facilities that did not incorporate modern, low-flow fixtures that are required by current standards and regulations. We have confidence that the specified system is sufficiently sized to meet the demand of the wastewater flows that have been conservatively estimated to occur at the proposed facility during the most extreme peak use scenario.

Soil profile borings, winter water table testing and soil percolation testing were conducted by this firm in the proposed drainfield area January through March of 2008 (See test results on file with County of Santa Cruz Environmental Health). The results of the exploratory borings and testing indicated favorable soil conditions in the proposed dispersal field area. A soil application loading rate of 0.36 gpd/sf was used in sizing the proposed dispersal trenches.

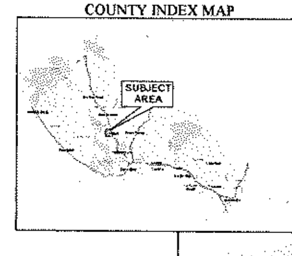
Drainfield Trench Sizing Calculations:

1,280 GPD / 0.36gpd/sf = 3,555.55 sf
3,555.55 sf / 2 (50% reduction with enhanced treatment) = 1,777.77 sf required
1,777.77 sf /13.5 sq/lf of effective trench sidewall and bottom area = 132 lf of trench required
132 lf / 2 trenches = 2 trenches @ 66 lf each

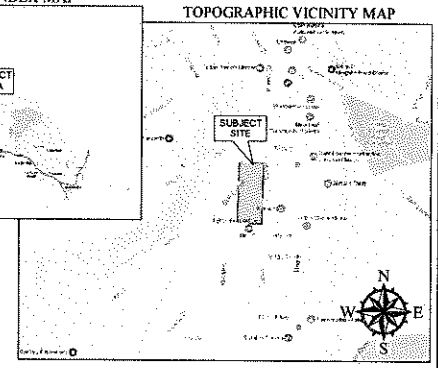
HEADWORKS VALVE BOX DETAIL



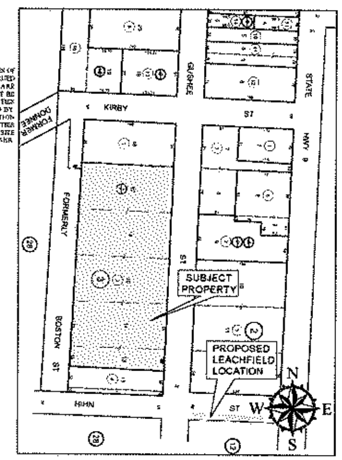
COUNTY INDEX MAP

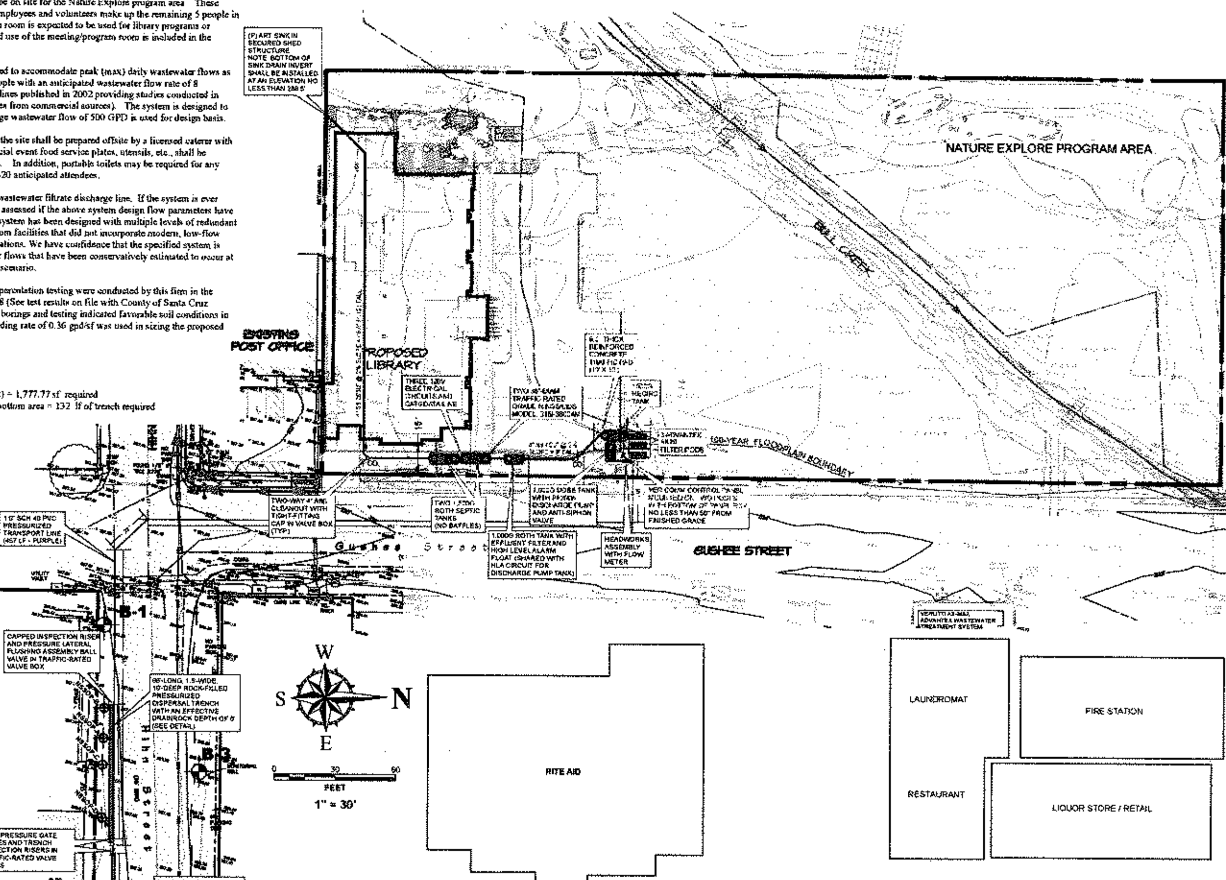
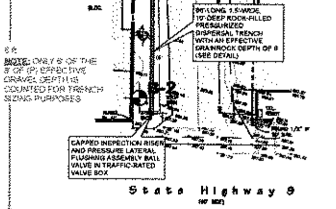


TOPOGRAPHIC VICINITY MAP

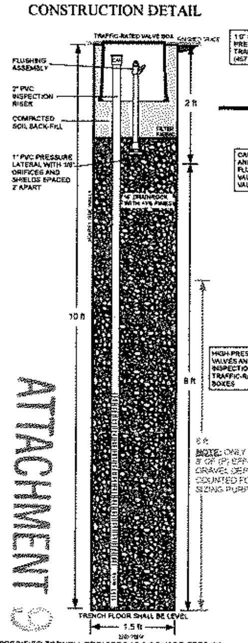


PARCEL INDEX MAP



DISPERSAL TRENCH CONSTRUCTION DETAIL



SPECIFIED TRENCH PROVIDES 13.5 SQUARE FEET OF EFFECTIVE SOIL ABSORPTION SIDEWALL AND FLOOR AREA PER LINEAL FOOT OF TRENCH

Felton Library Wastewater Design Flow Analysis:

Use	# OF PEOPLE	WASTEWATER GENERATED GPD/PERSON	TOTAL PEAK FLOW/USE (GPD)	MAX. HOURS ONSITE	DAYS/WEEK
STAFF (employees and volunteers)	5	8	40	8	5-6
GENERAL LIBRARY PATRONS	45	8	360	0.5 - 2	5-6
PROGRAM MEETING ROOM USE	80	8	640	1-3	2-4
NATURE EXPLORE PROGRAM	30	8	240	2-4	1
TOTALS:	160		1280		
BOOK PICK UP / DROP OFF	35	0	0	0.25	5-6
Special Events (Not in addition to regular library use; portable toilets as req.)	320	4	1280		1 / year

SYSTEM OPERATION AND MAINTENANCE

1. SPECIFIED WASTEWATER TREATMENT AND DISPERSAL SYSTEM SHALL BE OPERATED AND MAINTAINED IN ACCORDANCE WITH THE MANUFACTURERS OPERATION AND MAINTENANCE MANUAL. BI-ANNUAL MAINTENANCE SERVICING OF THE ADVANTEX SYSTEM BY A QUALIFIED TECHNICIAN IS REQUIRED

2. THE TREATMENT SYSTEM IS ALIVE WITH MICROORGANISMS PERFORMING OXIDATION AND REDUCTION OF THE CONTENTS. DO NOT DISPOSE OF TOXICS OR CHEMICALS INTO WASTEWATER DRAINS CONNECTED TO THE SYSTEM THAT MAY DISRUPT THE REQUIRED BIOLOGICAL PROCESS. EXAMPLES OF HARMFUL MATERIALS INCLUDE DEGREASERS, RV TANK ODOR CONTROLLERS AND DISINFECTANTS. WAX STRIPPERS FOR LINOLEUM, CARPET SHAMPOO, PAINT THINNER, PAINT, MOTOR OIL, UNUSED MEDICINE AND ANY OTHER TOXIC WASTE PRODUCTS.

3. WATER SOFTENERS BRINE DISCHARGE IS STRICTLY PROHIBITED FROM BEING DISCHARGED INTO THE TREATMENT SYSTEM. FAILURE TO ADHERE TO THIS POLICY WILL VOID THE WARRANTY FOR THE SYSTEM

4. THE PRIMARY TANK SHOULD BE PUMPED WHEN THE TOTAL OF THE COMBINED SCUM/SLUDGE THICKNESS IS GREATER THAN 1/3 OF TOTAL LIQUID LEVEL DEPTH IN THE FIRST PRIMARY TANK (EVERY 4 TO 8 YEARS IS ANTICIPATED)

5. ALL PLUMBING LEAKS THAT INCREASE FLOWS ROUTED TO TREATMENT SYSTEM (ESPECIALLY RUNNING TOILETS) SHALL BE REPAIRED PROMPTLY.

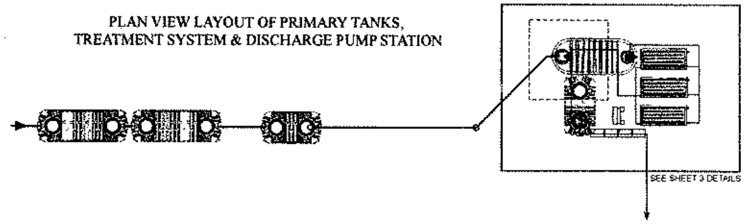
6. DISPERSAL TRENCH PRESSURE LATERALS SHALL BE FLUSHED YEARLY AND ALL FOUR INSPECTION RISERS CHECKED AND WATER LEVELS RECORDED

BioSphere Consulting Incorporated
Alternative Wastewater System Design
• Site Evaluation & Mapping
• Soil Analysis & Percolation Testing
• New Development, Upgrade & Repairs
• Residential & Commercial
1315 King Street
Santa Cruz, CA 95060
Tel: (831) 430-6116
www.biosphere-consulting.com

ONSITE WASTEWATER TREATMENT SYSTEM DESIGN

Project Location:	Corner of Gushee St. and Hihn St., Felton, California (Santa Cruz County)
Property Owner:	Santa Cruz Pulic Library System
Mailing Address:	Teall Messer, Architect 3833 Glen Haven Road, Soquel, CA 95073
Contact Phone #:	Teall Messer - (831) 462-4721
Date: 06/20/17	By: Andrew Brownstone
Job No.: 17019	APN: 065-073-03
Sheet:	1 OF 3

PLAN VIEW LAYOUT OF PRIMARY TANKS, TREATMENT SYSTEM & DISCHARGE PUMP STATION



GENERAL NOTES:

1. Tanks MUST BE BEDDED IN SCREENED MATERIAL (sand, pea gravel, stone dust, or other flowable fines). Native material is acceptable if it exhibits the same characteristics as select fill.

2. It is imperative that the TANK HAUNCH BE SUPPORTED WITH FILL. This is the area of the tank under the mold part-line along the sidewalls curving down to the belly of the tank.

3. The TANK BELLY MUST BE SUPPORTED WITH FILL. Make sure that tank feet seated in the backfill and that the tank belly is well supported.

4. Specified tanks achieve full structural integrity once installed properly. SIDEWALL COMPRESSION THROUGH COMPACTED BACKFILL is the key to this integrity. Use backhoe to compact sidewall backfill if possible.

5. CORRUGATIONS MUST BE PACKED SOLIDLY with backfill to achieve this. Compact backfill in 6" lifts.

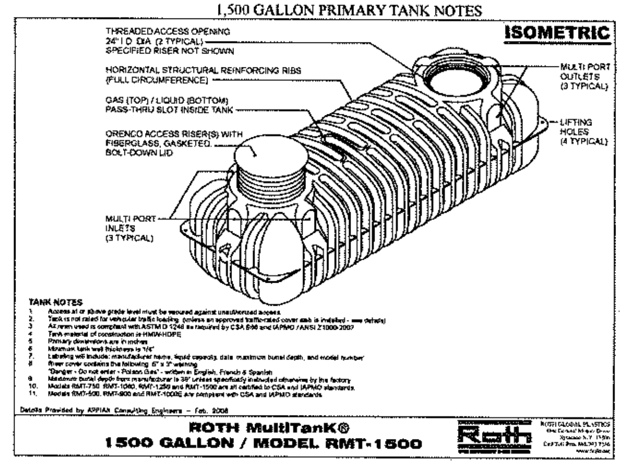
6. Backfill tank to top of roof all the way around, then BACKFILL BETWEEN RISERS FIRST, then around the endwalls of tank. This technique will prevent backfill from pushing risers "in" or toward one another.

7. In areas of high groundwater, the tank MUST BE FILLED immediately following backfill.

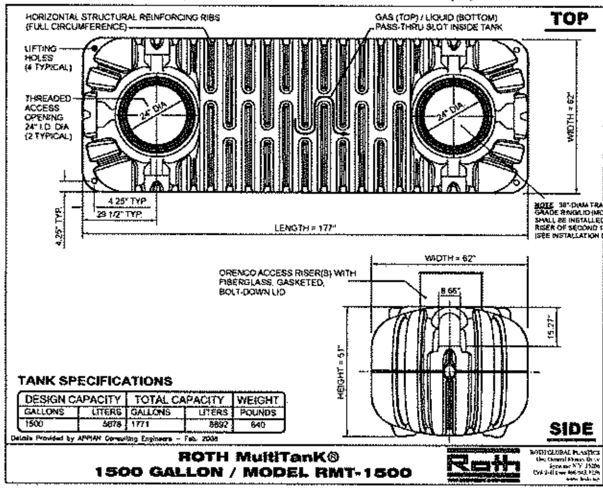
8. Tanks are not designed or rated for vehicular traffic. Avoid operation of vehicles heavier than 2500 pounds over or within 2' of tanks.

9. Maximum burial depth is 36" below grade.

1,500 GALLON PRIMARY TANK NOTES



1,500 GALLON PRIMARY TANK DETAIL (2x)

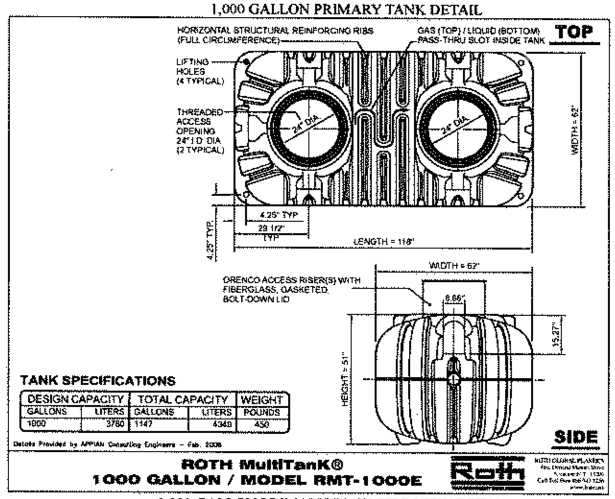


TANK SPECIFICATIONS

DESIGN CAPACITY		TOTAL CAPACITY		WEIGHT
GALLONS	LITERS	GALLONS	LITERS	POUNDS
1500	5678	1771	6692	640

Details Provided by APPIAN Consulting Engineers – Feb. 2008

1,000 GALLON PRIMARY TANK DETAIL

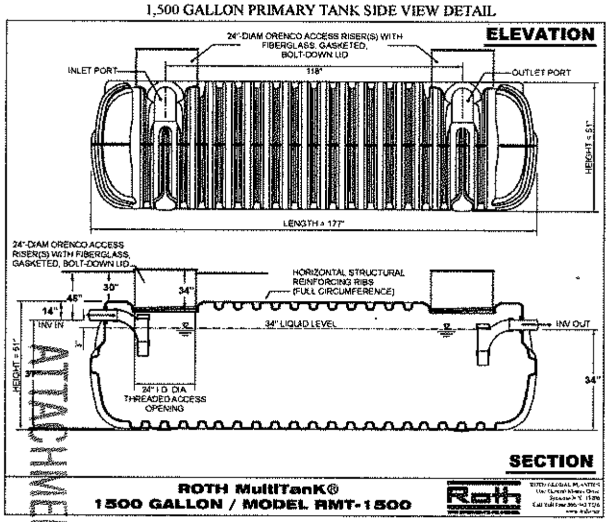


TANK SPECIFICATIONS

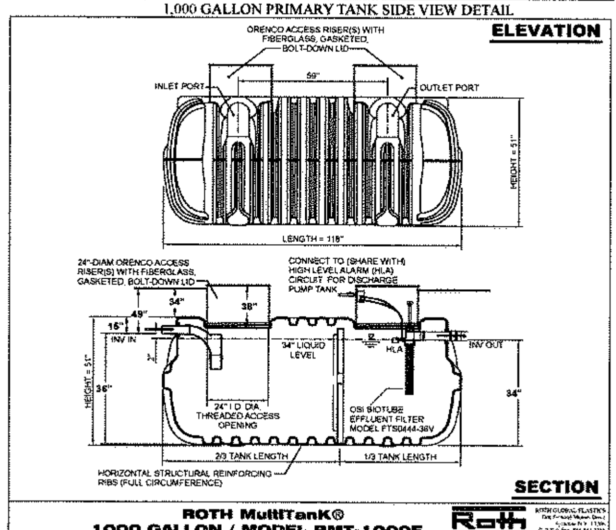
DESIGN CAPACITY		TOTAL CAPACITY		WEIGHT
GALLONS	LITERS	GALLONS	LITERS	POUNDS
1000	3780	1147	4340	450

Details Provided by APPIAN Consulting Engineers – Feb. 2008

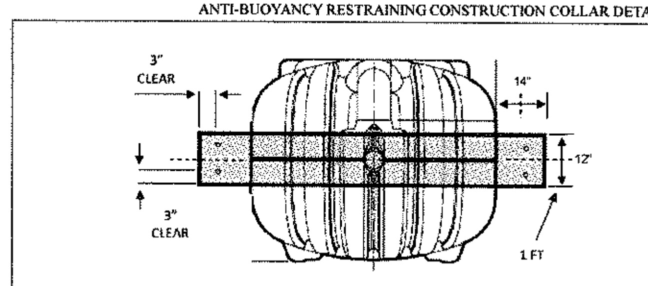
1,500 GALLON PRIMARY TANK SIDE VIEW DETAIL



1,000 GALLON PRIMARY TANK SIDE VIEW DETAIL



ANTI-BUOYANCY RESTRAINING CONSTRUCTION COLLAR DETAIL



GENERAL NOTE:

1) THE BUOYANCY RESTRAINING COLLAR DESIGN IS BASED ON BUOYANCY FORCE CALCULATIONS AVAILABLE ON REQUEST FROM ROTH GLOBAL PLASTICS, INC.

CONCRETE NOTES:

1) PROVIDE CONCRETE TO OBTAIN THE MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS

2) CONCRETE MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH ACI-318-99 (BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE) AND ACI-301-LATEST EDITION (SPECIFIFCATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS)

REINFORCED STEEL:

1) ALL STEEL SHALL BE BILLET STELL CONFORMING TO STANDARDS OF ASTM A615, GRADE 60

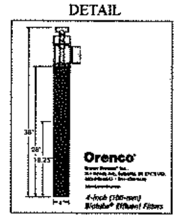
CONCRETE COLLAR SPECIFICATIONS

TANK MODEL	RMT-1500
WIDTH (FT)	7'-0"
LENGTH (FT)	16'-0"
*NOMINAL SAFETY FACTOR	2.02
EST CONCRETE VOLUME	1.92

*Based on installation with one foot of cover fill, density [illegible]

NOTE: ALL UNDERGROUND TANKS SHALL INCORPORATE ANTI-BUOYANCY RESTRAINING COLLARS INSTALLED PER MANUFACTURERS INSTRUCTIONS

EFFLUENT FILTER DETAIL



BioSphere Consulting
Incorporated
Alternative Wastewater System Design

- Site Evaluation & Mapping
- Soil Analysis & Percolation Testing
- New Development, Upgrade & Repairs
- Residential & Commercial

1315 King Street
Santa Cruz, CA 95060
Tel: (831) 430-9116
www.biosphere-consulting.com

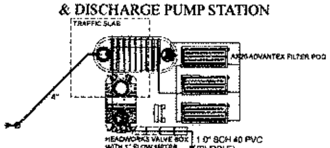
ONSITE WASTEWATER TREATMENT SYSTEM DESIGN

Project Location:	Corner of Gushee St. and Hihn St., Felton, California (Santa Cruz County)
Property Owner:	Santa Cruz Pulic Library System
Mailing Address:	Teall Messer, Architect 3833 Glen Haven Road, Soquel, CA 95073
Contact Phone #:	Teall Messer - (831) 462-4721
Date: 06/20/17	By: Andrew Brownstone
Job No.: 17019	APN: 065-073-03
Sheet:	2 OF 3

PROFESSIONAL GEOLOGIST ANDREW BROWNSTONE No. 7453 Exp. 12/31/17 STATE OF CALIFORNIA

ATTACHMENT 9

PLAN VIEW LAYOUT OF TREATMENT SYSTEM & DISCHARGE PUMP STATION



GENERAL NOTES

1. ALL NOTES FOUND IN THESE DOCUMENTS SHALL APPLY TYPICALLY THROUGHOUT. IF INCONSISTENCIES ARE FOUND IN THE VARIOUS NOTATIONS, NOTIFY THE DESIGNER (BIOSPHERE CONSULTING, INC.) IMMEDIATELY REQUESTING CLARIFICATION. PLAN CHANGES OR SPECIFICATIONS SHALL BE MADE ONLY AFTER CONSULTATION WITH AND APPROVAL BY THE DESIGNER.

2. ALL WORK SHALL COMPLY WITH APPLICABLE CODES AND TRADE STANDARDS WHICH GOVERN EACH PHASE OF WORK INCLUDING, BUT NOT LIMITED TO, CALIFORNIA PLUMBING CODE, MECHANICAL CODE, ELECTRICAL CODE AND ALL APPLICABLE STATE AND/OR LOCAL CODES.

3. THE INSTALLER IS REQUIRED TO FULLY READ AND UNDERSTAND THE MANUFACTURERS INSTALLATION MANUALS/GUIDELINES PRIOR TO THE COMMENCEMENT OF WORK.

4. ALL SPECIFIED EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE TO THE MANUFACTURERS INSTALLATION GUIDELINES/REQUIREMENTS. TANK INSTALLATION SHALL INCLUDE ANTI-BUOYANCY/FLOATATION MEASURES (CONCRETE COLLARS) ACCORDING TO MANUFACTURES REQUIREMENTS.

5. IT IS CRITICALLY IMPORTANT THAT ALL TANKS SHALL BE MADE WATERTIGHT TO THE GROUND SURFACE AND DEMONSTRATED TO BE WATERTIGHT PRIOR TO FINAL SIGN-OFF.

6. IT IS THE RESPONSIBILITY OF THE CONTRACTOR AND ALL SUBCONTRACTORS TO CHECK AND VERIFY ALL CONDITIONS, DIMENSIONS, LINES AND LEVELS INDICATED. PROPER FIT AND ATTACHMENT OF ALL PARTS IS REQUIRED. SHOULD THERE BE ANY DISCREPANCIES, IMMEDIATELY NOTIFY THE DESIGNER (BIOSPHERE CONSULTING, INC.) FOR CORRECTION OR ADJUSTMENT.

7. ASIDE FROM THE VALVE BOXES AND PIPE/PIPE FITINGS, THE COMPONENTS SPECIFIED SHALL BE FROM ORENCO, GEOFLOW, OR INFILTRATOR OR APPROVED EQUAL. THE TERM "OR APPROVED EQUAL" SHALL MEAN EQUAL IN THE JUDGMENT OF THE DESIGNER. THE BIDDER, AS A SUPPLEMENT TO THE BASE BID, MAY SUBMIT ALTERNATE PROPOSALS FOR PRODUCTS, SYSTEMS OR PROCEDURES NOT SPECIFIED FOR CONSIDERATION BY OWNER AND DESIGNER. ALTERNATE PROPOSALS WILL BE CONSIDERED ONLY IF BIDDER HAS SUBMITTED A BASE BID, WHICH IS IN ACCORDANCE WITH THE REQUIREMENTS OF THE SPECIFICATIONS. SHOULD THE BIDDER SEEK APPROVAL OF A PRODUCT OTHER THAN THE BRAND OR BRANDS NAMED IN THE SPECIFICATIONS, IT SHALL FURNISH WRITTEN EVIDENCE THAT SUCH PRODUCT CONFORMS IN ALL RESPECTS TO THE SPECIFIED REQUIREMENTS, AND THAT IT HAS BEEN USED SUCCESSFULLY ELSEWHERE UNDER SIMILAR CONDITIONS. WHERE THE SPECIFIED REQUIREMENTS INVOLVE CONFORMANCE TO RECOGNIZED CODES OR STANDARDS, THE BIDDER SHALL FURNISH EVIDENCE OF SUCH CONFORMANCE IN THE FORM OF TEST OR INSPECTION REPORTS, PREPARED BY A RECOGNIZED AGENCY, AND BEARING AN AUTHORIZED SIGNATURE. MANUFACTURER'S STANDARD DATA AND CATALOG CUT SHEETS WILL NOT BE CONSIDERED SUFFICIENT IN THEMSELVES, AND THE DESIGNER WILL NOT BE RESPONSIBLE FOR SEEKING FURTHER DATA FROM THE MANUFACTURER, OR FOR OTHERWISE RESEARCHING THE PRODUCT. FAILURE TO PROVIDE COMPLETE DATA WILL BE CAUSE FOR REJECTION OF THE PROPOSED ALTERNATE PRODUCT. THE SUBMISSION SHALL INCLUDE ANY IMPACTS THAT COULD BE EXPECTED FROM THE ALTERNATIVE PRODUCT AND SHALL ALSO INDICATE ANY PRODUCT THAT WOULD REQUIRE A LICENSE OR ROYALTY, THE ACTUAL FEES, AND A NOTE THAT THESE FEES WOULD BE HANDLED BY THE BIDDER. OWNER AND/OR DESIGNER RESERVES THE RIGHT TO ACCEPT OR REJECT BIDDERS ALTERNATE PROPOSALS.

8. THE SPECIFIED COMPONENTS SHALL BE INSTALLED BY A LICENSED CONTRACTOR EXPERIENCED IN THE INSTALLATION OF ADVANTEX® PRODUCTS. CONTRACTORS SHALL BE CERTIFIED BY ORENCO SYSTEMS, INC., OR AN AUTHORIZED DEALER AS AN "AUTHORIZED ADVANTEX INSTALLER" AND SHOW EVIDENCE OF SUCCESSFULLY INSTALLING AT LEAST THREE ADVANTEX® SYSTEMS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND THE DESIGN PLANS.

9. COMMENCEMENT OF WORK BY THE CONTRACTOR AND/OR ANY SUBCONTRACTOR SHALL INDICATE KNOWLEDGE AND ACCEPTANCE OF ALL CONDITIONS DESCRIBED IN THESE CONSTRUCTION DOCUMENTS.

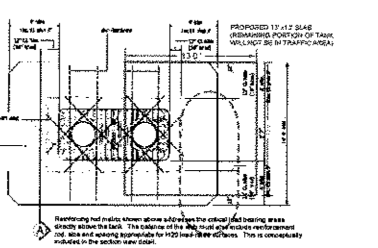
10. A PRE-CONSTRUCTION SITE CONFERENCE WITH DESIGNER SHALL BE ARRANGED PRIOR TO THE COMMENCEMENT OF WORK. REGULAR CONSTRUCTION INSPECTIONS, WATERTIGHT TANK TEST INSPECTION, ADVANTEX INSTALLATION INSPECTION, AND FINAL OPERATION OF SYSTEM SHALL BE MADE BY DESIGNER (BIOSPHERE CONSULTING) OR LOCAL DEALER WITH THE COUNTY OF SANTA CRUZ ENVIRONMENTAL HEALTH SERVICE INSPECTOR PRESENT. THE INSTALLER SHALL GIVE AT LEAST 24 HOURS NOTICE TO THE DESIGNER AND EHS FOR ALL INSPECTIONS REQUESTED.

11. INSTALLATION OF ALL GRAVITY FLOW SANITARY SEWER LINES SHALL BE FULLY COORDINATED WITH PLUMBING CONTRACTOR RESPONSIBLE FOR INTERNAL PLUMBING.

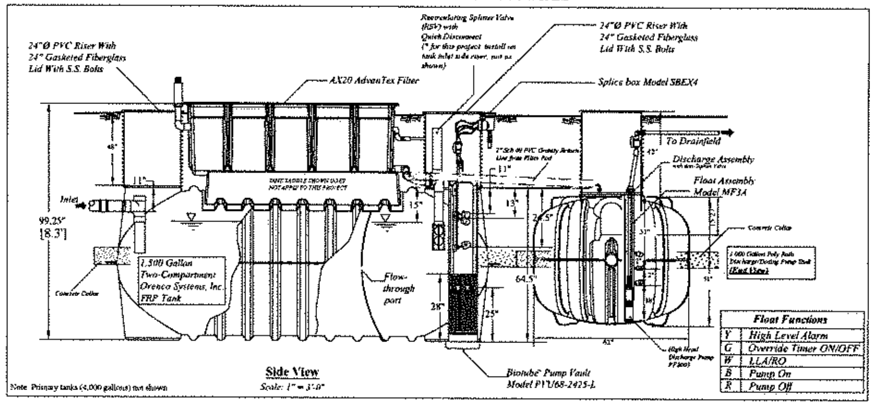
12. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL INCIDENTAL MATERIALS REQUIRED FOR A COMPLETE INSTALLATION. MATERIALS AND EQUIPMENT SHALL BE U.L. LISTED AND LABELED FOR THE APPLICATION.

14. ALL ELECTRICAL WORK SHALL CONFORM TO THE CURRENT ELECTRICAL CODE AND SHALL BE PERFORMED UNDER PERMIT AND INSPECTION FROM THE COUNTY BUILDING DEPARTMENT. INSTALLATION CONTRACTOR IS RESPONSIBLE FOR ASSURING THAT THE CONTROL PANEL INCLUDING PHONE/DATA LINE WITH CAT5 WIRING IS INSTALLED AND FULLY FUNCTIONAL. TELEMETRY CONNECTION SHALL BE DEMONSTRATED PRIOR TO FINAL APPROVAL SIGN-OFF.

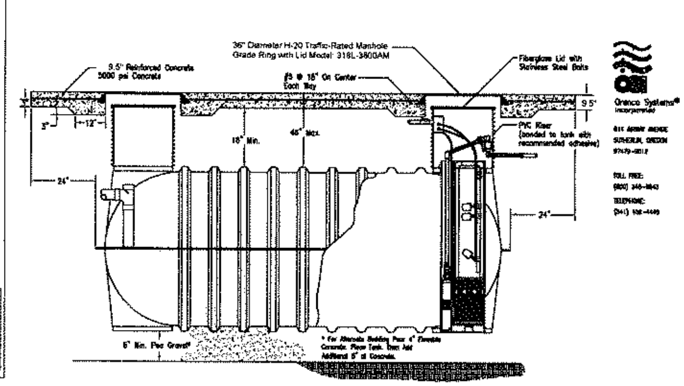
ROTH RMT TANK H20 TRAFFIC-RATED SLAB INSTALLATION DETAIL



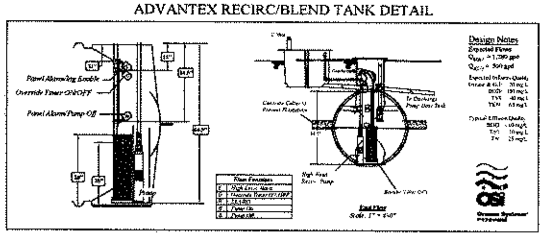
ADVANTEX TREATMENT SYSTEM DETAIL



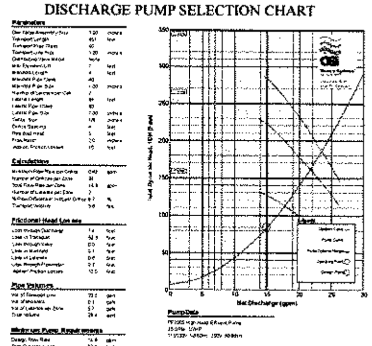
H-20 TRAFFIC-RATED SLAB FOR ORENCO FRP TANK DETAIL



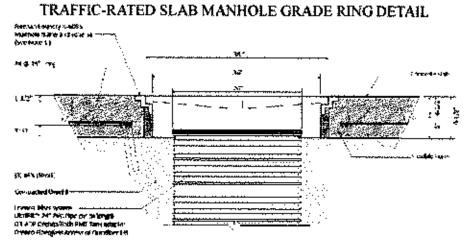
ADVANTEX RECIRC/BLEND TANK DETAIL



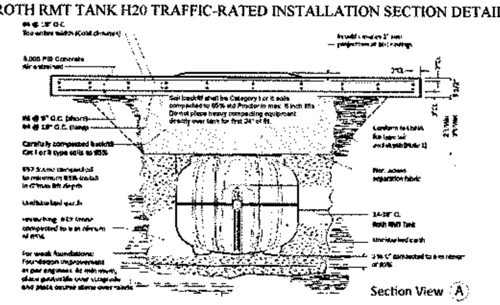
DISCHARGE PUMP SELECTION CHART



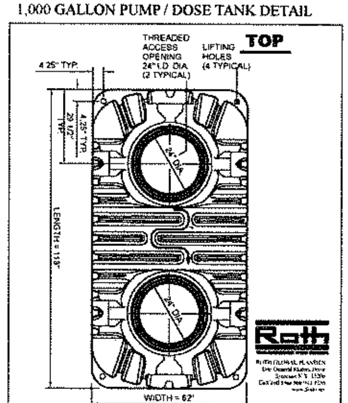
TRAFFIC-RATED SLAB MANHOLE GRADE RING DETAIL



ROTH RMT TANK H20 TRAFFIC-RATED INSTALLATION SECTION DETAIL



1,000 GALLON PUMP / DOSE TANK DETAIL

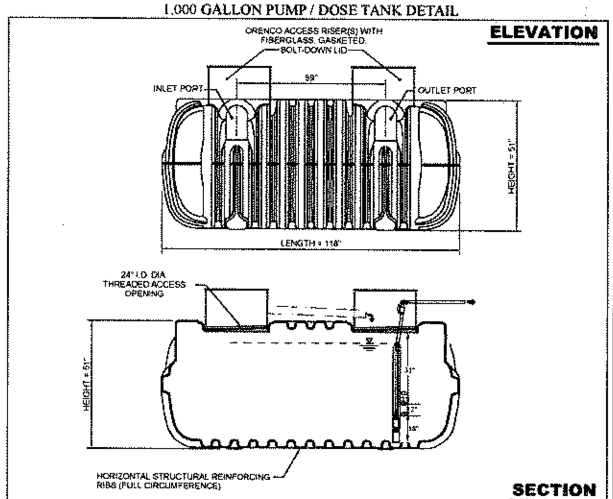


TANK SPECIFICATIONS

DESIGN CAPACITY		TOTAL CAPACITY		WEIGHT
GALLONS	LITERS	GALLONS	LITERS	POUNDS
1000	3780	1147	4340	450

NOTE: ALL UNDERGROUND TANKS SHALL INCORPORATE ANTI-BUOYANCY RESTRAINING COLLARS INSTALLED PER MANUFACTURERS INSTRUCTIONS

1,000 GALLON PUMP / DOSE TANK DETAIL



ROTH MultiTanK®
1000 GALLON / MODEL RMT-1000E

BioSphere Consulting Incorporated — Alternative Wastewater System Design

- Site Evaluation & Mapping
- Soil Analysis & Percolation Testing
- New Development, Upgrade & Repairs
- Residential & Commercial

1315 King Street
Santa Cruz, CA 95060
Tel: (831) 430-9116
www.biosphere-consulting.com

ONSITE WASTEWATER TREATMENT SYSTEM DESIGN

Project Location:	Corner of Gushee St. and Hihn St., Felton, California [Santa Cruz County]
Property Owner:	Santa Cruz Pulic Library System
Mailing Address:	Teall Messer, Architect 3833 Glen Haven Road, Soquel, CA 95073
Contact Phone #:	Teall Messer - (831) 462-4721
Date: 06/20/17	By: Andrew Brownstone
Job No.: 17019	APN: 065-073-03
Sheet:	3 OF 3

PROFESSIONAL GEOLOGIST ANDREW BROWNSTONE STATE OF CALIFORNIA

ATTACHMENT 9

SAN LORENZO VALLEY WATER DISTRICT
13060 Highway 9 • Boulder Creek, CA 95006-9119
Office (831) 338-2153 • Fax (831) 338-7986
Website: www.slvwd.com

February 2, 2017

Teall Messer
3833 Glen Haven Rd.
Soquel CA 95073

Subject: Request for Meter Review
APN: 065-073-03

Dear Mr. Messer,

The District has on file your request for meter service on the above parcel.

Your request has been:

☐ Approved. Please come to the District to pay your connection charges.
- *If possible, please notify the front office ahead of time for when you will be coming in to make your payment. This will allow us to prepare your paperwork ahead of time.*

☒ Approved. Please bring your plumbing plans and sprinkler system flow requirement to the District to determine the cost of the water connection.

☒ Conditions. Please contact the District office to discuss and make necessary arrangements.

☐ Denied. Please contact the District office to discuss this meter request if you have any questions.

- **Approval can be withdrawn at any time.**
- **Water service is never guaranteed until service has been approved, sized and all fees paid.**
- **Any addition of plumbing fixtures and/or residential fire sprinkler system to the existing water service requires an additional review by District staff and approval for compliance with meter sizing District Ordinances.**

If you have any questions regarding this matter, please contact our office.

Sincerely,

Stephanie Hill
Finance Manager

DOMESTIC or JOINT DOMESTIC/RESIDENTIAL FIRE SERVICE-METER REVIEW

ORIGINAL

Request Date 1.3.2017 APN 065-073-03

Why Building a library

Existing water sources: None ____ Well X Spring ____ Meter ____ Account # ____

Owner's Name Terry Messer (contractor) Existing Units 0

MAIL TO: 3833 Glen Haven Rd. Units to be built 1

Soquel Pad Elevation ____

Phone 462-4721

ENGINEERING REVIEW: Date 01/05/2017

Reimbursement Agreement for Parcel ____
In/Out District X
Tank Elevation ____
Main Size ____
Zone ____

6" WATER MAIN FRONTING PARCEL
ADDITIONAL INFORMATION NEEDED
- DOMESTIC PLUMBING PLANS FOR SIZING
- FIRE SPRINKLER CALCULATIONS FOR SIZING.
- DESCRIPTION OF SANITARY SYSTEM.

Engineering Department

FIELD OPERATION REVIEW: Date ____

Backflow Needed X
DC ____ RP X

OK FOR SERVICE, ADDITIONAL INFORMATION NEEDED

Operations Superintendent

WATERSHED ANALYST REVIEW: Date ____

Watershed Analyst

MANAGER REVIEW: Date 1/31/17 Approved ____ Conditions X Denied ____

District Manager

SECOND MANAGER REVIEW: Date ____ Approved ____ Agreement ____

District Manager

ATTACHMENT 10

Felton Library Downstream Drainage Evaluation

Prepared by Santa Cruz County Department of Public Works
Martha Shedden, Civil Engineer
May 16, 2017

Project Overview

The new Felton Library site is approximately 2 acres in size and is bisected from the southwest to the northeast by Bull Creek. A large portion of the site is wooded with riparian vegetation.

The proposed site improvements include the library building with patios providing outdoor programming space, a parking lot with 18 spaces, new footbridges over Bull Creek providing access to the western portion of the site and the adjacent San Lorenzo Valley Water District property, an outdoor discovery park comprised of a series of outdoor spaces linked by a walking path, a maintenance driveway from Kirby Street to the northwest corner of the property, and storm water and wastewater treatment improvements. Riparian restoration areas are proposed on site and on the SLVWD property to the west.

Downstream Off-Site Drainage Evaluation

As Bull Creek approaches the northeast corner of the library property, drainage flows leave the channel and enter a 48" diameter culvert adjacent to Gushee Street. From this location, storm water flows through a series of culverts and pipes east on Kirby Street, north and then east across Highway 9, northeast through a 36" box culvert under the New Leaf Market (APN: 065-081-20), and east through a 52" x 62" arch concrete culvert to the San Lorenzo River outlet.

In 1993, prior to construction of the Kirby Street Storm Drain Improvement Project, the County prepared a hydraulic analysis of the storm drain facilities from Gushee Street to the outlet at the San Lorenzo River. At that time, Caltrans had recently upgraded the storm drains within the Highway 9 right of way from existing 36" CMP to a 54" RCP storm drains.

The 1993 hydraulic analysis included the entire 400+ acre Bull Creek watershed and found that with the improvements (proposed then and currently existing) runoff from 10, 25 and 50 year storms could be handled in the new system. Storage capacity in Bull Creek above this point was not calculated due to lack of precise topographic information in 1993. The 1993 hydraulic analysis conclusion indicated that the new downstream storm drain system from Gushee Street to the San Lorenzo River would have adequate capacity for the watershed.

In July 2016, County Road Maintenance staff inspected the majority of the above described drainage system from Gushee Street downstream to the San Lorenzo River. The system was found to be in very sound condition with sufficient capacity and without any blockages to restrict flow. In April 2017, the 36" box culvert under the New Leaf Market was video-taped to examine the condition of this section of the system. Overall, the box culvert is in very good condition, flowing freely with no obstructions. Minor cracking and seepage at several culvert joints can be observed from approximately station 1+30 to 2+30.

Conclusion

Bull Creek flows from the library site to the river entirely within storm drain pipes and culverts. These existing storm drain facilities from the Gushee Street inlet to the San Lorenzo River outlet have adequate capacity and are in good condition at this time.

100-year Floodplain Analysis
of
Bull Creek
at the
Proposed Felton Library Site

Felton, California

Prepared For: Teall Messer, Architect

Project No. 12038

May, 2017

IFLAND ENGINEERS
Civil Engineering ▪ Structural Design ▪ Land Development

5300 Soquel Avenue Suite 101
Santa Cruz, CA 95062
(831) 426-5313 FAX (831) 426-1763
www.iflandengineers.com

ATTACHMENT 1

Table of Contents

Exhibits & Calculations

ATTACHMENT 12

Introduction

The Santa Cruz County Environmental Planning Department has determined that the proposed construction of a new library on a parcel (APN 065-073-03) fronting Gushee Street in Felton, adjacent to the existing U. S. Post Office at the corner of Gushee Street and Hihn Street, requires evaluation of the potential 100-year flood level. The property is crossed at an angle (southwest to northeast) by Bull Creek and is roughly two blocks east of San Lorenzo River. Flood plain boundaries along Bull Creek have not been delineated by the Federal Emergency Management Agency (FEMA).

Site Description

The attached *Watershed Exhibit* shows the watershed boundaries of Bull Creek upstream of and including the subject property. The total watershed boundaries encompass a drainage area of approximately 400 acres. The drainage area ranges in elevation from approximately 1790 feet to 279 feet above sea level, a change in elevation of 1511 feet. The total drainage length is approximately 2.37 miles.

The attached *Site Map Exhibit* shows the section of Bull Creek analyzed in this study. The focus of the study was the section of Bull Creek that begins at the outlet of a 48" CMP culvert just north of Hihn Street (STA: 2+50) and ends at the headwall and inlet of a 48" RCP at the northeast corner of the subject property (STA: 8+90). The creek is relatively straight with a fairly uniform slope. The surface of the creek is covered by grass and small weeds.

Vertical Datum

All elevations are referenced to the North American Vertical Datum of 1988 (NAVD88). Site topographic surveys were provided on the National Geodetic Vertical Datum of 1929 (NGVD29) (Ifland Survey, 2009). The survey was adjusted vertically by 2.79 feet to convert the elevation datum from NGVD29 to NAVD88. Proposed plans were developed on NAVD88.

Digital aerial contours (Santa Cruz County, 2003) were used to develop a digital terrain model of Bull Creek and the areas around the subject property. The digital aerial contours are on the NAVD88 elevation datum.

Hydrologic Analysis

Several studies of the Bull Creek watershed produced by County of Santa Cruz Public Works Department staff dating as far back as 1978 were reviewed and the results of the studies were compared. These studies estimated the 100-year flood discharge rate using a variety of methodologies which included:

- State Highway Design Manual
- U.S.G.S. Water Supply Papers
- Magnitude & Frequency of Floods in California
- County Design Criteria

After reviewing the previously completed studies, 300 cfs was determined to be the most reasonable estimation of the 100-year flood discharge rate. However, after analyzing the upstream conditions, it was determined that not all 300 cfs will reach the subject property. Runoff entering the site from the approximate 380-acre Watershed A is restricted by the existing 48" CMP culvert that runs under Hihn Street (see Watershed Exhibit following page 7). Because the 48" CMP culvert does not have the capacity to convey all 300 cfs, runoff backs up in Bull Creek at the inlet to the 48" CMP culvert. Hihn Street is elevated high enough that no over-topping occurs, instead the runoff is diverted east into Plateau Drive and towards Gushee Street.

There is accumulated sand, gravel and other sediment in the bottom of the culvert that currently limits the capacity of the culvert. However, for the purposes of this analysis, we have assumed the culvert will be cleaned out from time to time, which would maximize its capacity. It will be at those times that the floodwater level would be at its highest for a 100-year event.

The following calculation shows the capacity of the existing 48" CMP culvert.

Entered Data:
- Shape .... Circular
- Solving for .... Headwater
- Chart Description .... CORRUGATED METAL PIPE CULVERT
- Scale Description .... PIPE PROJECTING FROM FILL
- **Flowrate .... 96.0000 cfs**
- Manning's n 0.0240
- Roadway Elevation .... 289.7900 ft
- Inlet Elevation .... 282.0500 ft
- Outlet Elevation .... 281.8200 ft
- Diameter .... 4.0000 ft
- Length .... 146.0000 ft
- Entrance Loss 0.8000
- Tailwater .... 4.0000 ft

Computed Results:
- Headwater .... 289.6644 ft Outlet Control
- Slope .... 0.0016 ft/ft
- Velocity .... 7.6394 fps

When functioning at capacity, the 48" culvert can convey 96 cfs of runoff.

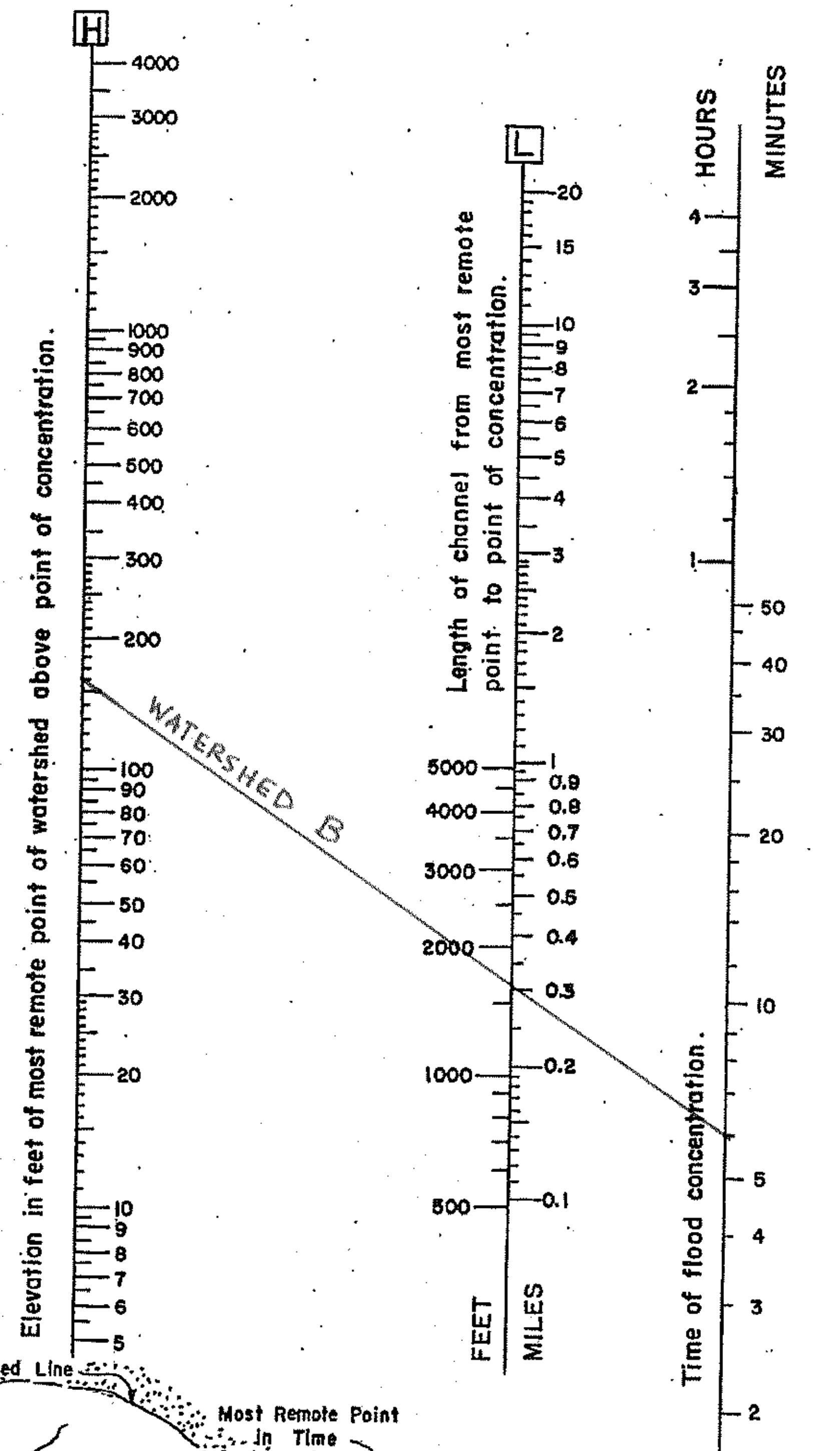
In addition to the 96 cfs of runoff discharging out of the culvert, there is also approximately 20 acres of watershed (Watershed B) contributing runoff to that section of Bull Creek that crosses the project site downstream of the 48-inch CMP culvert (see Watershed Exhibit following page 7).

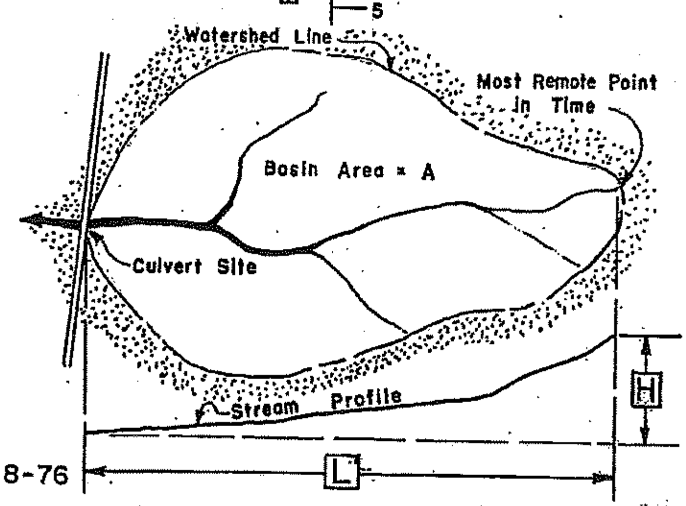
The following calculations provide analysis of the runoff generated by Watershed B.

• Watershed Area	= 20 AC
C_{10}	= 0.20
I_{10} @ T_c = 6 min (From SWM-4)	= 3.2"/hr.
$Q_{10} = (0.20)(3.2)(20)$	= 12.8 c.f.s.
$Q_{100} = (Q_{10})(1.25)(1.5)$	**= 24.0 c.f.s.**

The combined runoff from the culvert discharge and Watershed B is equal to 120 cfs. Therefore, 120 cfs has been used to determine the base flood elevation (BFE) for Bull Creek at the subject property.

ATTACHMENT 12





REV. 8-76

TIME of CONCENTRATION
NOMOGRAPH for
NATURAL WATERSHEDS
(pear shaped basins)

FIG. SWM-4

ATTACHMENT 12

Hydraulic Analysis

A digital terrain model of the proposed Felton Library site and adjacent lands along Bull Creek upstream to Hihn Street was built in AutoCAD using digital topographic maps developed from aerial surveys (Santa Cruz County, 2003) as well as ground-based surveys (Ifland Survey, 2009). The terrain model was generally sampled at 50 foot increments and cross-sections were created. The model was sampled and cross-sections were also created for other critical areas

At each cross-section, the 100-year flow depth or base flood elevation (BFE) was calculated using the Manning's Equation,

$$Q = \frac{1.49}{n} * A * R^{2/3} * \sqrt{S}$$

where,

n = roughness coefficient
A = channel area (ft^2)
R = hydraulic radius (ft)
S = channel slope (ft/ft)

In the sampled sections where the creek lacked the capacity to contain the 100-year flood discharge, the Manning's Equation was used to estimate the spread of the overflow.

The roughness coefficient value (Manning's n) was estimated using field based observations of the channel and surrounding areas.

The hydraulic analysis for this study was based on unobstructed flow, without debris. Base flood elevations shown on the attached *Bull Creek Profile* are valid if the creek and culverts remain unobstructed.

Results

In some areas, the channel lacks the capacity to contain the 100-year flood discharge and runoff begins to either spread to the west or spill over the bank to the east. The overflow to the east is collected in an "overflow channel". This "overflow channel" carries the excess flood water through the subject property and dumps it back into Bull Creek between station 7+50 and 8+00. However, at station 7+50 the "overflow channel" does not have the capacity to contain the volume carried by the channel immediately upstream. Because the existing ground between the "overflow channel" and Bull Creek is higher than the sidewalk along Gushee Street, some of the flood water will flow into the street at this location. By station 8+00, flow into the street will have ended.

For each sampled station along Bull Creek a cross-section was created and the base flood elevation was plotted. A separate base flood elevation was estimated at each station for the "overflow channel" to the east of Bull Creek. These cross-sections, as well as their associated calculations, can be found in the attached *Bull Creek Cross-Sections* exhibits and *Bull Creek Cross-Section Calculations.*

A 100-year floodplain map was created (see attached Floodplain Exhibit) that shows the approximate limits of the 100-year floodplain.

The following are the calculated base flood elevations for each station along Bull Creek.

Base Flood Elevation (BFE)		
Station	**Bull Creek**	**"Overbank Channel"**
STA: 2+50	287.78	
STA: 3+00	287.37	
STA: 3+50	286.37	
STA: 4+00	285.57	
STA: 4+50	285.44	
STA: 5+00	285.21	
STA: 5+26	284.89	284.87
STA: 5+50	285.48	284.51
STA: 5+66.19	285.31	284.71
STA: 5+89.31	285.09	284.92
STA: 6+00	284.36	284.78
STA: 6+50	284.23	283.99
STA: 7+00	283.29	283.71
STA: 7+50	282.97	283.81
STA: 8+00	283.19	283.63
STA: 8+50	282.27	
STA: 8+75	281.25	
STA: 8+90	281.58	

ATTACHMENT 12

References

Autodesk. (2008). Computer Program AutoCAD 2008.

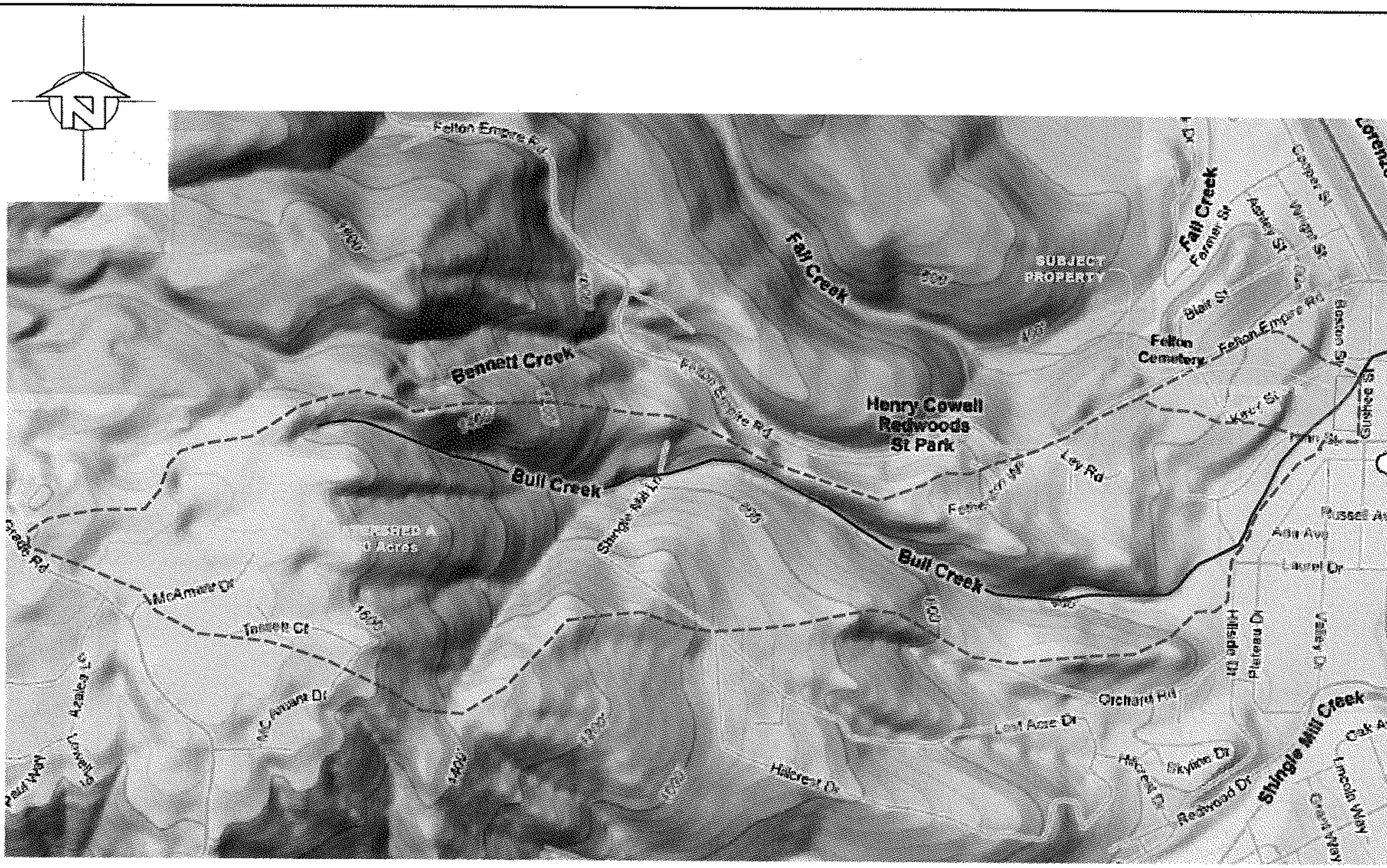
Ifland Survey. (June, 2009). Topographic Survey for the Felton Library, Felton, California.

Santa Cruz County. (2003). Digital Aerial Contours. Contour Interval: 2 foot in urban areas, 10 foot in regional areas.

Santa Cruz County. (June, 2006). County of Santa Cruz Design Criteria.

Ifland Engineers Inc. (December, 2002). Preliminary Drainage Study for Felton Library.

County of Santa Cruz Public Works Department. (April, 1978). Hydraulic Report for Gushee Street Improvements.



Watershed Exhibit

SCALE: 1" = 800'

JOB NO. 12038 - FELTON LIBRARY

SHEET NO. ____ OF ____

CALCULATED BY RC/JM DATE 5/24/17

SCALE: 1" = 800'

IFLAND ENGINEERS

5900 SOQUEL AVE, SUITE 101
SANTA CRUZ, CA 95062

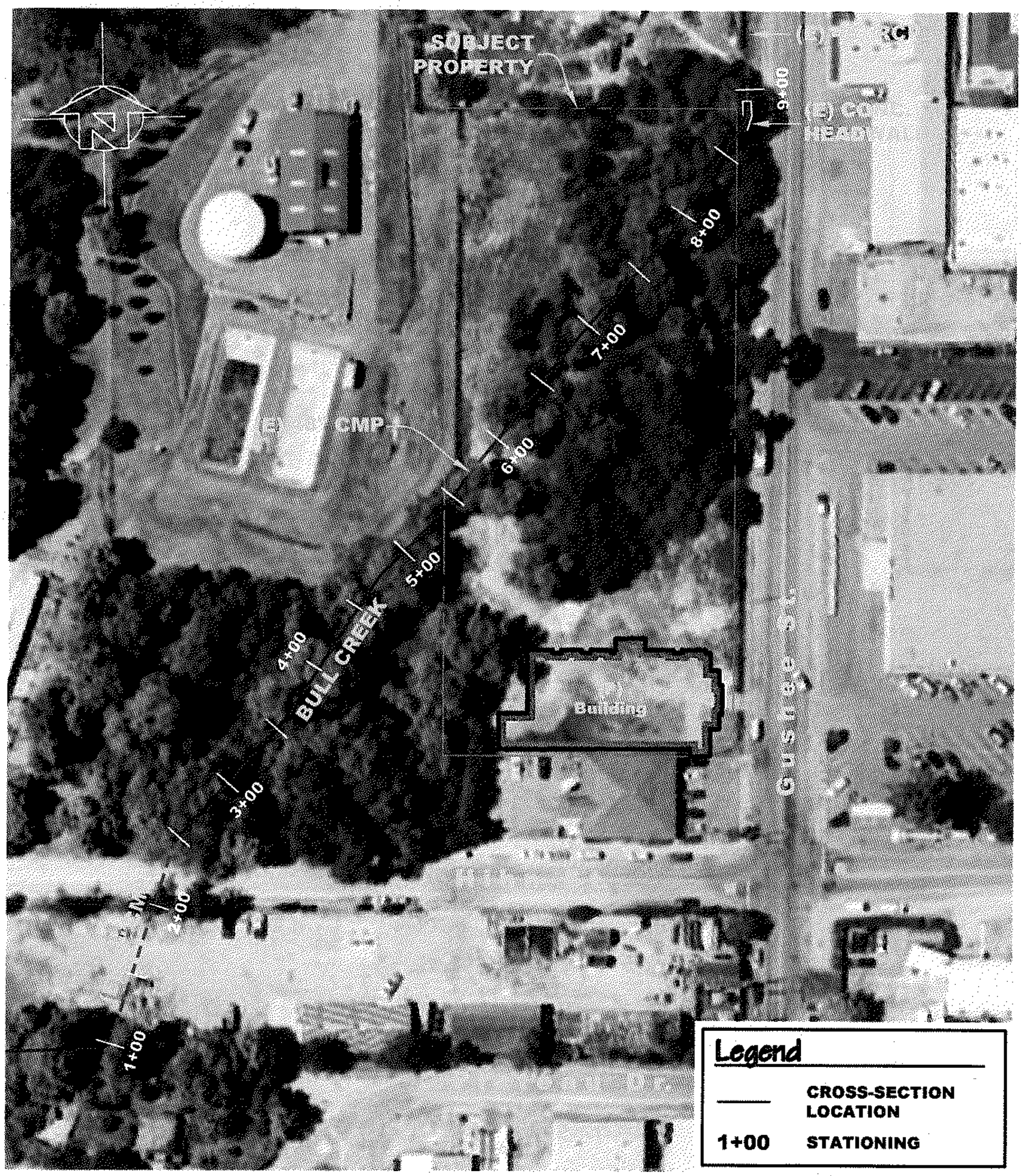
CIVIL ENGINEERING • LAND PLANNING • STRUCTURAL DESIGN

ATTACHMENT 12

IFLAND ENGINEERS
CIVIL ENGINEERING ▪ LAND PLANNING ▪ STRUCTURAL DESIGN

5300 SOQUEL AVE, SUITE 101
SANTA CRUZ, CA 95062
TEL (831) 426-5313
FAX (831) 426-1763
www.iflandengineers.com

JOB NO. 12038 - FELTON LIBRARY
SHEET NO. ________ OF ________
CALCULATED BY RC/JM DATE 5/24/17
SCALE: 1" = 100'



Site Map Exhibit

SCALE: 1" = 100'

100' 0' 50' 100' 200'

GRAPHIC SCALE: 1 INCH = 100 FEET

I:\sdskproj\2002\02124\dwg\Drainage\Floodplain Exhibit.dwg 25May17 10:44:41 AM joshmaccallister

ATTACHMENT 12

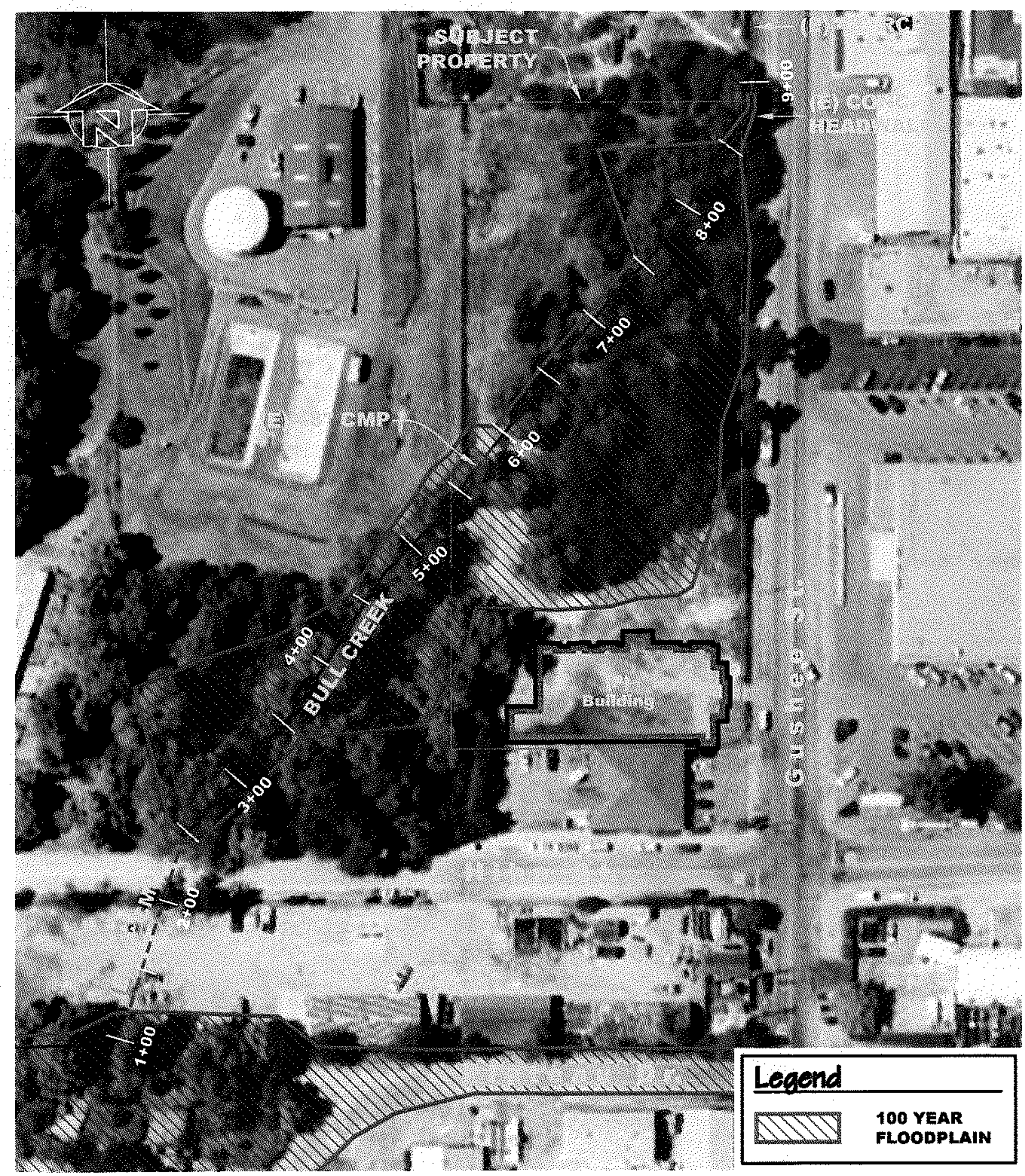
IFLAND ENGINEERS
CIVIL ENGINEERING ▪ LAND PLANNING ▪ STRUCTURAL DESIGN
5300 SOQUEL AVE, SUITE 101
SANTA CRUZ, CA 95062
TEL (831) 426-5313
FAX (831) 426-1763
www.iflandengineers.com

JOB NO. 12038 - FELTON LIBRARY

SHEET NO. ______ OF ______

CALCULATED BY RC/JM DATE 5/24/17

SCALE: 1" = 100'



Floodplain Exhibit

SCALE: 1" = 100'

100' 0' 50' 100' 200'

GRAPHIC SCALE: 1 INCH = 100 FEET

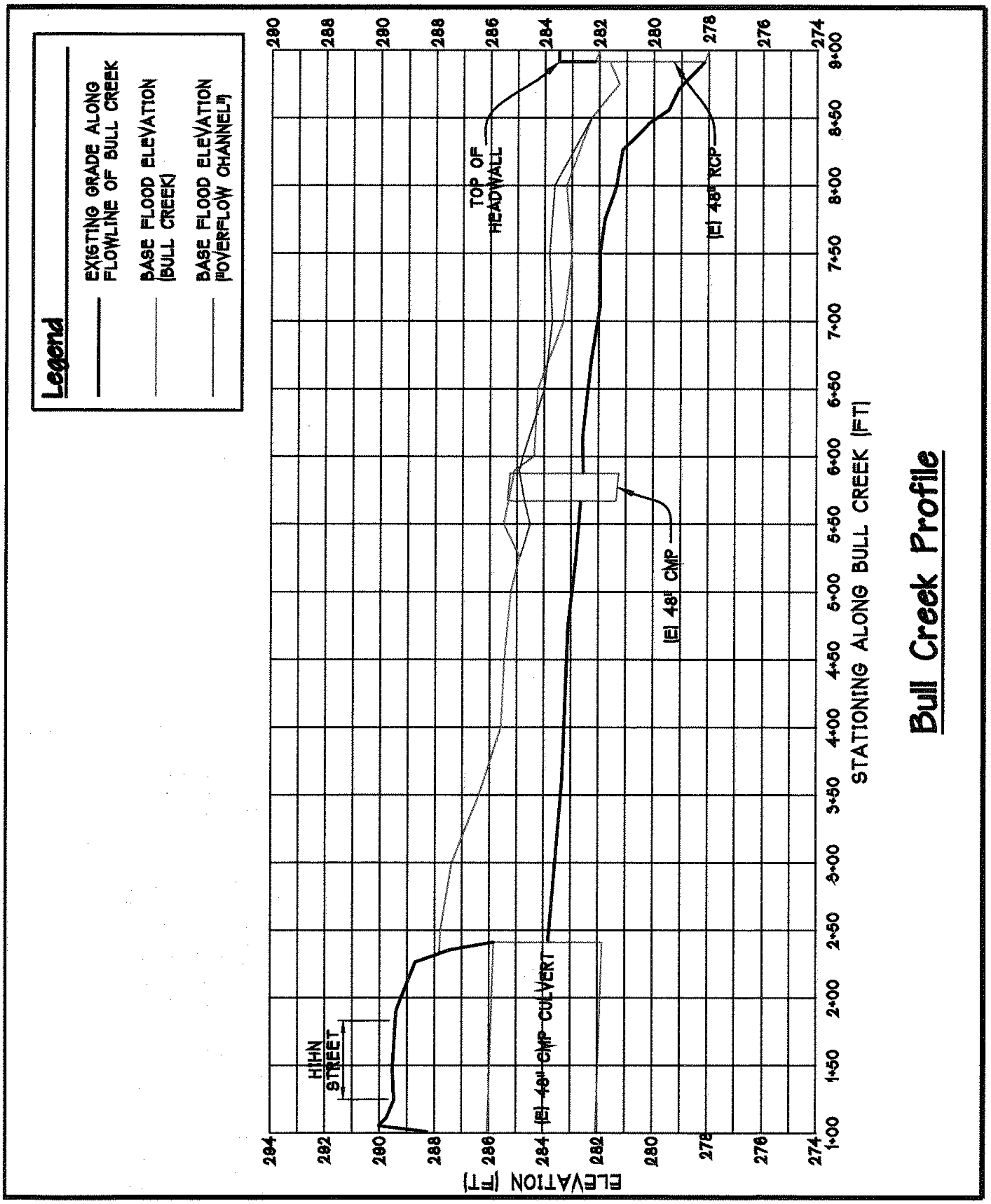
I:\sdskproj\2002\02124\dwg\Drainage\Floodplain Exhibit.dwg 25May17 10:45:29 AM joshmaccallister

ATTACHMENT 12

IFLAND ENGINEERS
CIVIL ENGINEERING ▪ LAND PLANNING ▪ STRUCTURAL DESIGN

5300 SOQUEL AVE, SUITE 101
SANTA CRUZ, CA 95062
TEL (831) 426-5313
FAX (831) 426-1763
www.iflandengineers.com

JOB NO. 12058 - FELTON LIBRARY
SHEET NO. ______ OF ______
CALCULATED BY RC/JM DATE 5/24/17
SCALE: 1" = 100'



ATTACHMENT 12

IFLAND ENGINEERS

CIVIL ENGINEERING ▪ LAND PLANNING ▪ STRUCTURAL DESIGN

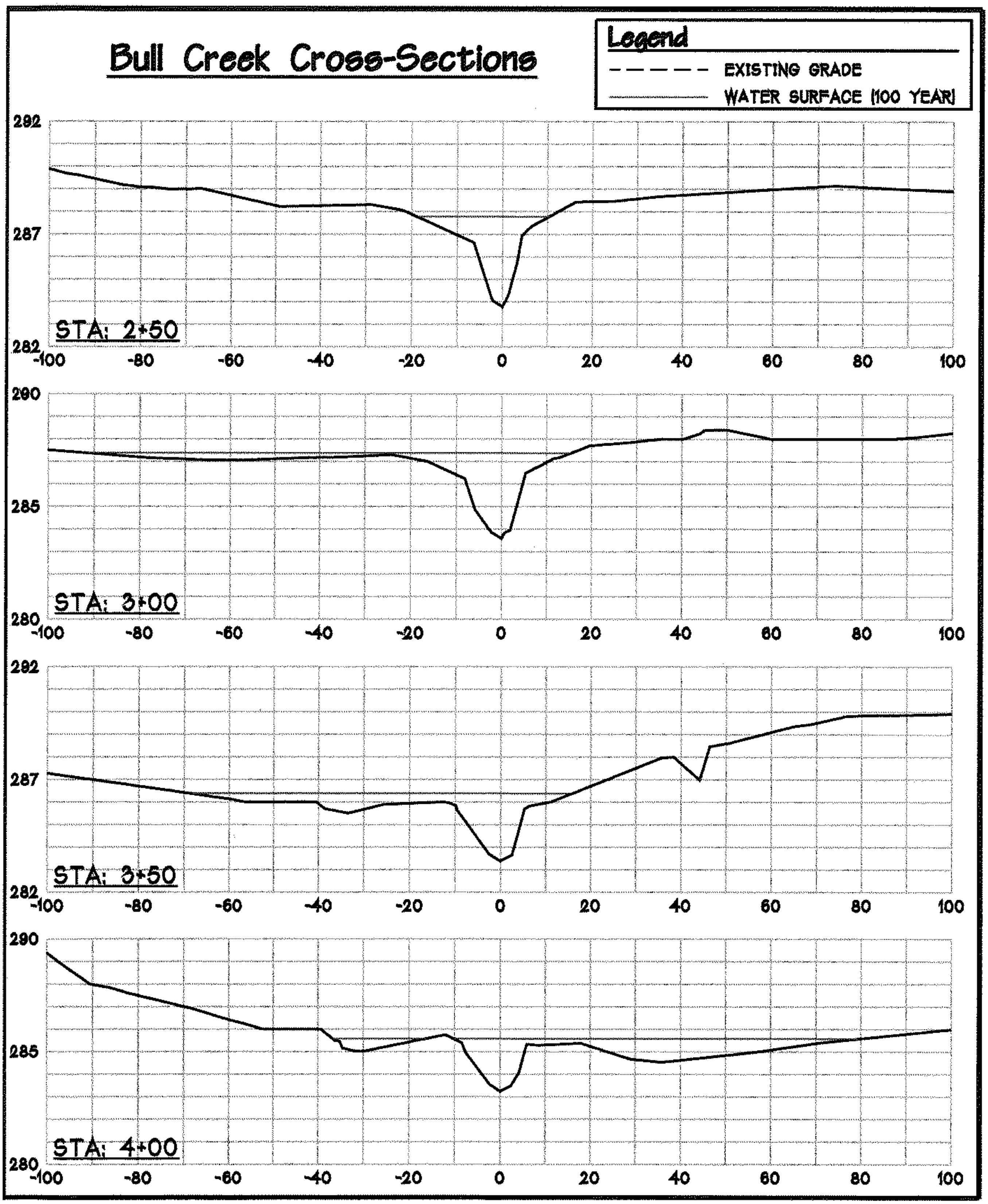
5300 SOQUEL AVE, SUITE 101
SANTA CRUZ, CA 95062
TEL (831) 426-5313
FAX (831) 426-1763
www.iflandengineers.com

JOB NO. 12068 – FELTON LIBRARY

SHEET NO. 1 OF 5

CALCULATED BY RC/JM DATE 5/24/17

SCALE:



I:\sdskproj\2002\02124\dwg\Drainage\Cross-Sections Exhibit.dwg 25May17 10:47:09 AM joshmaccallister © IFLAND ENGINEERS, INC.

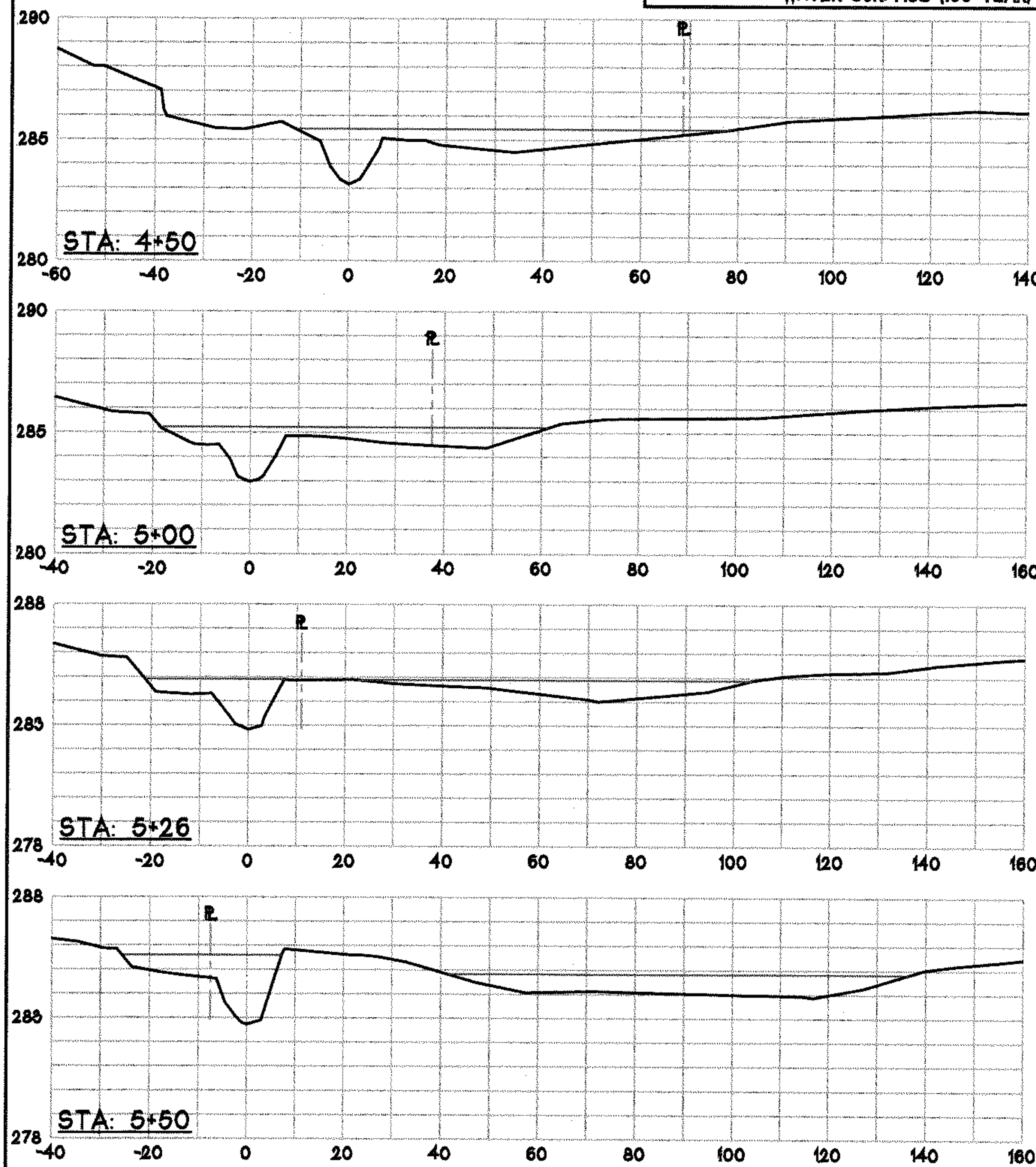
ATTACHMENT 12

IFLAND ENGINEERS
CIVIL ENGINEERING ▪ LAND PLANNING ▪ STRUCTURAL DESIGN
5300 SOQUEL AVE, SUITE 101
SANTA CRUZ, CA 95062
TEL (831) 426-5313
FAX (831) 426-1763
www.iflandengineers.com

JOB NO. 12008 – FELTON LIBRARY
SHEET NO. 2 OF 5
CALCULATED BY RC/JM DATE 5/24/17
SCALE:

Bull Creek Cross-Sections

Legend
- - - - - - EXISTING GRADE
———— WATER SURFACE (100 YEAR)

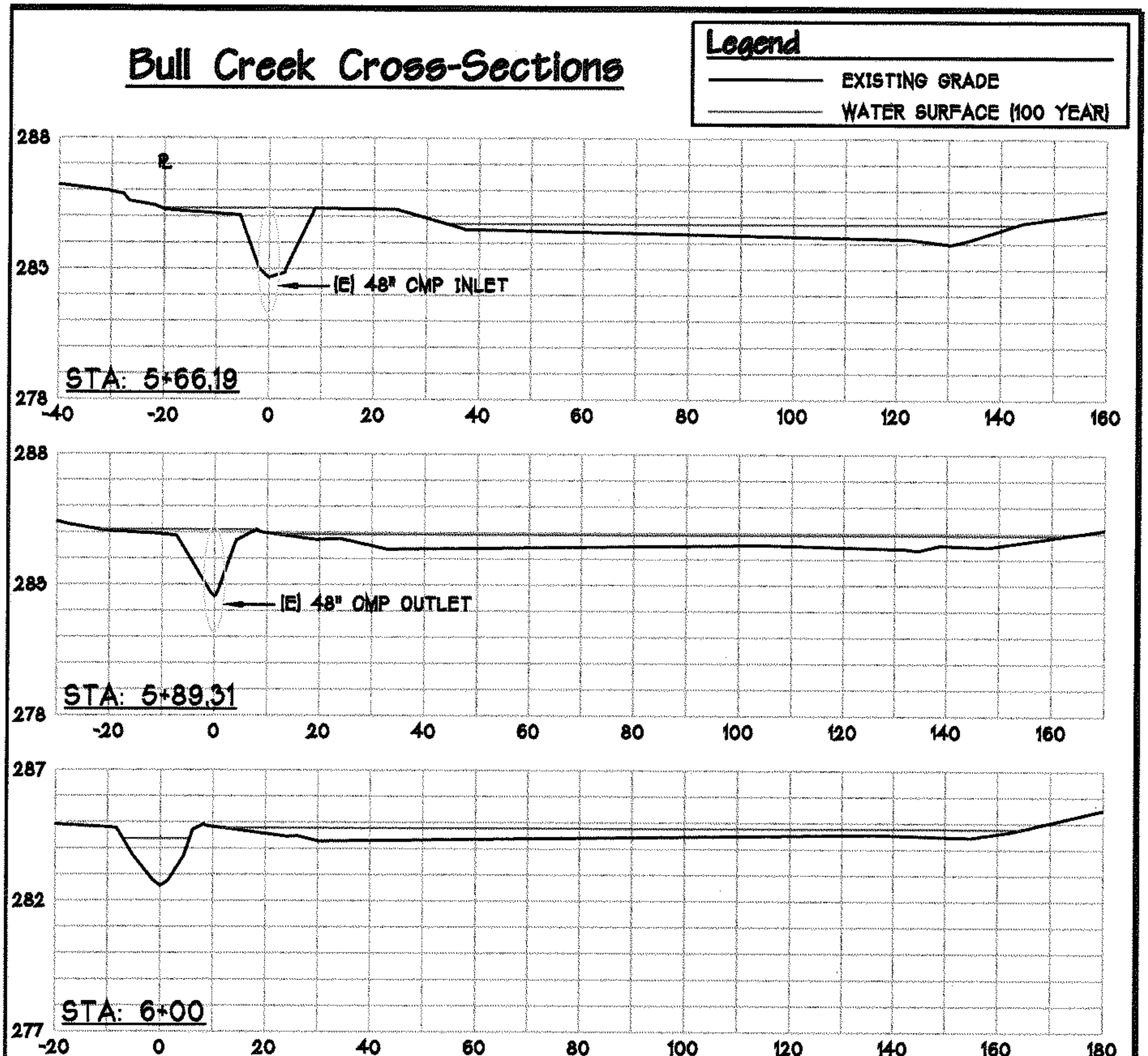


ATTACHMENT 12

IFLAND ENGINEERS
CIVIL ENGINEERING ▪ LAND PLANNING ▪ STRUCTURAL DESIGN
5300 SOQUEL AVE, SUITE 101
SANTA CRUZ, CA 95062
TEL (831) 426-5313
FAX (831) 426-1763
www.iflandengineers.com

JOB NO. 12038 - FELTON LIBRARY
SHEET NO. 3 OF 5
CALCULATED BY RC/JM DATE 5/24/17
SCALE:

Bull Creek Cross-Sections



ATTACHMENT 12

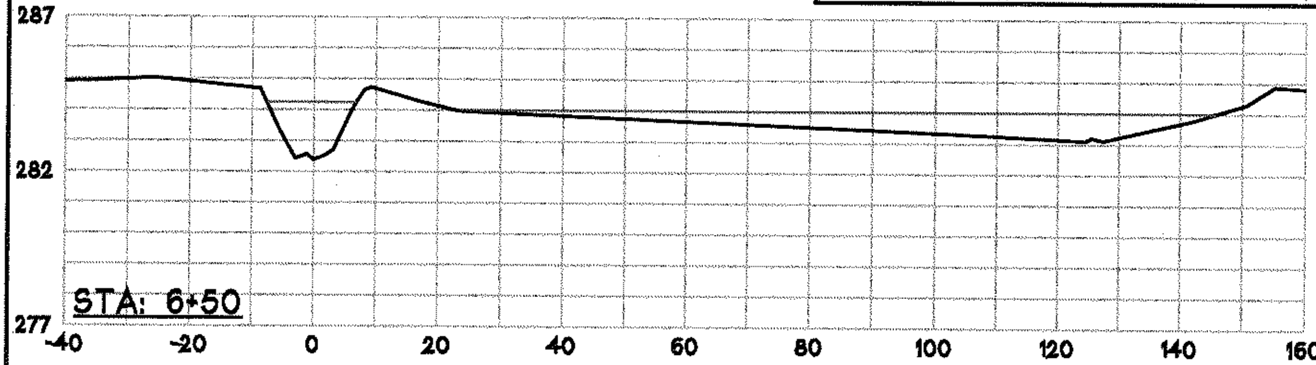
IFLAND ENGINEERS
CIVIL ENGINEERING • LAND PLANNING • STRUCTURAL DESIGN

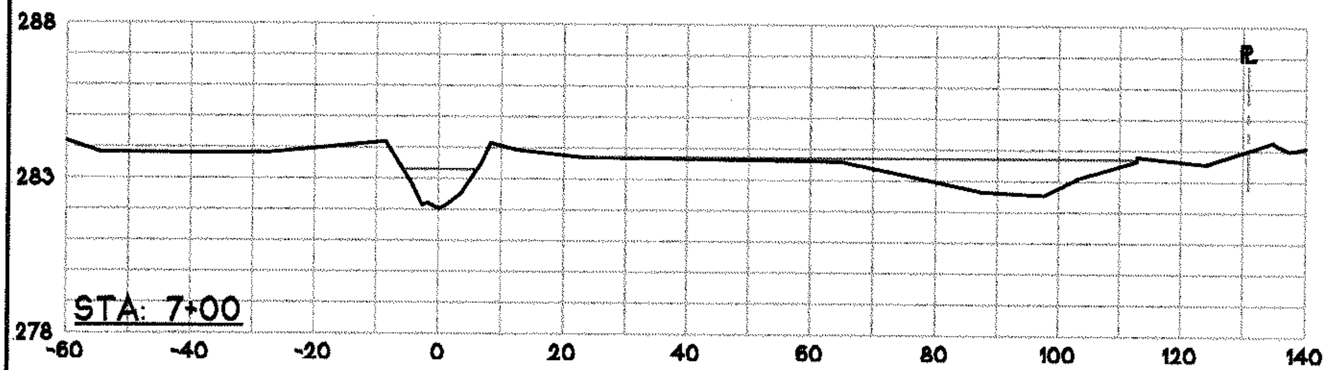
6300 SOQUEL AVE, SUITE 101
SANTA CRUZ, CA 95062
TEL (831) 426-5313
FAX (831) 426-1763
www.iflandengineers.com

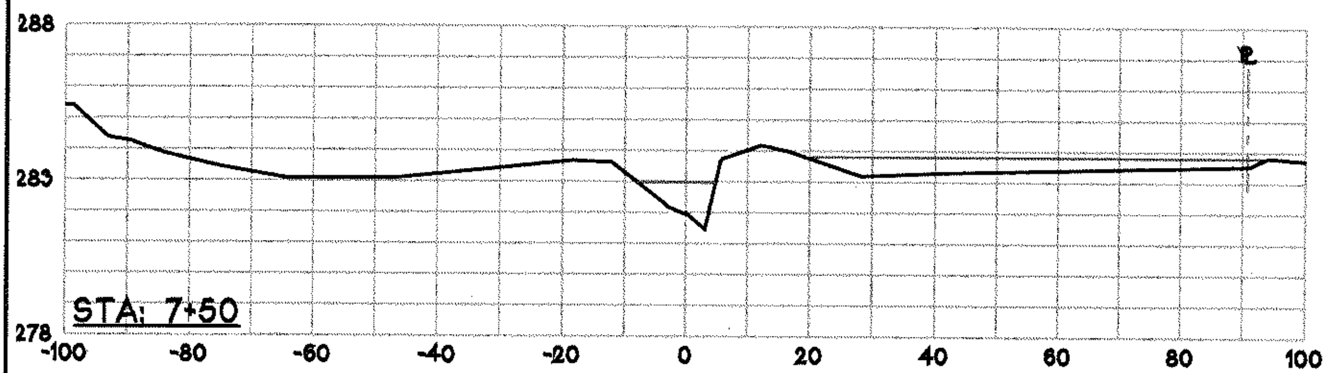
JOB NO. 12058 - FELTON LIBRARY
SHEET NO. 4 OF 5
CALCULATED BY RC/JM DATE 5/24/17
SCALE:

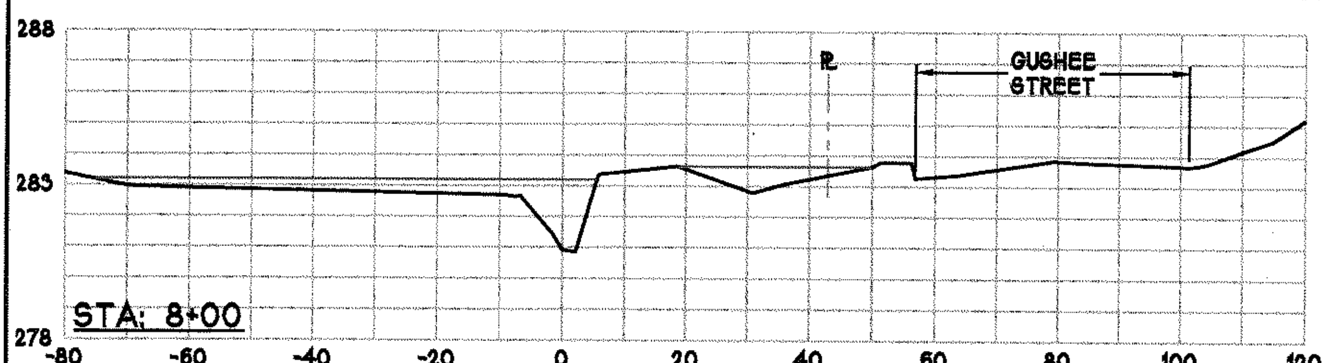
Bull Creek Cross-Sections

Legend
- - - - - - EXISTING GRADE
———— WATER SURFACE (100 YEAR)









I:\sdskproj\2002\02124\dwg\Drainage\Cross-Sections Exhibit.dwg 25May17 10:48:21 AM joshmaccallister © IFLAND ENGINEERS, INC.

ATTACHMENT 12

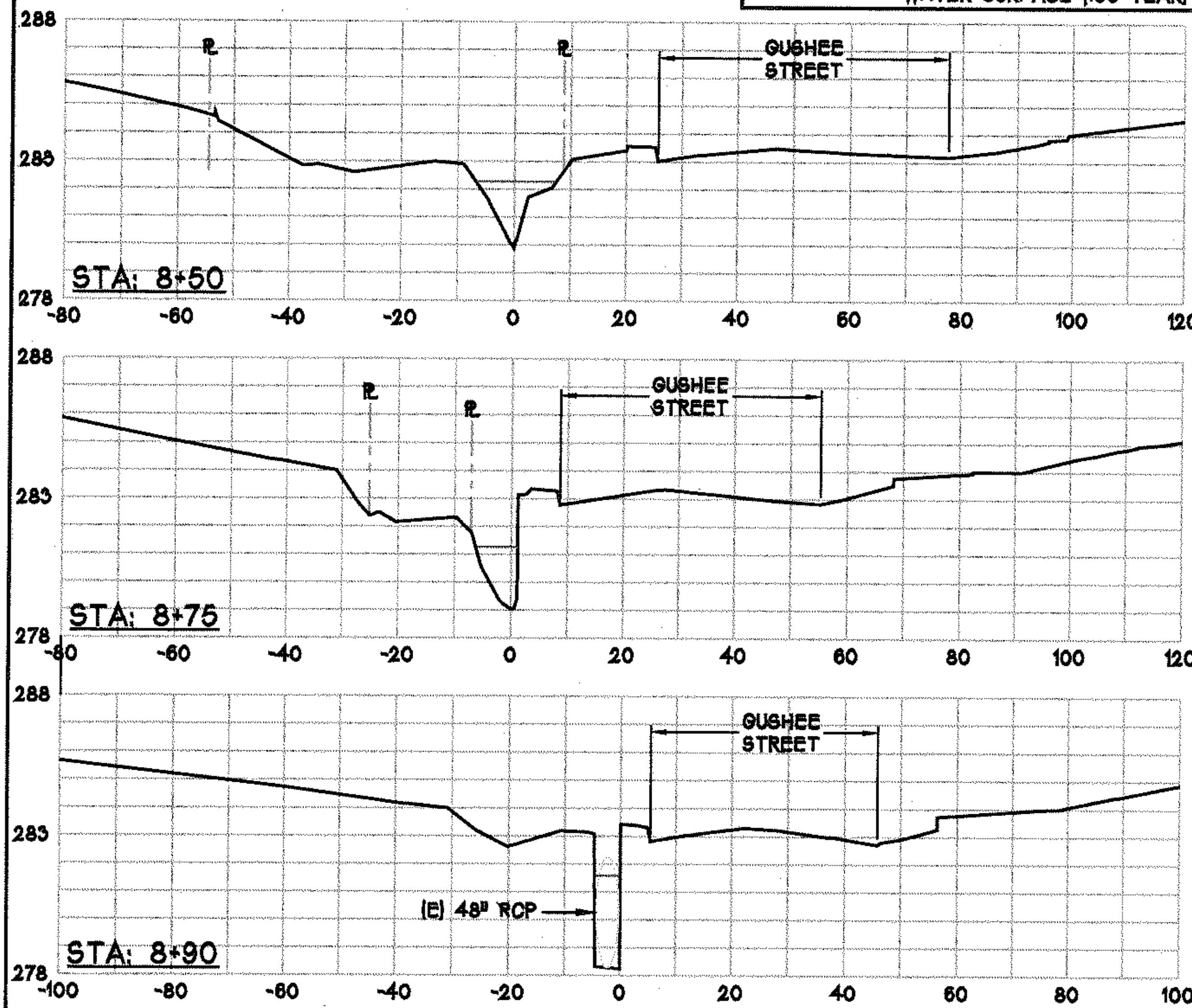
IFLAND ENGINEERS
CIVIL ENGINEERING ▪ LAND PLANNING ▪ STRUCTURAL DESIGN

5300 SOQUEL AVE, SUITE 101
SANTA CRUZ, CA 95062
TEL (831) 426-5313
FAX (831) 426-1763
www.iflandengineers.com

JOB NO. 12058 - FELTON LIBRARY
SHEET NO. 5 OF 5
CALCULATED BY RC/JM DATE 5/24/17
SCALE:

Bull Creek Cross-Sections

Legend
EXISTING GRADE
WATER SURFACE (100 YEAR)



I:\sdskproj\2002\02124\dwg\Drainage\Cross-Sections Exhibit.dwg 25May17 10:48:45 AM joshmaccallister © IFLAND ENGINEERS, INC.

ATTACHMENT 12

Bull Creek Cross-Section Calculations

Date: 5/24/17

STA: 2+50

Flowline elev:	283.78	
S =	0.0036	ft/ft
n =	0.035	

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	4.00	31.33	40.12	121

Base Flood Elevation: 287.78

STA: 3+00

Flowline elev:	283.57	
S =	0.0036	ft/ft
n =	0.035	

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	3.80	110.16	66.17	120

Base Flood Elevation: 287.37

STA: 3+50

Flowline elev:	283.36	
S =	0.0036	ft/ft
n =	0.035	

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	3.01	85.38	60.22	122

Base Flood Elevation: 286.37

STA: 4+00

Flowline elev:	283.24	
S =	0.0036	ft/ft
n =	0.035	

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100Year Flood:	2.33	117.23	67.59	120

Base Flood Elevation: 285.57

ATTACHMENT 12

Bull Creek Cross-Section Calculations
Date: 5/24/17

STA: 4+50

Flowline elev: 283.15
S = 0.0036 ft/ft
n = 0.035

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	2.29	90.26	61.01	120

Base Flood Elevation: 285.44

STA: 5+00

Flowline elev: 282.96
S = 0.0036 ft/ft
n = 0.035

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	2.25	80.53	58.17	120

Base Flood Elevation: 285.21

STA: 5+26

Flowline elev: 282.82
S = 0.0036 ft/ft
n = 0.035

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
Section Capacity:	2.07	29.29	28.17	70

Base Flood Elevation: 284.89

OVERFLOW PATH

Flowline elev: 284.00
S = 0.0036 ft/ft
n = 0.035

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	0.87	81.14	34.89	51

Base Flood Elevation: 284.87

ATTACHMENT 12

Bull Creek Cross-Section Calculations
Date: 5/24/17

STA: 5+50

Flowline elev:	282.72	
S =	0.0036	ft/ft
n =	0.035	

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	2.76	31.64	29.14	70

Base Flood Elevation: 285.48

OVERFLOW PATH

Flowline elev:	283.88	
S =	0.0036	ft/ft
n =	0.035	

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	0.63	84.49	35.14	50

Base Flood Elevation: 284.51

STA: 5+66.19

Flowline elev:	282.65	
S =	0.0036	ft/ft
n =	0.035	

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	2.66	30.46	26.46	62

Base Flood Elevation: 285.31

OVERFLOW PATH

Flowline elev:	283.96	
S =	0.0036	ft/ft
n =	0.035	

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	0.75	108.84	42.43	58

Base Flood Elevation: 284.71

ATTACHMENT 12

Bull Creek Cross-Section Calculations
Date: 5/24/17

STA: 5+89.31

Flowline elev: 282.55
S = 0.0036 ft/ft
n = 0.035

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	2.54	31.11	19.09	35

Base Flood Elevation: 285.09

OVERFLOW PATH

Flowline elev: 284.34
S = 0.0036 ft/ft
n = 0.035

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	0.58	150.85	61.1	85

Base Flood Elevation: 284.92

STA: 6+00

Flowline elev: 282.56
S = 0.0036 ft/ft
n = 0.035

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	1.80	13.21	13.44	35

Base Flood Elevation: 284.36

OVERFLOW PATH

Flowline elev: 284.28
S = 0.0036 ft/ft
n = 0.035

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	0.50	157.76	62.21	85

Base Flood Elevation: 284.78

Bull Creek Cross-Section Calculations

Date: 5/24/17

STA: 6+50

Flowline elev:	282.38	
S =	0.0036	ft/ft
n =	0.035	

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	1.85	17.57	15.08	35

Base Flood Elevation: **284.23**

OVERFLOW PATH

Flowline elev:	283.09	
S =	0.0036	ft/ft
n =	0.035	

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	0.90	122.96	56.14	85

Base Flood Elevation: **283.99** xr

STA: 7+00

Flowline elev:	282.03	xr
S =	0.011	ft/ft
n =	0.035	

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	1.26	12.19	9.37	35

Base Flood Elevation: **283.29**

OVERFLOW PATH

Flowline elev:	282.54	
S =	0.011	ft/ft
n =	0.035	

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	1.17	90.5	35.52	85

Base Flood Elevation: **283.71**

ATTACHMENT 12

Bull Creek Cross-Section Calculations

Date: 5/24/17

STA: 7+50

Flowline elev: 281.46
S = 0.011 ft/ft
n = 0.035

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	1.51	13.48	9.74	35

Base Flood Elevation: 282.97

OVERFLOW PATH

Flowline elev: 283.18
S = 0.011 ft/ft
n = 0.035

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
Section Capacity:	0.63	75.13	30.73	76

Base Flood Elevation: 283.81

STA: 8+00

Flowline elev: 280.85
S = 0.011 ft/ft
n = 0.035

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	2.34	78.94	32.41	80

Base Flood Elevation: 283.19

OVERFLOW PATH

Flowline elev: 282.78
S = 0.011 ft/ft
n = 0.035

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	0.85	31.47	12.66	31

Base Flood Elevation: 283.63

ATTACHMENT 12

Bull Creek Cross-Section Calculations

Date: 5/24/17

STA: 8+50

Flowline elev: 279.88
S = 0.046 ft/ft
n = 0.035

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	2.39	15.15	13.25	111

Base Flood Elevation: 282.27

STA: 8+75

Flowline elev: 279.04
S = 0.046 ft/ft
n = 0.035

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	2.21	9.8	11.15	111

Base Flood Elevation: 281.25

STA: 8+90

Flowline elev: 278.24
S = 0.046 ft/ft
n = 0.035

	Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Flow Rate (ft^3/sec)
100 Year Flood:	3.34	11.08	15	111

Base Flood Elevation: 281.58

COUNTY OF SANTA CRUZ

PLANNING DEPARTMENT
701 OCEAN STREET, 4TH FLOOR, SANTA CRUZ, CA 95060
(831) 454-2580 FAX: (831) 454-2131 TDD: (831) 454-2123
KATHLEEN MOLLOY PREVISICH, PLANNING DIRECTOR

file copy

10 August 2017

Teall Messer
3833 Glen Haven Road
Soquel, CA 95073

Subject: Review of the Hydrology report titled 100-year Floodplain Analysis of Bull Creek at the Proposed Felton Library Site dated May 2017 by Ifland Engineers – Project No. 12038

Project Site: Proposed Felton Library, Gushee Street, Felton
APN 065-073-03
Application No. 171167

Dear Applicant:

The purpose of this letter is to inform you that the Planning Department has accepted the subject report. The following items shall be required:

1. Final plans shall reference the Hydrology report by title, author, and date. The project plans shall incorporate the results of the Hydrology report, specifically the location and elevations of the 100-year flood plain; and

2. The author of the Hydrology report is also the preparer of the project civil engineering plan set. After building permit issuance the project civil engineer *must remain involved with the project* during construction.

   At the completion of construction, a Final Grading Inspection Form from your project civil engineer is required to be submitted to Environmental Planning certifying that the project was constructed in conformance with the project plans. An electronic copy of the Final Grading Inspection Form may be found on our website: www.sccoplanning.com, under "Environmental", "Geology & Soils", "Assistance & Forms".

Our acceptance of the report is limited to its technical content. Other project issues such as zoning, fire safety, septic or sewer approval, etc. may require resolution by other agencies.

Please note that this determination may be appealed within 14 calendar days of the date of service. Additional information regarding the appeals process may be found online at: http://www.sccoplanning.com/html/devrev/plnappeal_bldg.htm

If we can be of any further assistance, please contact the undersigned at (831) 454-3168 or rick.parks@santacruzcounty.us

Sincerely,

Rick Parks, GE 2603
Civil Engineer – Environmental Planning

Cc: Ifland Engineers, Attn: David Heinrichsen, PE
Environmental Planning, Attn: Annette Olson

M
M
MOTT
MACDONALD

Teall Messer
Teall Messer Architect
3833 Glen Haven Road
Soquel, CA 95073

Felton Library Traffic Impact Analysis (Revised), Santa Cruz County, California

August 28, 2017

379535 Letter4.docx

1300 First Street
Suite B
Gilroy CA 95020
United States of America

T +1 (408) 848 3122
F +1 (408) 848 2202
mottmac.com

Dear Teall:

Mott MacDonald has prepared a revised traffic impact analysis for the proposed Felton Library relocation, to be located on Gushee Street between Kirby and Hihn Streets in Felton, Santa Cruz County, California. **Figure 1** depicts the location of the study project.

This revised analysis includes an evaluation of project trip generation, distribution, and assignment; on-site and off-site parking; identification of potential traffic impacts; pedestrian circulation to and from the site; and project access and internal circulation. The prior analyses for the library were dated February 26, 2013 and May 23, 2017.

A. Project Background

The existing Felton library is located within a former church (approximately 1,250 square feet in size) at the corner of Gushee Street and Felton Empire Road in Felton. The Santa Cruz Public Libraries (SCPL), the joint-powers agency that oversees the public library system in northern Santa Cruz County, is proposing to relocate the library onto a currently vacant property bordered by existing homes off Kirby Street to the north, Gushee Street to the east, the United States Post Office for Felton to the south, and the San Lorenzo Valley Water District's Kirby Water Treatment Plant to the west. SCPL is proposing an approximately 9,389 square foot library and an outdoor nature walk on the project site. **Figure 2** depicts the site plan for the project.

The new library building will be accessible from Gushee Street just north of Hihn Street.

B. Project Trip Generation, Distribution and Assignment

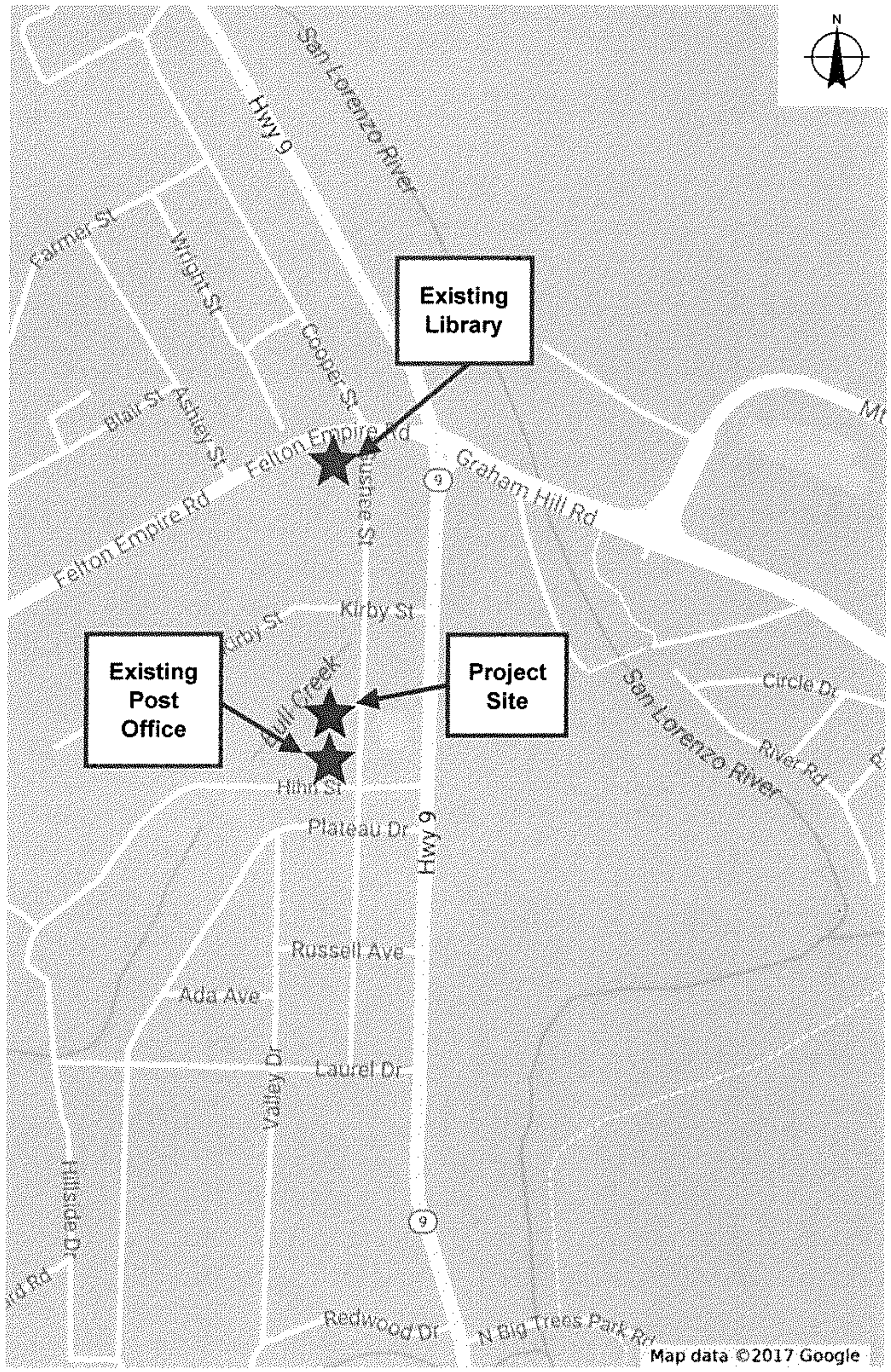
Table 1 depicts the revised project trip generation. This trip generation estimate was derived using trip rates published in 2012 within *Trip Generation Manual*, 9th Edition, by the Institute of Transportation Engineers, and reflects the current definition of the project. Although the proposed project itself would generate 528 daily trips, there are already existing library trips on the surrounding roadway network. Taking into account the existing library traffic, the project would generate

ATTACHMENT 1

MOTT MACDONALD

an estimated net 458 daily trips, with 9 trips (6 in, 3 out) during the AM peak hour and 59 trips (28 in, 31 out) during the PM peak hour.

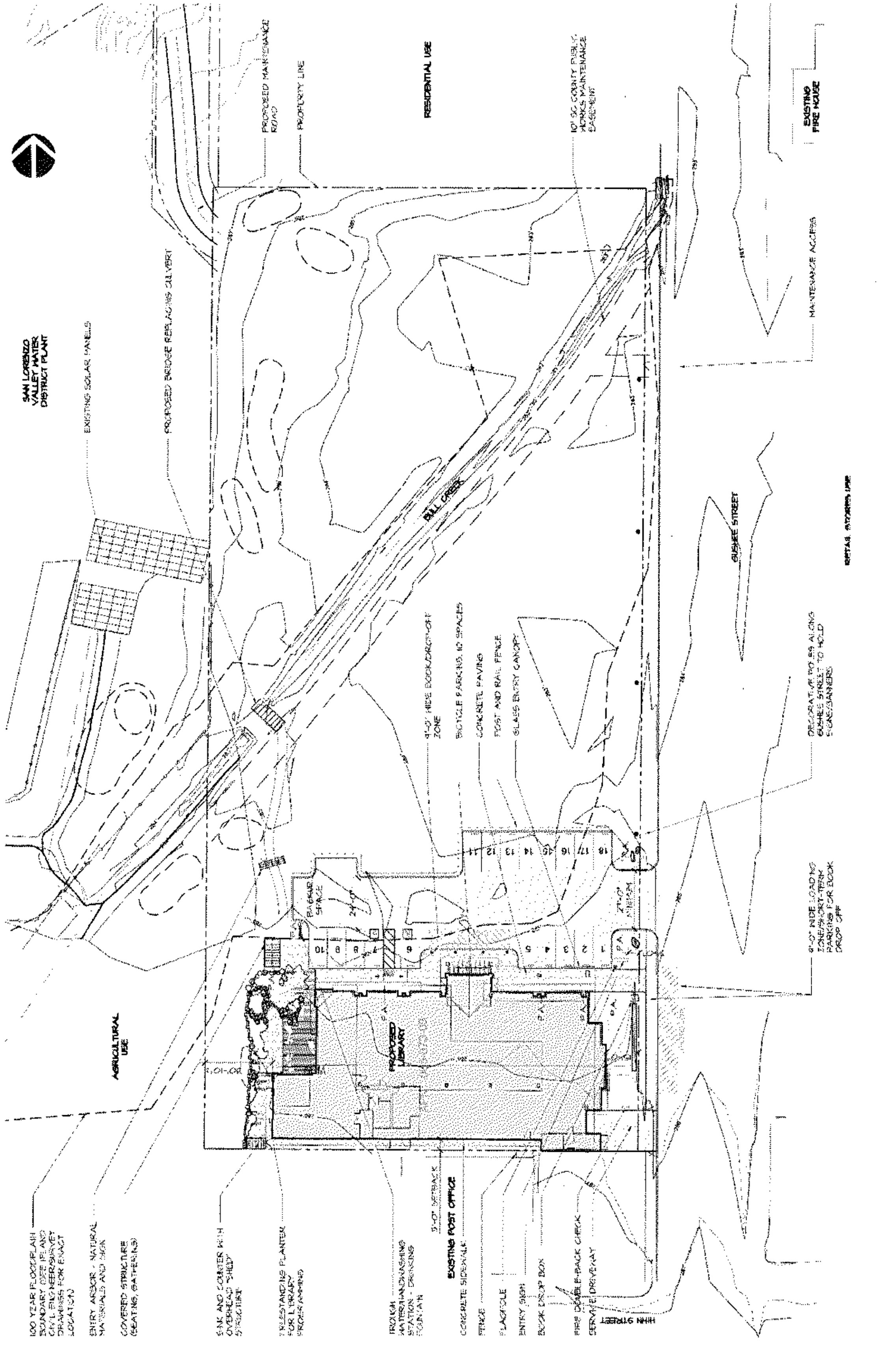
Figure 1 – Project Location Map



ATTACHMENT 1 4

M M
MOTT MACDONALD

Figure 2 – Project Site Plan



Source: Teall Messer Architect, April 2017.

ATTACHMENT 14

MOTT MACDONALD

Note: The revised project definition (without the adjustments for the existing library traffic) would generate approximately the same number of trips as the prior project analyzed in the February 2013 report. More specifically, compared to the prior project, the revised project definition would generate 9 fewer daily trips, 13 fewer AM peak hour trips, and 5 fewer PM peak hour trips.

Table 1 – Project Trip Generation

			AM PEAK HOUR				PM PEAK HOUR			
GENERATED TRIPS	PROJECT SITE	DAILY TRIPS	PEAK HOUR TRIPS	% OF ADT	TRIPS IN	TRIPS OUT	PEAK HOUR TRIPS	% OF ADT	TRIPS IN	TRIPS OUT
Proposed Use:										
New Library	9,389 sf[2]	528	10	2%	7	3	69	13%	33	36
Previous Use:										
Existing Library	1,250 sf[2]	-70	-1	1%	-1	0	-10	14%	-5	-5
Net New Trip Generation:		**458**	**9**		**6**	**3**	**59**		**28**	**31**

Notes:

1. Trip generation estimate based on rates from Institute of Transportation Engineers (ITE), Trip Generation Manual, 9th Edition, 2012.
2. "sf" = square feet.

The projected project trip distribution and trip assignment are depicted in **Figure 3**.

C. Traffic Impact Assessment

As shown in **Figure 3**, vehicle traffic to and from the project site would be split between various streets within the Felton area, including Gushee, Hihn, and Kirby Streets, Laurel Drive, Felton Empire Road and State Route 9 (SR 9). For this reason, the level of potential traffic impact on any one street or intersection would be minimized. However, past analyses of the SR 9 / Felton Empire Road – Graham Hill Road intersection found deficient operations.[1] As a result, a detailed evaluation has been prepared for this intersection, in order to quantitatively evaluate the project's impact.

Figure 4 depicts the traffic volumes under Existing, Existing Plus Project, Background, Background Plus Project, Cumulative Without Project and Cumulative Plus Project conditions. (These volumes are from traffic counts collected by Mott MacDonald in October/November 2013, seasonal factors derived from data obtained from the Santa Cruz County Transportation Commission and growth rates provided by the Santa Cruz County Public Works Department.)

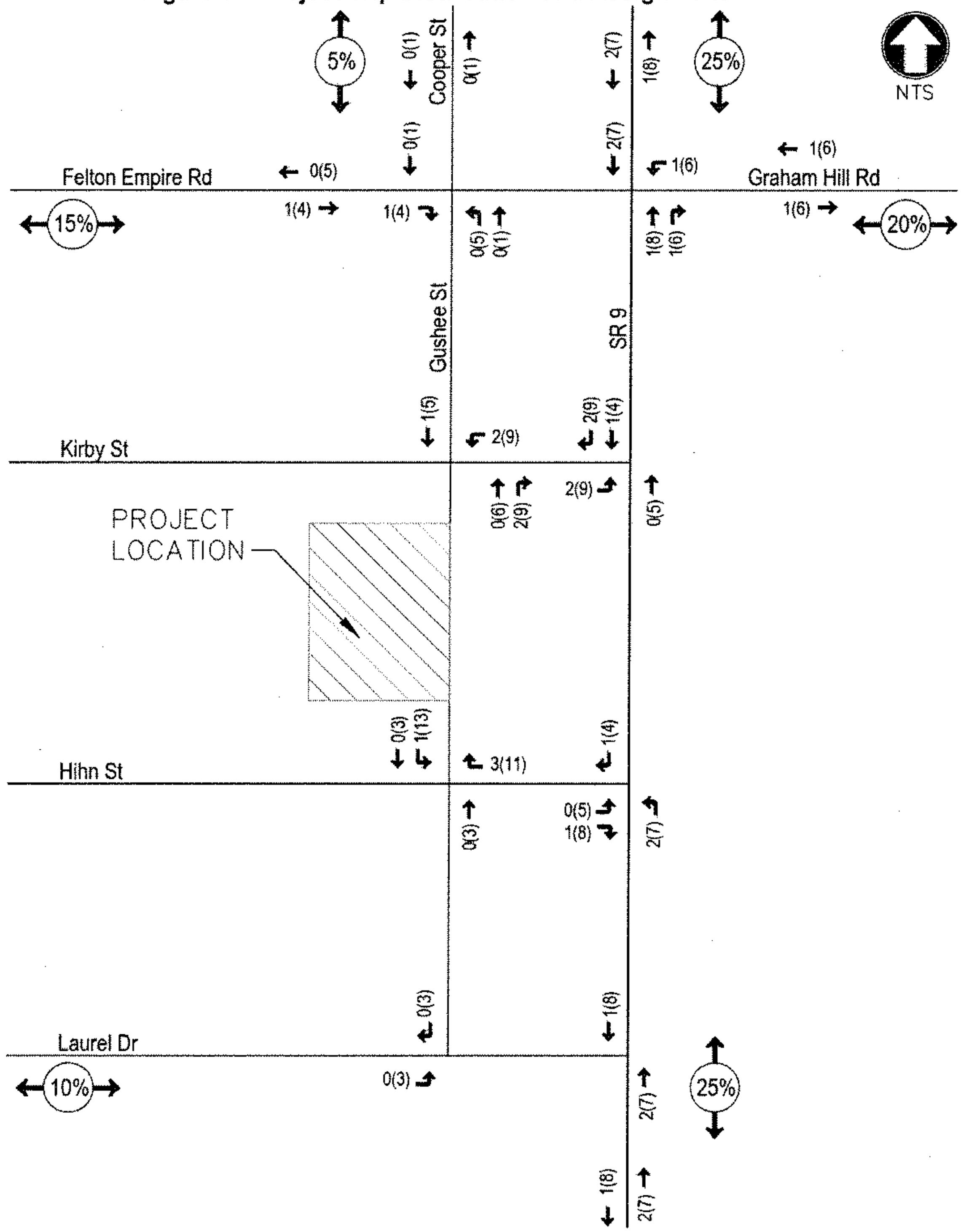
Table 2 summarizes the traffic operations – delay and level of service (LOS) – under the six analysis scenarios. **Appendix A** contains the level of service calculations. The SR 9 / Felton Empire Road – Graham Hill Road intersection operates at a deficient LOS D (AM) and LOS F (PM) under Existing, Existing Plus Project, Background and Background Plus Project conditions. Under Cumulative Without Project and Cumulative Plus Project conditions, the intersection operates at LOS E (AM) and LOS F (PM). The study project would represent a significant impact under Existing Plus Project, Background Plus Project and Cumulative Plus Project conditions.

[1] Past analyses that found an operational deficiency at this intersection include *Zayante Oaks Residential Development Traffic Impact Analysis, Felton, Santa Cruz County, California – Significant Impact Evaluation at Signalized Intersections,* Hatch Mott MacDonald, February 5, 2009.

ATTACHMENT 4

MOTT MACDONALD

Figure 3 – Project Trip Distribution and Assignment



Note: XX(YY) = AM(PM)

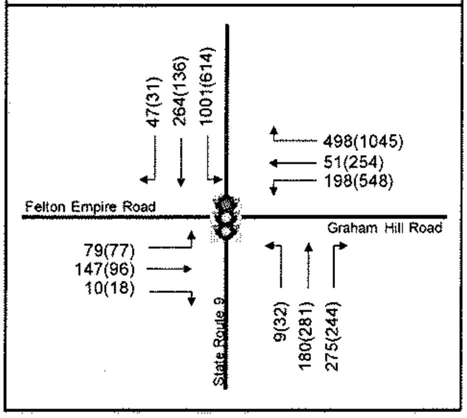
ATTACHMENT 14

MOTT MACDONALD

Figure 4 – Project Trip Distribution and Assignment

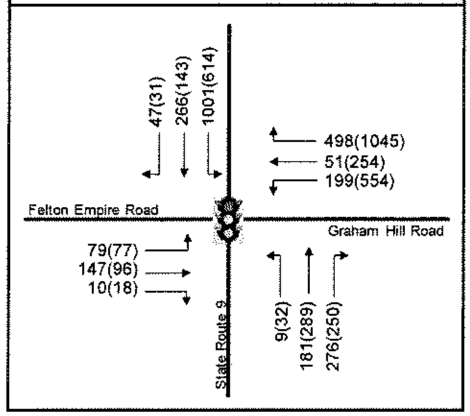
Existing Conditions

1. State Route 9 / Felton Empire Road - Graham Hill Road



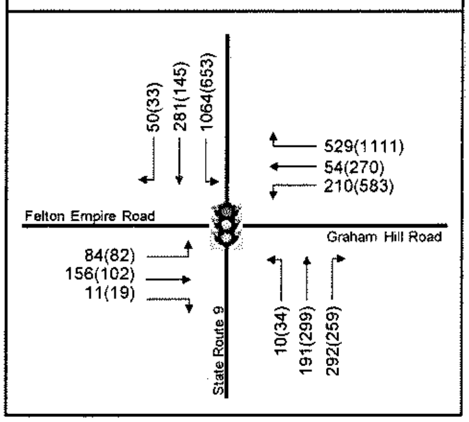
Existing Plus Project Conditions

1. State Route 9 / Felton Empire Road - Graham Hill Road



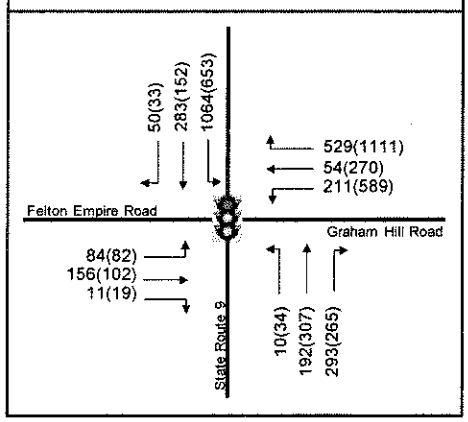
Background Conditions

1. State Route 9 / Felton Empire Road - Graham Hill Road



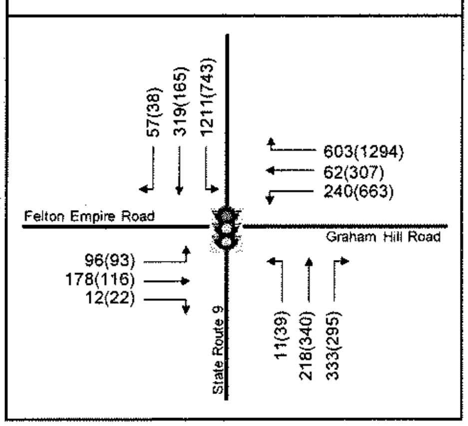
Background Plus Project Conditions

1. State Route 9 / Felton Empire Road - Graham Hill Road



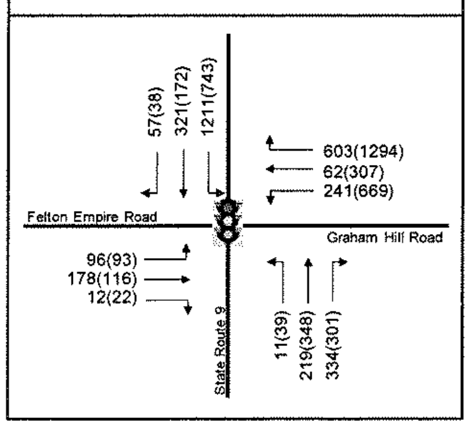
Cumulative Without Project Conditions

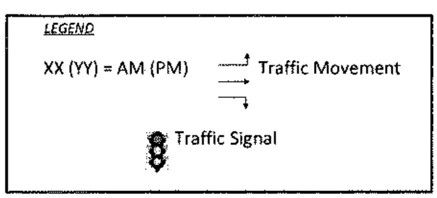
1. State Route 9 / Felton Empire Road - Graham Hill Road



Cumulative Plus Project Conditions

1. State Route 9 / Felton Empire Road - Graham Hill Road





ATTACHMENT 14

MOTT MACDONALD

Table 2 – Level of Service Summary

	N-S Street	E-W Street	Existing Intersection Control	LOS Stnd.	Peak Hour	Existing Conditions Delay (sec)	Existing Conditions LOS	Existing Plus Project Conditions Delay (sec)	Existing Plus Project Conditions LOS	Background Conditions Delay (sec)	Background Conditions LOS	Background Plus Project Conditions Delay (sec)	Background Plus Project Conditions LOS	Cumulative Without Project Conditions Delay (sec)	Cumulative Without Project Conditions LOS	Cumulative Plus Project Conditions Delay (sec)	Cumulative Plus Project Conditions LOS
1	State Route 9	Felton Empire Road - Graham Hill Road	Signal	C/D	AM	39.1	D	**39.2**	D	43.7	D	**43.7**	D	75.9	E	**75.8**	E
					PM	117.5	F	**119.7**	F	124.0	F	**126.2**	F	190.7	F	**200.2**	F
			With Improvement		*AM*			*33.5*	*C*			*36.5*	*D*			*52.5*	*D*
					PM			*101.2*	*F*			*105.5*	*F*			*172.5*	*F*

Notes:

1. LOS Stnd. = Level of Service Standard.
2. Analysis performed using *2000 Highway Capacity Manual* methodologies.
3. Overall level of service standard for Caltrans is the transition between LOS C and LOSD (or LOS C/D).
4. Above delays and levels of service are summarizes from calculations in **Appendix B**.
5. Items in **bold** represent significant impacts.

It is recommended that the following improvement be implemented at this intersection:

- Restripe eastbound Felton Empire Road as one left lane and one through-right lane.

Although this improvement would not fully improve operations to an acceptable level of service, the decrease in delay at this intersection due to its implementation would more than offset the increase in delay caused by the project traffic; therefore, this improvement would reduce the project impact at this intersection to a less than significant level. The project would be responsible for implementation of this improvement, presuming that no other improvements are implemented by others at this intersection.

Note: The existing library generates 1 AM and 4 PM peak hour trips at the SR 9 / Felton Empire Road – Graham Hill Road intersection. The proposed project would increase this to 5 AM and 27 PM peak hour trips.

D. Parking Analysis

As shown in **Figure 2**, the library parking lot will contain 18 vehicle parking spaces and 10 bicycle parking locations. According to the Santa Cruz County parking ordinance, a library of approximately 9,389 square feet would require 32 vehicle parking spaces and 10 bicycle parking locations. As indicated in **Table 3**, this would represent an onsite deficit of 14 vehicle parking spaces and exactly meet the required number of bicycle parking locations.

Table 3 – Santa Cruz County Parking Requirements for Libraries

County Vehicle Parking Standard	Library Size	Parking Spaces Required	Parking Spaces Provided On-Site	Parking Spaces Surplus/ Deficit
1 space per 300 sq. ft.	9,389 sq. ft.	32	18	-14

County Bicycle Parking Standard	Library Size	Parking Spaces Required	Parking Spaces Provided On-Site	Parking Spaces Surplus/ Deficit
1 space per 1,000 sq. ft. (minimum of 2 spaces)	9,389 sq. ft.	10	10	0

Notes:
1. County vehicle and bicycle parking standards for the project site (library) cited from the Santa Cruz County parking ordinance,
2. Sq. Ft. = square feet.

Although the bicycle parking locations may encourage more library visitors to bicycle to the site instead of drive, it would not offset the lack of vehicle parking spaces. The environmental constraints that limit the developable area on the site would also limit the ability to add additional on-site parking spaces.

It is recommended that the remaining 14 required parking spaces for the library be on-street parking spaces along southbound Gushee Street along the project site frontage north of the library driveway. A similar situation exists at the current Felton library, which has no on-site parking (see **Figure 5**). Observations in February 2013 found little to no parking occupancy along this section of Southbound Gushee Street; therefore, it would be available for use by library patrons.

A total of 14 on-street parking spaces would need to be available for use by library patrons. At 20 feet per vehicle (a typical on-street parking length), this would total 280 feet of street frontage. Preferably, the library-only spaces should be directly in front of the library property (i.e., along southbound Gushee Street), starting north of the library driveway and continuing north up the street. The total block length of Gushee Street between Hihn and Kirby Streets is approximately 600 feet, so there is sufficient on-street parking to make this conversion.

Figure 5 – Existing "Library Parking Only" sign near existing Felton library.

For flexibility in use by the post office and other commercial uses on the street, it is recommended that the on-street library parking not be reserved solely for library use. Instead, a maximum parking time should be established for the spaces, to be determined by the County in conjunction with library management. Signs should be added on southbound Gushee Street noting the maximum parking time.

MOTT MACDONALD

The on-street parking area along southbound Gushee Street between the library and post office is proposed to be reserved for library book drop-off only. A book drop-off depository box is to be added adjacent to this area, thus allowing library patrons to drop off books without having to enter the library building. This will also slightly lessen the overall parking demand for the library.

The conversion of the on-street parking along Gushee Street into library-only parking and a library book drop-off area could potentially affect parking for the post office. Currently, 138 feet of this frontage (including along the post office and library frontage) is already designated as a 20-minute parking zone, presumably for visitors of the post office (see **Figure 6**). In order to determine how parking activity for the post office would be affected by the proposed library, observations were performed of on-street parking occupancy between 3:00 – 6:00 PM in February 2013, specifically along Gushee and Hihn Streets adjacent to the post office, as well as along the entirety of Gushee Street between Hihn and Kirby Streets. These observations indicate that visitors to the post office park both in the small post office parking lot (four standard spaces and one ADA space) and along Gushee and Hihn Streets. The spaces on Gushee Street that were used were the first two spaces along northbound Gushee Street immediately north of Hihn Street, as well as the two southbound "20-minute parking only" spaces closest to the post office. (Although the Gushee Street frontage along the post office is designated "No Parking" via a red-painted curb, it is still used by post office visitors when dropping off letters into the public mail box located in that area.). Post office visitors were also observed parking along the post office's Hihn Street frontage.

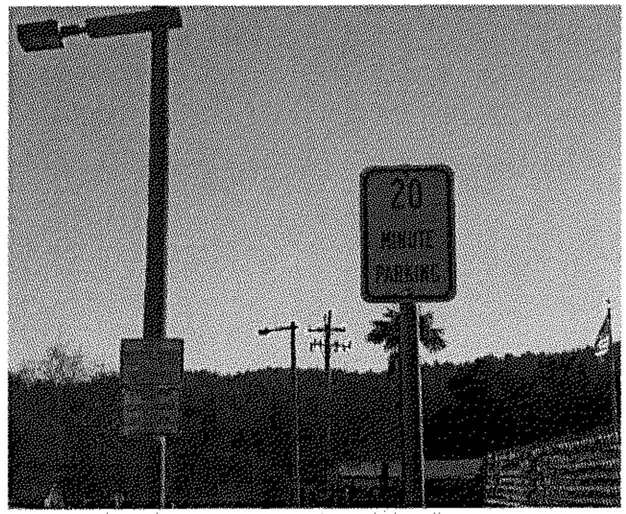


Figure 6 – Existing "20 Minute Parking" sign near existing post office and proposed Felton library.

No post office visitors were observed parking on Gushee Street more than approximately 50 feet north of the library/post office property line. In fact, few vehicles were observed parking in this portion of the block between Hihn and Kirby Streets. The only parked vehicles were two large dirt/gravel long-haul trucks with trailers, of which only one moved during the observation period. Therefore, there is a sufficiently low level of on-street parking demand that their use by library patrons would not significantly affect parking supply for non-library uses in the area. There is also a sufficient number of unused on-street parking spaces for displaced post office visitors to find other parking spaces on either Gushee or Hihn Streets in the immediate vicinity of the post office.

ATTACHMENT 1 4

M
MOTT M
MACDONALD

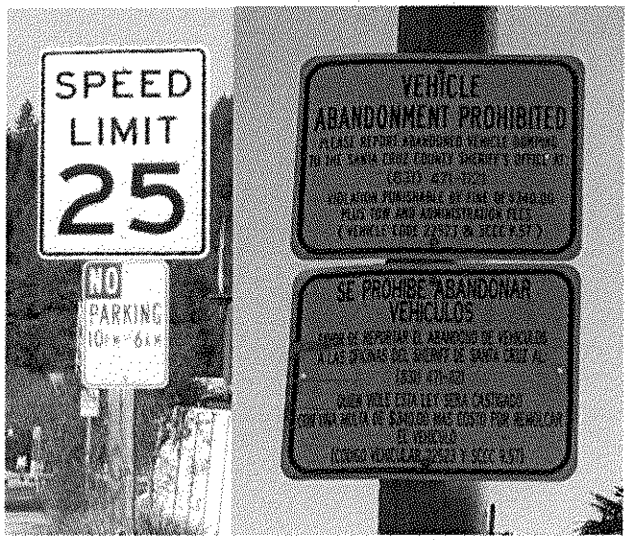


Figure 7 – Additional parking restrictions along Gushee Street.

Two additional parking restrictions are also present along parts of Gushee Street near the project site (see **Figure 7**). One is the prohibition of overnight parking between 10:00 PM and 6:00 AM, which is in effect over the entire block between Hihn and Kirby Streets. The hours of this prohibition may need to be amended if the library is open after 10:00 PM or before 6:00 AM. The other parking restriction is a pair of similar signs – one in English and one in Spanish – prohibiting abandonment of vehicles. These signs are located on one of the wooden street light poles in front of the project site facing southbound traffic. It is recommended that this latter parking restriction remain in place.

E. Project Access and Internal Circulation

Vehicular access to the proposed library parking area would be via a driveway on Gushee Street, approximately 100 feet north of the post office property. The parking area would run east-west, parallel to and directly in front of the proposed library building. Due to the low project trip generation and low traffic activity on Gushee Street, the project driveway is expected to operate acceptably. Operations within the parking area are also expected to operate acceptably.

The proposed driveway into the library parking area appears to be at the location of one of the many existing wooden street light poles along southbound Gushee Street (see **Figure 8**). It is recommended that the pole be relocated to a place far enough away from the driveway to not affect vehicular sight distance at the driveway.

Figure 8 – Existing wooden streetlight pole near driveway for proposed Felton library.

F. Pedestrian Facilities

The main entrance to the library would face the proposed parking area, and would be roughly at the mid-point of the building. A pedestrian walkway would be constructed along the entire north side of the building, facing the parking lot. This walkway would connect to the street, allowing for convenient pedestrian access to the building.

ATTACHMENT 14

MOTT MACDONALD

A small "retreat" area north of the proposed library building is accessible via a pedestrian walkway at the western end of the parking lot. This walkway is contiguous with the walkway fronting the proposed library building, thus providing a continuous walkway to that area from Gushee Street.

Figure 9 – Typical existing wooden streetlight pole adjacent to sidewalk on Gushee Street.

Currently, an asphalt sidewalk with curb return fronts the project site along Gushee Street. At its southern end, this sidewalk connects to the existing concrete sidewalk directly in front of the post office. The northern end of the asphalt sidewalk extends up to Kirby Street.

As previously mentioned, lighting is attached to wooden poles along the west side of Gushee Street (i.e., the side of the street fronting the project site – see **Figure 9**). However, it is unclear if this lighting is currently in operation, as no power source to the lighting was evident. The poles supporting the lighting are located within the aforementioned asphalt sidewalk. Although the clearance space around the poles meets the required Americans with Disabilities Act (ADA) standards around vertical obstructions – a minimum of three feet – the sidewalk is only four feet wide north of the library driveway. The 2010 United States Department of Justice ADA standards (Section 403.5.3) require that, if the sidewalk is less than five feet wide, the sidewalk must provide passing spaces (i.e., areas where the sidewalk is at least five feet wide) no less than every 200 feet. It is therefore recommended that the asphalt sidewalk along the west side of Gushee Street be widened to meet this standard, either by adding the passing spaces or widening the entire sidewalk to five feet. This may best be accomplished by widening the sidewalk onto the project site.

Pedestrian traffic is also anticipated to increase along the north side of Hihn Street, specifically to the east of Gushee Street (towards SR 9). There are currently no pedestrian facilities on this block of Hihn Street; the entire shoulder (i.e., between the paved roadway and the adjacent property, including the on-street parking aisle) is unpaved. It is suggested that a pedestrian facility be added at this location. The project applicant should work with County staff regarding such specific sidewalk requirements.

Finally, although pedestrians would be crossing Gushee Street at Hihn Street, a formal crosswalk is not advised at this location. Crosswalks are typically located at the corners of the intersection. However, the corners of Hihn Street at Gushee Street are slightly offset, due in part to the lack of pedestrian facilities east of Gushee Street. A crosswalk lined up with the northeastern corner of the intersection (even with the addition of a pedestrian facility) would intersect with the sidewalk along southbound Gushee Street just north of the drop-off mail box. This means that vehicles stopped adjacent to the mail box would be blocking the crosswalk. Relocation of the mail box on Gushee Street may not be possible, given its proximity to the street and post office. In addition, a crosswalk would require ADA ramp improvements at each end of the crosswalk. Thus, a crosswalk would require extensive modifications at the corner.

ATTACHMENT 14

MOTT MACDONALD

G. Conclusion

In summary, the study project is estimated to generate a net 458 daily trips, with 9 trips (6 in, 3 out) during the AM peak hour and 59 trips (28 in, 31 out) during the PM peak hour. This traffic would be spread out over multiple streets near the project site, minimizing the potential traffic impact at any one location. However, as the SR 9 / Felton Empire Road – Graham Hill Road intersection operates deficiently under current and future conditions, the project would be responsible for its share of the necessary improvements to this intersection to offset its impact, presuming that no other improvements are implemented by others at this intersection.

The project on-site parking supply would meet Santa Cruz County bicycle parking requirements but would provide 14 fewer vehicle spaces than required. It is recommended that the remaining 14 required spaces be on-street parking spaces along the project's Gushee Street frontage. For flexibility in use by the post office and other commercial uses on the street, the on-street library parking not be reserved solely for library use; rather, a maximum parking time should be established and signed for the spaces.

The current on-street parking prohibition on Gushee Street between 10:00 PM and 6:00 AM should be reviewed to verify that it does not conflict with the proposed operating hours of the library.

The proposed location of the library driveway on Gushee Street appears to be at the location of a wooden street light pole. It is recommended that this pole be relocated to a location that would not affect sight distance at this library driveway.

The existing sidewalk surrounding each wooden streetlight pole should be widened as necessary to meet ADA clearance standards around each pole. This may best be accomplished by widening the sidewalk into the project site.

A pedestrian facility is suggested along the north side of Hihn Street between Gushee Street and SR 9. The project applicant should work with County staff regarding specific sidewalk requirements.

Due to various feasibility issues, a crosswalk is not advised across Gushee Street at Hihn Street.

If you have any questions regarding the contents of this letter, please contact Jeff Waller. Thank you for the opportunity to assist you with this project.

L. Trujillo

Leo Trujillo, PE, TE
Principal Engineer
D (408) 842-5263 F (408) 842-2202
leo.trujillo@mottmac.com

Appendix A

Intersection
Level of Service
Calculations

ATTACHMENT 14

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	147	10	198	51	498	9	180	275	1001	264	47
Future Volume (vph)	79	147	10	198	51	498	9	180	275	1001	264	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0		3.0	3.0	1.9	4.0	4.0	4.2	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt		0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1726		1676	1765	1500	1676	1765	1500	3252	1725	
Flt Permitted		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1726		1676	1765	1500	1676	1765	1500	3252	1725	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	86	160	11	215	55	541	10	196	299	1088	287	51
RTOR Reduction (vph)	0	2	0	0	0	189	0	0	251	0	5	0
Lane Group Flow (vph)	0	255	0	215	55	352	10	196	48	1088	333	0
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA	Perm	Split	NA	
Protected Phases	4	4		6	6	6 2	3	3		2	2	
Permitted Phases									3			
Actuated Green, G (s)		16.4		13.8	13.8	60.1	16.9	16.9	16.9	41.0	41.0	
Effective Green, g (s)		15.6		14.0	14.0	57.4	17.1	17.1	16.9	42.3	42.3	
Actuated g/C Ratio		0.15		0.13	0.13	0.55	0.16	0.16	0.16	0.40	0.40	
Clearance Time (s)		4.2		3.2	3.2		4.2	4.2	4.2	5.3	5.3	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		256		223	235	820	272	287	241	1310	694	
v/s Ratio Prot		c0.15		c0.13	0.03	0.23	0.01	c0.11		c0.33	0.19	
v/s Ratio Perm									0.03			
v/c Ratio		1.00		0.96	0.23	0.43	0.04	0.68	0.20	0.83	0.48	
Uniform Delay, d1		44.7		45.3	40.7	14.1	37.0	41.4	38.2	28.1	23.2	
Progression Factor		1.00		0.79	0.77	0.54	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		55.1		49.3	0.5	0.4	0.1	6.6	0.4	6.2	2.4	
Delay (s)		99.8		85.0	31.9	7.9	37.1	48.0	38.6	34.4	25.6	
Level of Service		F		F	C	A	D	D	D	C	C	
Approach Delay (s)		99.8			30.0			42.2			32.3	
Approach LOS		F			C			D			C	

Intersection Summary

HCM 2000 Control Delay	39.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

ATTACHMENT 14

1: Highway 9 & Felton Empire Road/Graham Hill Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	96	18	548	254	1045	32	281	244	614	136	31
Future Volume (vph)	77	96	18	548	254	1045	32	281	244	614	136	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0		3.0	3.0	1.9	4.0	4.0	4.2	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt		0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1707		1676	1765	1500	1676	1765	1500	3252	1715	
Flt Permitted		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1707		1676	1765	1500	1676	1765	1500	3252	1715	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	84	104	20	596	276	1136	35	305	265	667	148	34
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	203	0	7	0
Lane Group Flow (vph)	0	205	0	596	276	1136	35	305	62	667	175	0
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA	Perm	Split	NA	
Protected Phases	4	4		6	6	6 2	3	3		2	2	
Permitted Phases									3			
Actuated Green, G (s)		15.7		35.4	35.4	61.1	21.6	21.6	21.6	20.4	20.4	
Effective Green, g (s)		14.9		35.6	35.6	58.4	21.8	21.8	21.6	21.7	21.7	
Actuated g/C Ratio		0.14		0.32	0.32	0.53	0.20	0.20	0.20	0.20	0.20	
Clearance Time (s)		4.2		3.2	3.2		4.2	4.2	4.2	5.3	5.3	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		231		542	571	796	332	349	294	641	338	
v/s Ratio Prot		c0.12		0.36	0.16	c0.76	0.02	c0.17		0.21	0.10	
v/s Ratio Perm									0.04			
v/c Ratio		0.89		1.10	0.48	1.43	0.11	0.87	0.21	1.04	0.52	
Uniform Delay, d1		46.7		37.2	29.8	25.8	36.1	42.8	37.1	44.1	39.5	
Progression Factor		1.00		0.93	0.92	0.90	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		30.6		62.8	2.0	197.3	0.1	20.7	0.4	46.5	1.3	
Delay (s)		77.3		97.4	29.6	220.5	36.3	63.5	37.4	90.7	40.8	
Level of Service		E		F	C	F	D	E	D	F	D	
Approach Delay (s)		77.3			157.7			50.5			80.0	
Approach LOS		E			F			D			E	

Intersection Summary

HCM 2000 Control Delay	117.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	105.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

ATTACHMENT 14

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	147	10	199	51	498	9	181	276	1001	266	47
Future Volume (vph)	79	147	10	199	51	498	9	181	276	1001	266	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0		3.0	3.0	1.9	4.0	4.0	4.2	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt		0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1726		1676	1765	1500	1676	1765	1500	3252	1725	
Flt Permitted		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1726		1676	1765	1500	1676	1765	1500	3252	1725	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	86	160	11	216	55	541	10	197	300	1088	289	51
RTOR Reduction (vph)	0	2	0	0	0	189	0	0	252	0	5	0
Lane Group Flow (vph)	0	255	0	216	55	352	10	197	48	1088	335	0
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA	Perm	Split	NA	
Protected Phases	4	4		6	6	6 2	3	3		2	2	
Permitted Phases									3			
Actuated Green, G (s)		16.4		13.8	13.8	60.1	16.9	16.9	16.9	41.0	41.0	
Effective Green, g (s)		15.6		14.0	14.0	57.4	17.1	17.1	16.9	42.3	42.3	
Actuated g/C Ratio		0.15		0.13	0.13	0.55	0.16	0.16	0.16	0.40	0.40	
Clearance Time (s)		4.2		3.2	3.2		4.2	4.2	4.2	5.3	5.3	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		256		223	235	820	272	287	241	1310	694	
v/s Ratio Prot		c0.15		c0.13	0.03	0.23	0.01	c0.11		c0.33	0.19	
v/s Ratio Perm									0.03			
v/c Ratio		1.00		0.97	0.23	0.43	0.04	0.69	0.20	0.83	0.48	
Uniform Delay, d1		44.7		45.3	40.7	14.1	37.0	41.4	38.2	28.1	23.2	
Progression Factor		1.00		0.78	0.76	0.53	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		55.1		50.2	0.5	0.4	0.1	6.7	0.4	6.2	2.4	
Delay (s)		99.8		85.7	31.5	7.8	37.1	48.1	38.6	34.4	25.6	
Level of Service		F		F	C	A	D	D	D	C	C	
Approach Delay (s)		99.8			30.1			42.3			32.3	
Approach LOS		F			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	39.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

ATTACHMENT 14

1: Highway 9 & Felton Empire Road/Graham Hill Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	96	18	554	254	1045	32	289	250	614	143	31
Future Volume (vph)	77	96	18	554	254	1045	32	289	250	614	143	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0		3.0	3.0	1.9	4.0	4.0	4.2	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt		0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1707		1676	1765	1500	1676	1765	1500	3252	1717	
Flt Permitted		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1707		1676	1765	1500	1676	1765	1500	3252	1717	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	84	104	20	602	276	1136	35	314	272	667	155	34
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	201	0	7	0
Lane Group Flow (vph)	0	205	0	602	276	1136	35	314	71	667	182	0
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA	Perm	Split	NA	
Protected Phases	4	4		6	6	6 2	3	3		2	2	
Permitted Phases									3			
Actuated Green, G (s)		15.6		35.3	35.3	60.8	22.0	22.0	22.0	20.2	20.2	
Effective Green, g (s)		14.8		35.5	35.5	58.1	22.2	22.2	22.0	21.5	21.5	
Actuated g/C Ratio		0.13		0.32	0.32	0.53	0.20	0.20	0.20	0.20	0.20	
Clearance Time (s)		4.2		3.2	3.2		4.2	4.2	4.2	5.3	5.3	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		229		540	569	792	338	356	300	635	335	
v/s Ratio Prot		c0.12		0.36	0.16	c0.76	0.02	c0.18		0.21	0.11	
v/s Ratio Perm									0.05			
v/c Ratio		0.89		1.11	0.49	1.43	0.10	0.88	0.24	1.05	0.54	
Uniform Delay, d1		46.8		37.2	29.9	25.9	35.8	42.6	37.0	44.2	39.8	
Progression Factor		1.00		0.93	0.92	0.89	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		32.4		68.2	2.0	200.4	0.1	21.7	0.4	49.7	1.8	
Delay (s)		79.2		102.8	29.5	223.6	35.9	64.3	37.4	93.9	41.6	
Level of Service		E		F	C	F	D	E	D	F	D	
Approach Delay (s)		79.2			160.9			50.9			82.4	
Approach LOS		E			F			D			F	

Intersection Summary

HCM 2000 Control Delay	119.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	106.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

ATTACHMENT 14

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	96	18	554	254	1045	32	289	250	614	143	31
Future Volume (vph)	77	96	18	554	254	1045	32	289	250	614	143	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		3.0	3.0	1.9	4.0	4.0	4.2	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1676	1722		1676	1765	1500	1676	1765	1500	3252	1717	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1676	1722		1676	1765	1500	1676	1765	1500	3252	1717	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	84	104	20	602	276	1136	35	314	272	667	155	34
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	201	0	7	0
Lane Group Flow (vph)	84	118	0	602	276	1136	35	314	71	667	182	0
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA	Perm	Split	NA	
Protected Phases	4	4		6	6	6 2	3	3		2	2	
Permitted Phases									3			
Actuated Green, G (s)	12.5	12.5		35.3	35.3	63.9	22.0	22.0	22.0	23.3	23.3	
Effective Green, g (s)	11.7	11.7		35.5	35.5	61.2	22.2	22.2	22.0	24.6	24.6	
Actuated g/C Ratio	0.11	0.11		0.32	0.32	0.56	0.20	0.20	0.20	0.22	0.22	
Clearance Time (s)	4.2	4.2		3.2	3.2		4.2	4.2	4.2	5.3	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	178	183		540	569	834	338	356	300	727	383	
v/s Ratio Prot	0.05	c0.07		0.36	0.16	c0.76	0.02	c0.18		0.21	0.11	
v/s Ratio Perm									0.05			
v/c Ratio	0.47	0.64		1.11	0.49	1.36	0.10	0.88	0.24	0.92	0.48	
Uniform Delay, d1	46.2	47.1		37.2	29.9	24.4	35.8	42.6	37.0	41.7	37.1	
Progression Factor	1.00	1.00		0.93	0.92	0.89	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	7.5		68.2	2.0	168.3	0.1	21.7	0.4	16.4	0.9	
Delay (s)	48.2	54.7		102.8	29.5	190.1	35.9	64.3	37.4	58.1	38.0	
Level of Service	D	D		F	C	F	D	E	D	E	D	
Approach Delay (s)		52.1			142.0			50.9			53.6	
Approach LOS		D			F			D			D	

Intersection Summary

HCM 2000 Control Delay	101.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	101.9%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

ATTACHMENT 14

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	147	10	199	51	498	9	181	276	1001	266	47
Future Volume (vph)	79	147	10	199	51	498	9	181	276	1001	266	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		3.0	3.0	1.9	4.0	4.0	4.2	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1676	1748		1676	1765	1500	1676	1765	1500	3252	1725	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1676	1748		1676	1765	1500	1676	1765	1500	3252	1725	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	86	160	11	216	55	541	10	197	300	1088	289	51
RTOR Reduction (vph)	0	3	0	0	0	180	0	0	252	0	5	0
Lane Group Flow (vph)	86	168	0	216	55	361	10	197	48	1088	335	0
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA	Perm	Split	NA	
Protected Phases	4	4		6	6	6 2	3	3		2	2	
Permitted Phases									3			
Actuated Green, G (s)	14.2	14.2		13.8	13.8	62.3	16.9	16.9	16.9	43.2	43.2	
Effective Green, g (s)	13.4	13.4		14.0	14.0	59.6	17.1	17.1	16.9	44.5	44.5	
Actuated g/C Ratio	0.13	0.13		0.13	0.13	0.57	0.16	0.16	0.16	0.42	0.42	
Clearance Time (s)	4.2	4.2		3.2	3.2		4.2	4.2	4.2	5.3	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	213	223		223	235	851	272	287	241	1378	731	
v/s Ratio Prot	0.05	c0.10		c0.13	0.03	0.24	0.01	c0.11		c0.33	0.19	
v/s Ratio Perm									0.03			
v/c Ratio	0.40	0.76		0.97	0.23	0.42	0.04	0.69	0.20	0.79	0.46	
Uniform Delay, d1	42.1	44.2		45.3	40.7	12.9	37.0	41.4	38.2	26.2	21.6	
Progression Factor	1.00	1.00		0.78	0.76	0.52	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.3	13.5		50.2	0.5	0.3	0.1	6.7	0.4	4.7	2.1	
Delay (s)	43.4	57.7		85.7	31.5	7.0	37.1	48.1	38.6	30.9	23.7	
Level of Service	D	E		F	C	A	D	D	D	C	C	
Approach Delay (s)		52.9			29.6			42.3			29.2	
Approach LOS		D			C			D			C	

Intersection Summary

HCM 2000 Control Delay	33.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

ATTACHMENT 14

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	156	11	210	54	529	10	191	292	1064	281	50
Future Volume (vph)	84	156	11	210	54	529	10	191	292	1064	281	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0		3.0	3.0	1.9	4.0	4.0	4.2	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt		0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1725		1676	1765	1500	1676	1765	1500	3252	1725	
Flt Permitted		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1725		1676	1765	1500	1676	1765	1500	3252	1725	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	170	12	228	59	575	11	208	317	1157	305	54
RTOR Reduction (vph)	0	2	0	0	0	180	0	0	249	0	5	0
Lane Group Flow (vph)	0	271	0	228	59	395	11	208	68	1157	354	0
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA	Perm	Split	NA	
Protected Phases	4	4		6	6	6 2	3	3		2	2	
Permitted Phases									3			
Actuated Green, G (s)		16.4		13.8	13.8	59.6	17.4	17.4	17.4	40.5	40.5	
Effective Green, g (s)		15.6		14.0	14.0	56.9	17.6	17.6	17.4	41.8	41.8	
Actuated g/C Ratio		0.15		0.13	0.13	0.54	0.17	0.17	0.17	0.40	0.40	
Clearance Time (s)		4.2		3.2	3.2		4.2	4.2	4.2	5.3	5.3	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		256		223	235	812	280	295	248	1294	686	
v/s Ratio Prot		c0.16		c0.14	0.03	0.26	0.01	c0.12		c0.36	0.20	
v/s Ratio Perm									0.05			
v/c Ratio		1.06		1.02	0.25	0.49	0.04	0.71	0.27	0.89	0.52	
Uniform Delay, d1		44.7		45.5	40.8	15.0	36.6	41.3	38.3	29.5	23.9	
Progression Factor		1.00		0.79	0.77	0.46	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		72.9		65.6	0.6	0.5	0.1	7.5	0.6	9.8	2.8	
Delay (s)		117.6		101.5	32.0	7.3	36.7	48.7	38.9	39.3	26.7	
Level of Service		F		F	C	A	D	D	D	D	C	
Approach Delay (s)		117.6			33.9			42.6			36.3	
Approach LOS		F			C			D			D	

Intersection Summary

HCM 2000 Control Delay	43.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

ATTACHMENT 14

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	102	19	583	270	1111	34	299	259	653	145	33
Future Volume (vph)	82	102	19	583	270	1111	34	299	259	653	145	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0		3.0	3.0	1.9	4.0	4.0	4.2	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt		0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1708		1676	1765	1500	1676	1765	1500	3252	1716	
Flt Permitted		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1708		1676	1765	1500	1676	1765	1500	3252	1716	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	89	111	21	634	293	1208	37	325	282	710	158	36
RTOR Reduction (vph)	0	3	0	0	0	133	0	0	200	0	7	0
Lane Group Flow (vph)	0	218	0	634	293	1075	37	325	82	710	187	0
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA	Perm	Split	NA	
Protected Phases	4	4		6	6	6 2	3	3		2	2	
Permitted Phases									3			
Actuated Green, G (s)		15.9		35.4	35.4	60.3	22.2	22.2	22.2	19.6	19.6	
Effective Green, g (s)		15.1		35.6	35.6	57.6	22.4	22.4	22.2	20.9	20.9	
Actuated g/C Ratio		0.14		0.32	0.32	0.52	0.20	0.20	0.20	0.19	0.19	
Clearance Time (s)		4.2		3.2	3.2		4.2	4.2	4.2	5.3	5.3	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		234		542	571	785	341	359	302	617	326	
v/s Ratio Prot		c0.13		0.38	0.17	c0.72	0.02	c0.18		0.22	0.11	
v/s Ratio Perm									0.05			
v/c Ratio		0.93		1.17	0.51	1.37	0.11	0.91	0.27	1.15	0.57	
Uniform Delay, d1		46.9		37.2	30.2	26.2	35.7	42.8	37.1	44.5	40.5	
Progression Factor		1.00		1.01	1.03	1.03	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		39.5		89.1	2.1	171.6	0.1	25.3	0.5	85.5	2.4	
Delay (s)		86.4		126.8	33.2	198.7	35.8	68.0	37.5	130.0	42.9	
Level of Service		F		F	C	F	D	E	D	F	D	
Approach Delay (s)		86.4			154.6			52.8			111.3	
Approach LOS		F			F			D			F	

Intersection Summary

HCM 2000 Control Delay	124.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	111.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

ATTACHMENT 14

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	156	11	211	54	529	10	192	293	1064	283	50
Future Volume (vph)	84	156	11	211	54	529	10	192	293	1064	283	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0		3.0	3.0	1.9	4.0	4.0	4.2	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt		0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1725		1676	1765	1500	1676	1765	1500	3252	1725	
Flt Permitted		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1725		1676	1765	1500	1676	1765	1500	3252	1725	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	170	12	229	59	575	11	209	318	1157	308	54
RTOR Reduction (vph)	0	2	0	0	0	180	0	0	249	0	5	0
Lane Group Flow (vph)	0	271	0	229	59	395	11	209	69	1157	357	0
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA	Perm	Split	NA	
Protected Phases	4	4		6	6	6 2	3	3		2	2	
Permitted Phases									3			
Actuated Green, G (s)		16.4		13.8	13.8	59.6	17.4	17.4	17.4	40.5	40.5	
Effective Green, g (s)		15.6		14.0	14.0	56.9	17.6	17.6	17.4	41.8	41.8	
Actuated g/C Ratio		0.15		0.13	0.13	0.54	0.17	0.17	0.17	0.40	0.40	
Clearance Time (s)		4.2		3.2	3.2		4.2	4.2	4.2	5.3	5.3	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		256		223	235	812	280	295	248	1294	686	
v/s Ratio Prot		c0.16		c0.14	0.03	0.26	0.01	c0.12		c0.36	0.21	
v/s Ratio Perm									0.05			
v/c Ratio		1.06		1.03	0.25	0.49	0.04	0.71	0.28	0.89	0.52	
Uniform Delay, d1		44.7		45.5	40.8	15.0	36.6	41.3	38.3	29.5	24.0	
Progression Factor		1.00		0.78	0.76	0.44	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		72.9		66.7	0.6	0.5	0.1	7.6	0.6	9.8	2.8	
Delay (s)		117.6		102.2	31.5	7.0	36.7	48.8	38.9	39.3	26.8	
Level of Service		F		F	C	A	D	D	D	D	C	
Approach Delay (s)		117.6			33.9			42.7			36.3	
Approach LOS		F			C			D			D	

Intersection Summary

HCM 2000 Control Delay	43.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

ATTACHMENT 14

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	102	19	589	270	1111	34	307	265	653	152	33
Future Volume (vph)	82	102	19	589	270	1111	34	307	265	653	152	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0		3.0	3.0	1.9	4.0	4.0	4.2	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt		0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1708		1676	1765	1500	1676	1765	1500	3252	1717	
Flt Permitted		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1708		1676	1765	1500	1676	1765	1500	3252	1717	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	89	111	21	640	293	1208	37	334	288	710	165	36
RTOR Reduction (vph)	0	3	0	0	0	132	0	0	199	0	7	0
Lane Group Flow (vph)	0	218	0	640	293	1077	37	334	89	710	194	0
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA	Perm	Split	NA	
Protected Phases	4	4		6	6	6 2	3	3		2	2	
Permitted Phases									3			
Actuated Green, G (s)		15.9		35.4	35.4	60.1	22.4	22.4	22.4	19.4	19.4	
Effective Green, g (s)		15.1		35.6	35.6	57.4	22.6	22.6	22.4	20.7	20.7	
Actuated g/C Ratio		0.14		0.32	0.32	0.52	0.21	0.21	0.20	0.19	0.19	
Clearance Time (s)		4.2		3.2	3.2		4.2	4.2	4.2	5.3	5.3	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		234		542	571	782	344	362	305	611	323	
v/s Ratio Prot		c0.13		0.38	0.17	c0.72	0.02	c0.19		0.22	0.11	
v/s Ratio Perm									0.06			
v/c Ratio		0.93		1.18	0.51	1.38	0.11	0.92	0.29	1.16	0.60	
Uniform Delay, d1		46.9		37.2	30.2	26.3	35.5	42.8	37.1	44.6	40.9	
Progression Factor		1.00		1.01	1.02	1.02	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		39.5		93.4	2.1	174.7	0.1	28.5	0.5	90.0	3.0	
Delay (s)		86.4		131.0	33.0	201.5	35.6	71.3	37.6	134.7	43.8	
Level of Service		F		F	C	F	D	E	D	F	D	
Approach Delay (s)		86.4			157.4			54.6			114.6	
Approach LOS		F			F			D			F	

Intersection Summary

HCM 2000 Control Delay	126.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	112.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

ATTACHMENT 14

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	156	11	211	54	529	10	192	293	1064	283	50
Future Volume (vph)	84	156	11	211	54	529	10	192	293	1064	283	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		3.0	3.0	1.9	4.0	4.0	4.2	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1676	1747		1676	1765	1500	1676	1765	1500	3252	1725	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1676	1747		1676	1765	1500	1676	1765	1500	3252	1725	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	170	12	229	59	575	11	209	318	1157	308	54
RTOR Reduction (vph)	0	3	0	0	0	173	0	0	249	0	5	0
Lane Group Flow (vph)	91	179	0	229	59	402	11	209	69	1157	357	0
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA	Perm	Split	NA	
Protected Phases	4	4		6	6	6 2	3	3		2	2	
Permitted Phases									3			
Actuated Green, G (s)	14.6	14.6		13.8	13.8	61.4	17.4	17.4	17.4	42.3	42.3	
Effective Green, g (s)	13.8	13.8		14.0	14.0	58.7	17.6	17.6	17.4	43.6	43.6	
Actuated g/C Ratio	0.13	0.13		0.13	0.13	0.56	0.17	0.17	0.17	0.42	0.42	
Clearance Time (s)	4.2	4.2		3.2	3.2		4.2	4.2	4.2	5.3	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	220	229		223	235	838	280	295	248	1350	716	
v/s Ratio Prot	0.05	c0.10		c0.14	0.03	0.27	0.01	c0.12		c0.36	0.21	
v/s Ratio Perm									0.05			
v/c Ratio	0.41	0.78		1.03	0.25	0.48	0.04	0.71	0.28	0.86	0.50	
Uniform Delay, d1	41.9	44.2		45.5	40.8	13.9	36.6	41.3	38.3	27.9	22.6	
Progression Factor	1.00	1.00		0.78	0.76	0.44	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.3	15.9		66.7	0.6	0.4	0.1	7.6	0.6	7.2	2.5	
Delay (s)	43.1	60.1		102.2	31.5	6.5	36.7	48.8	38.9	35.1	25.1	
Level of Service	D	E		F	C	A	D	D	D	D	C	
Approach Delay (s)		54.4			33.6			42.7			32.7	
Approach LOS		D			C			D			C	

Intersection Summary

HCM 2000 Control Delay	36.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

ATTACHMENT 14

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	102	19	589	270	1111	34	307	265	653	152	33
Future Volume (vph)	82	102	19	589	270	1111	34	307	265	653	152	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		3.0	3.0	1.9	4.0	4.0	4.2	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1676	1723		1676	1765	1500	1676	1765	1500	3252	1717	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1676	1723		1676	1765	1500	1676	1765	1500	3252	1717	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	89	111	21	640	293	1208	37	334	288	710	165	36
RTOR Reduction (vph)	0	6	0	0	0	124	0	0	199	0	7	0
Lane Group Flow (vph)	89	126	0	640	293	1084	37	334	89	710	194	0
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA	Perm	Split	NA	
Protected Phases	4	4		6	6	6 2	3	3		2	2	
Permitted Phases									3			
Actuated Green, G (s)	12.8	12.8		35.4	35.4	63.2	22.4	22.4	22.4	22.5	22.5	
Effective Green, g (s)	12.0	12.0		35.6	35.6	60.5	22.6	22.6	22.4	23.8	23.8	
Actuated g/C Ratio	0.11	0.11		0.32	0.32	0.55	0.21	0.21	0.20	0.22	0.22	
Clearance Time (s)	4.2	4.2		3.2	3.2		4.2	4.2	4.2	5.3	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	182	187		542	571	825	344	362	305	703	371	
v/s Ratio Prot	0.05	c0.07		0.38	0.17	c0.72	0.02	c0.19		0.22	0.11	
v/s Ratio Perm									0.06			
v/c Ratio	0.49	0.67		1.18	0.51	1.31	0.11	0.92	0.29	1.01	0.52	
Uniform Delay, d1	46.1	47.1		37.2	30.2	24.8	35.5	42.8	37.1	43.1	38.1	
Progression Factor	1.00	1.00		1.01	1.03	1.04	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.1	9.2		93.6	2.1	147.1	0.1	28.5	0.5	36.4	1.3	
Delay (s)	48.2	56.3		131.3	33.2	172.9	35.6	71.3	37.6	79.5	39.4	
Level of Service	D	E		F	C	F	D	E	D	E	D	
Approach Delay (s)		53.0			141.4			54.6			70.7	
Approach LOS		D			F			D			E	

Intersection Summary

HCM 2000 Control Delay	105.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	107.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

ATTACHMENT 14

1: Highway 9 & Felton Empire Road/Graham Hill Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	178	12	240	62	603	11	218	333	1211	319	57
Future Volume (vph)	96	178	12	240	62	603	11	218	333	1211	319	57
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0		3.0	3.0	1.9	4.0	4.0	4.2	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt		0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1726		1676	1765	1500	1676	1765	1500	3252	1725	
Flt Permitted		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1726		1676	1765	1500	1676	1765	1500	3252	1725	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	104	193	13	261	67	655	12	237	362	1316	347	62
RTOR Reduction (vph)	0	2	0	0	0	174	0	0	234	0	6	0
Lane Group Flow (vph)	0	308	0	261	67	481	12	237	128	1316	403	0
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA	Perm	Split	NA	
Protected Phases	4	4		6	6	6 2	3	3		2	2	
Permitted Phases									3			
Actuated Green, G (s)		20.8		13.8	13.8	54.0	18.6	18.6	18.6	34.9	34.9	
Effective Green, g (s)		20.0		14.0	14.0	51.3	18.8	18.8	18.6	36.2	36.2	
Actuated g/C Ratio		0.19		0.13	0.13	0.49	0.18	0.18	0.18	0.34	0.34	
Clearance Time (s)		4.2		3.2	3.2		4.2	4.2	4.2	5.3	5.3	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		328		223	235	732	300	316	265	1121	594	
v/s Ratio Prot		c0.18		c0.16	0.04	0.32	0.01	c0.13		c0.40	0.23	
v/s Ratio Perm									0.09			
v/c Ratio		0.94		1.17	0.29	0.66	0.04	0.75	0.48	1.17	0.68	
Uniform Delay, d1		41.9		45.5	41.0	20.2	35.6	40.9	38.9	34.4	29.4	
Progression Factor		1.00		0.78	0.77	0.52	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		34.3		113.1	0.7	2.1	0.1	9.6	1.4	87.9	6.1	
Delay (s)		76.2		148.8	32.1	12.6	35.7	50.5	40.3	122.3	35.6	
Level of Service		E		F	C	B	D	D	D	F	D	
Approach Delay (s)		76.2			50.1			44.1			101.8	
Approach LOS		E			D			D			F	

Intersection Summary

HCM 2000 Control Delay	75.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	93.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

ATTACHMENT 14

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	116	22	663	307	1264	39	340	295	743	165	38
Future Volume (vph)	93	116	22	663	307	1264	39	340	295	743	165	38
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0		3.0	3.0	1.9	4.0	4.0	4.2	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt		0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1708		1676	1765	1500	1676	1765	1500	3252	1715	
Flt Permitted		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1708		1676	1765	1500	1676	1765	1500	3252	1715	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	126	24	721	334	1374	42	370	321	808	179	41
RTOR Reduction (vph)	0	3	0	0	0	115	0	0	199	0	7	0
Lane Group Flow (vph)	0	248	0	721	334	1259	42	370	122	808	213	0
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA	Perm	Split	NA	
Protected Phases	4	4		6	6	6 2	3	3		2	2	
Permitted Phases									3			
Actuated Green, G (s)		16.0		35.4	35.4	59.4	23.0	23.0	23.0	18.7	18.7	
Effective Green, g (s)		15.2		35.6	35.6	56.7	23.2	23.2	23.0	20.0	20.0	
Actuated g/C Ratio		0.14		0.32	0.32	0.52	0.21	0.21	0.21	0.18	0.18	
Clearance Time (s)		4.2		3.2	3.2		4.2	4.2	4.2	5.3	5.3	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		236		542	571	773	353	372	313	591	311	
v/s Ratio Prot		c0.14		0.43	0.19	c0.84	0.03	c0.21		0.25	0.12	
v/s Ratio Perm									0.08			
v/c Ratio		1.05		1.33	0.58	1.63	0.12	0.99	0.39	1.37	0.68	
Uniform Delay, d1		47.4		37.2	31.0	26.6	35.1	43.3	37.5	45.0	42.0	
Progression Factor		1.00		1.03	1.03	1.04	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		72.0		154.9	2.1	285.9	0.2	45.0	0.8	175.9	6.1	
Delay (s)		119.4		193.0	34.2	313.6	35.3	88.3	38.3	220.9	48.1	
Level of Service		F		F	C	F	D	F	D	F	D	
Approach Delay (s)		119.4			239.4			63.4			183.9	
Approach LOS		F			F			E			F	

Intersection Summary

HCM 2000 Control Delay	190.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.39		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	125.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

ATTACHMENT 14

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	178	12	241	62	603	11	219	334	1211	321	57
Future Volume (vph)	96	178	12	241	62	603	11	219	334	1211	321	57
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0		3.0	3.0	1.9	4.0	4.0	4.2	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt		0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1726		1676	1765	1500	1676	1765	1500	3252	1725	
Flt Permitted		0.98		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1726		1676	1765	1500	1676	1765	1500	3252	1725	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	104	193	13	262	67	655	12	238	363	1316	349	62
RTOR Reduction (vph)	0	2	0	0	0	174	0	0	233	0	6	0
Lane Group Flow (vph)	0	308	0	262	67	481	12	238	130	1316	405	0
Turn Type	Split	NA		Split	NA	pt+ov	Split	NA	Perm	Split	NA	
Protected Phases	4	4		6	6	6 2	3	3		2	2	
Permitted Phases									3			
Actuated Green, G (s)		20.7		13.8	13.8	54.0	18.7	18.7	18.7	34.9	34.9	
Effective Green, g (s)		19.9		14.0	14.0	51.3	18.9	18.9	18.7	36.2	36.2	
Actuated g/C Ratio		0.19		0.13	0.13	0.49	0.18	0.18	0.18	0.34	0.34	
Clearance Time (s)		4.2		3.2	3.2		4.2	4.2	4.2	5.3	5.3	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		327		223	235	732	301	317	267	1121	594	
v/s Ratio Prot		c0.18		c0.16	0.04	0.32	0.01	c0.13		c0.40	0.23	
v/s Ratio Perm									0.09			
v/c Ratio		0.94		1.17	0.29	0.66	0.04	0.75	0.49	1.17	0.68	
Uniform Delay, d1		42.0		45.5	41.0	20.2	35.6	40.8	38.8	34.4	29.5	
Progression Factor		1.00		0.77	0.75	0.48	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		34.9		114.6	0.6	2.1	0.1	9.6	1.4	87.9	6.2	
Delay (s)		76.9		149.8	31.4	11.7	35.6	50.4	40.2	122.3	35.7	
Level of Service		E		F	C	B	D	D	D	F	D	
Approach Delay (s)		76.9			49.8			44.1			101.7	
Approach LOS		E			D			D			F	

Intersection Summary

HCM 2000 Control Delay	75.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

ATTACHMENT 14

Annette Olson

From: Waller, Jeffrey <Jeffrey.Waller@mottmac.com>
Sent: Thursday, August 31, 2017 2:02 PM
To: Annette Olson
Subject: RE: Felton Library

Annette:

Yes, that is correct. The 21.4% is the total growth over existing volumes, or 1.26% per year for 17 years. (Our existing condition counts were originally from 2013, which we verified were essentially unchanged in 2014 and 2015.) That specific growth rate per year was requested by Santa Cruz County Public Works Department staff.

All of the traffic volumes (Existing, Background and Cumulative) also include a seasonal adjustment factor of 1.041, which raises the traffic counts (collected in the Fall) to typical Summer season counts. This factor was also provided by Santa Cruz County Public Works Department staff.

Let me know if you have any questions.

Jeffrey Waller
TE
Project Engineer

D +1 (408) 848 3163 T +1 (408) 848 3122 F +1 (408) 848 2202
jeffrey.waller@mottmac.com

Mott MacDonald
1300 First Street
Suite B
Gilroy CA 95020
United States of America

Website | **Twitter** | **LinkedIn** | **Facebook** | **YouTube**

From: Annette Olson [mailto:Annette.Olson@santacruzcounty.us]
Sent: Thursday, August 31, 2017 12:05 PM
To: Waller, Jeffrey <Jeffrey.Waller@mottmac.com>
Subject: Felton Library

Hi Jeff.
Thanks again for your time on the phone today. Could you confirm that I understood your methodology for calculating the cumulative scenario provided in Table 2 (Level of Service Summary)?

What I understood you to say is that the cumulative scenario is based upon an assumption of growth of 1.26% until 2030. You calculated that to be an overall growth of 21.4% over existing. Is that correct?

Thanks again,
Annette

Preliminary
Stormwater Control Plan

For

Felton Public Library

Gushee Street
Felton, California
APN: 065-073-03

REGISTERED PROFESSIONAL ENGINEER
DAVID A. HEINRICHSEN,
No. C49167
CIVIL
STATE OF CALIFORNIA

8/9/17

By: Joshua MacCallister
Reviewed By: David Heinrichsen, RCE #49167

July 5, 2017

Job # 12038

IFLAND ENGINEERS
Civil Engineering ▪ Structural Design ▪ Land Development

5300 Soquel Avenue Suite 101
Santa Cruz, CA 95062
(831) 426-5313 FAX (831) 426-1763
www.iflandengineers.com

ATTACHMENT 15

Table of Contents

List of Figures

List of Tables

Appendices

ATTACHMENT 1

Existing Conditions

The subject property is an approximately 2.03 acre parcel located on the west side of Gushee Street, between Kirby Street and Hihn Street, in Felton, California. A site location map has been included as Figure 1. The site shares its southern boundary with the Felton Post Office. The parcel to the west of the proposed library is a San Lorenzo Valley Water District facility. The subject parcel is bounded to the north by a single family residence. To the east, across Gushee Street, there is the Felton Fire Department as well as multiple retail spaces.

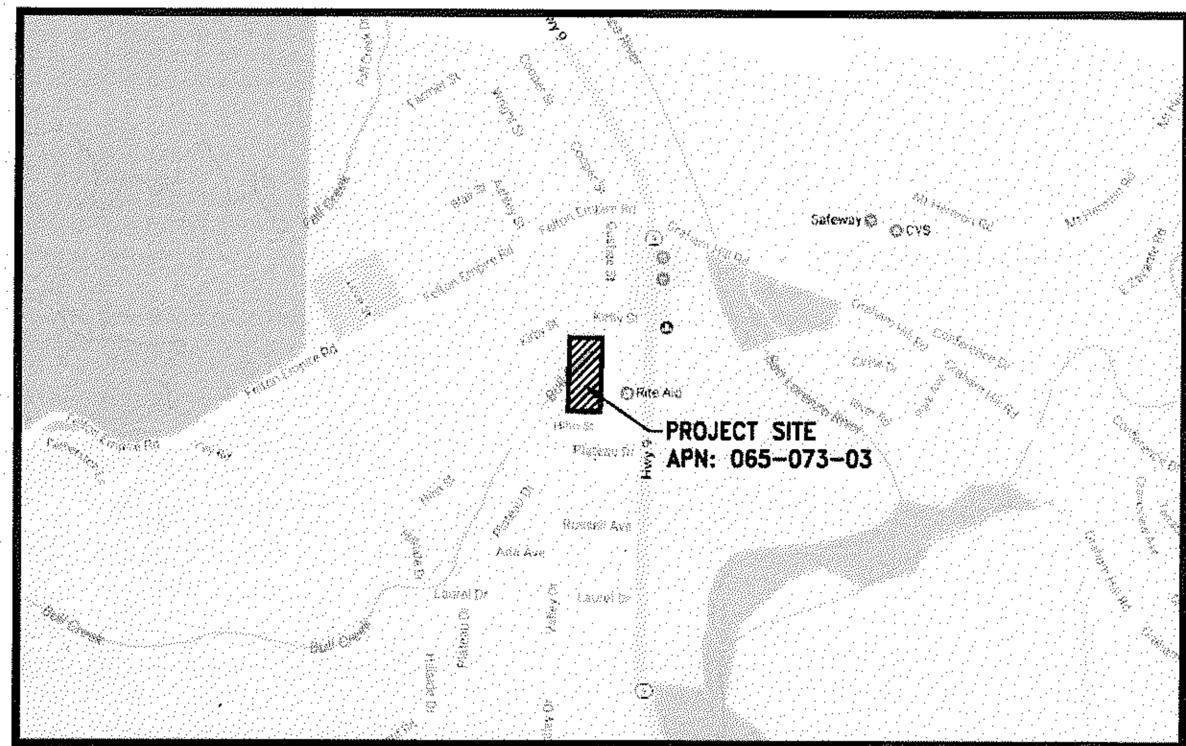


Figure 1 – Site Location Map
Not to scale – Source: Google Maps (Map data ©2017 Google)

Currently, the site is unused land with no buildings on the property. There is a clearing at the southern portion of the site which will be the primary development area. The northern two-thirds of the site is densely vegetated riparian area. Bull Creek flows northeasterly through the site to a headwall located in the northeast corner. Elevations on site vary from approximately 279 to 287, with slopes generally between 0 to 5%, and slopes generally below 3% for the building envelope. In the existing condition, the site is 100% pervious. Refer to Figure 2A for pervious areas and existing topography.

The NRCS classifies soil in the site area as Soquel Loam, a deep, moderately well drained soil with moderately slow permeability. The NRCS estimates saturated conductivity (Ksat) of the limiting layer of soil at 0.2 – 0.57 inches/hour, and the Ksat of the soil in general to be 0.68 inches/hour. A Geotechnical Investigation provided by Bauldry Engineering, dated December 2003, has been included as Appendix A to this report. This investigation confirms that subsurface conditions match the NRCS classification, with interbedded layers of silty sand,

AREA SUMMARY TABLE

	TOTAL
BUILDING & ROOF AREA	0 SF
IMPERVIOUS PATH AREA	0 SF
CONCRETE AREA	0 SF
IMPERVIOUS AREA	0 SF
LANDSCAPE & VEGETATION AREA	88,399 SF
PERVIOUS CONCRETE AREA	0 SF
PERVIOUS AREA	88,399 SF
TOTAL AREA	88,399 SF

HATCH LEGEND

- BUILDING & ROOF AREA
- CONCRETE AREA
- IMPERVIOUS PATH AREA
- PERVIOUS CONCRETE AREA
- LANDSCAPE & VEGETATION AREA

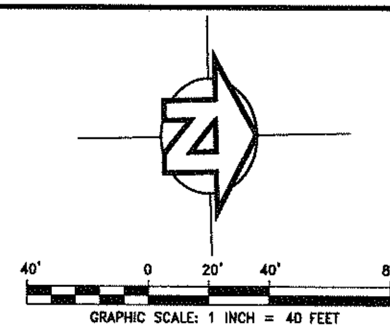
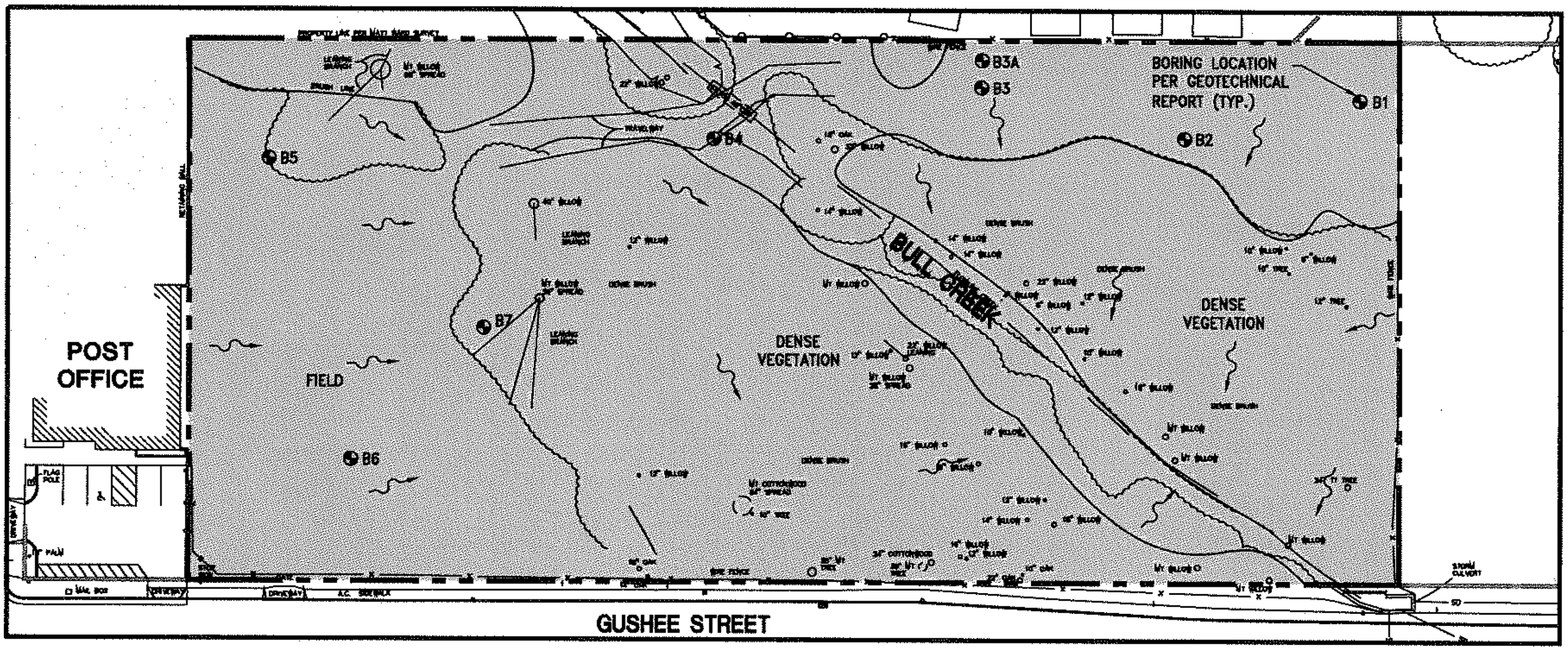


FIGURE 2A - EXISTING PERVIOUS & IMPERVIOUS AREAS



IFLAND ENGINEERS
CIVIL ENGINEERING LAND PLANNING STRUCTURAL DESIGN
5300 SOQUEL AVE. SUITE 101
SANTA CRUZ, CA 95062
TEL (831) 426-5313
FAX (831) 426-1763
www.iflandengineers.com

JOB NO. 12038
DESCRIPTION FIG. 2A - EXISTING PERVIOUS AND IMPERVIOUS AREAS
CALCULATED BY JJM
PAGE NO. 3
SCALE 1" = 40'
DATE 7/5/2017

sandy silt and silty clay all over gravelly sand and sandy gravel. There is also an approximately 2 foot thick layer of fill at the south end of the site. Groundwater was encountered in each of the seven borings performed by Bauldry at depths varying from 4 – 10 feet, with ground water in the building envelope around 9 – 10 feet. The drilling occurred in the October following a very average rainfall winter in 2002 – 2003. It is expected that the average seasonal high groundwater table may vary from the groundwater encountered in 2003.

It is expected that the Geotechnical investigation performed by Bauldry will be updated prior to the construction document phase of the project. This report will have site specific percolation rates as well as updated recommendations based upon current design requirements. These will be taken into account in final stormwater design during the building permit approval process.

Existing storm drain improvements around the site include a corrugated metal pipe running below the western gutter in Gushee Street, starting about half way along the property frontage. This line continues north approximately 200 feet to an outfall at the Bull Creek headwall. The existing depth of the CMP is approximately 2 feet. Beyond the site, Bull Creek continues underground through a series of large culverts to an outfall at the San Lorenzo River, approximately 1,000 feet away.

Bull Creek

Due to the possibility of flooding on site caused by the presence of Bull Creek, a number of studies have been performed to analyze the hydrology of the creek. A 100 – Year Floodplain Analysis was put together by Ifland Engineers in July of 2009, and was updated in May of 2017. The updated analysis has been included as Appendix B to this report. The Floodplain Analysis delineates the watershed for Bull Creek. The 100 year volume was determined using a number of methodologies, with a 100 – year flow rate of 300 cubic feet per second. However, due to a bottleneck upstream, only 96 cubic feet per second will reach the site. Cross sections of the creek were taken, and Manning's Equation was used to determine the depth and extent of the creek at each section. The floodplain is substantial, encompassing most of the riparian area to the south of Bull Creek, as shown in the Floodplain Exhibit of the attached report. However, the floodplain does not reach the building envelope to the south of the site, leaving an area suitable for placement of a building.

Santa Cruz County Department of Public Works put together a Downstream Drainage Evaluation, dated May 16, 2017, included as Appendix C to this report. The County did an analysis of the capacity and condition of the culverts downstream of the library site. It was determined that the culverts running from the site to the San Lorenzo River have sufficient capacity and are in good condition to accommodate additional runoff from the Library project.

Project Description

Proposed improvements for the new library site will be built in 2 phases. The first phase will consist of the one story library building, with associated utilities & flatwork, a permeable concrete parking lot, landscaping & outdoor public space, and sidewalk & frontage improvements along Gushee Street. All utility connections will be made in Gushee Street. As there is currently no sanitary sewer line in the area, a septic system will be installed, with pretreatment and storage tanks on site and a leach field located to the southeast in Hihn Street. The 48 inch culvert near the western site boundary will be removed and replaced with a bridge that spans the creek, and a path will be installed terminating at the bridge. Refer to the Civil Plans included as Appendix D to this report for detailed site work to be performed.

Phase 2 of the project will generally consist of work dictated by the landscape architect. A nature path will be installed, along with seating areas and a small stage. A secondary maintenance access road will also be constructed from Kirby Street through the SLVWD facility. This will be a dirt road that will terminate near the northwestern corner of the site.

Stormwater mitigation requirements for the project will be met using the pervious concrete parking lot with an infiltration and detention bed beneath it. An outlet control structure will be placed near the driveway, and will connect to the existing storm drain in Gushee Street, allowing runoff beyond the design storm to bypass and exit the site. In total, the project will create or replace approximately ±20,000 sf of impervious surface, leaving ±68,400 sf of pervious area. See Figure 2B for more information regarding proposed pervious and impervious areas. For the complete project information, see Table 1 – Project Information Summary.

Project Name:	Felton Public Library
Project Reference Number:	TBD
Address:	Gushee Street, Felton CA 95018
APN:	065-073-03
Applicant:	Teall Messer Architect 3833 Glen Haven Road Soquel, CA 95073
Project Type:	Civic Improvements
Detached Single Family Home:	No
Development Type:	New Development
Total Project Area (Ac):	2.03
Existing Impervious Area (SF):	0
New Impervious Area (SF):	20,016
Replaced Impervious Area (SF):	0
Total Proposed Impervious Area (SF):	20,016
Net Impervious Area (SF):	20,016

Table 1 – Project Information Summary

Stormwater Management Requirements

The new Felton Public Library falls within the jurisdiction of the County of Santa Cruz. The County Public Works Design Criteria, dated February 2017, provides requirements for stormwater mitigation for all new development within the unincorporated areas of Santa Cruz County. These requirements are based upon the requirements put forth by the Central Coast Regional Water Quality Control Board in Resolution R3-2013-0032 for Watershed Management Zones 1, 4 &10. As shown in Figure 3, the site falls within Watershed Management Zone 1.

Because the project is creating more than 5,000 square feet of new or replaced impervious area, it is categorized as a Large Project within the county. Large Projects must incorporate Low Impact Development (LID) and Best Management Practices (BMP) to reduce and treat pollution from the 85th percentile storm. Large projects are also required to retain runoff from the 2 – year, 2 – hour storm on site and maintain predevelopment discharge rates up to the 10- year, 15 – minute design storm through the use of detention and metered release. For complete stormwater runoff mitigation requirements, refer to the County Design Criteria.

AREA SUMMARY TABLE

	TOTAL
BUILDING & ROOF AREA	9,679 SF
IMPERVIOUS PATH AREA	2,560 SF
CONCRETE AREA	4,008 SF
IMPERVIOUS AREA	20,016 SF
LANDSCAPE & VEGETATION AREA	64,615 SF
PERVIOUS CONCRETE AREA	7,537 SF
PERVIOUS AREA	68,384 SF
TOTAL AREA	88,399 SF

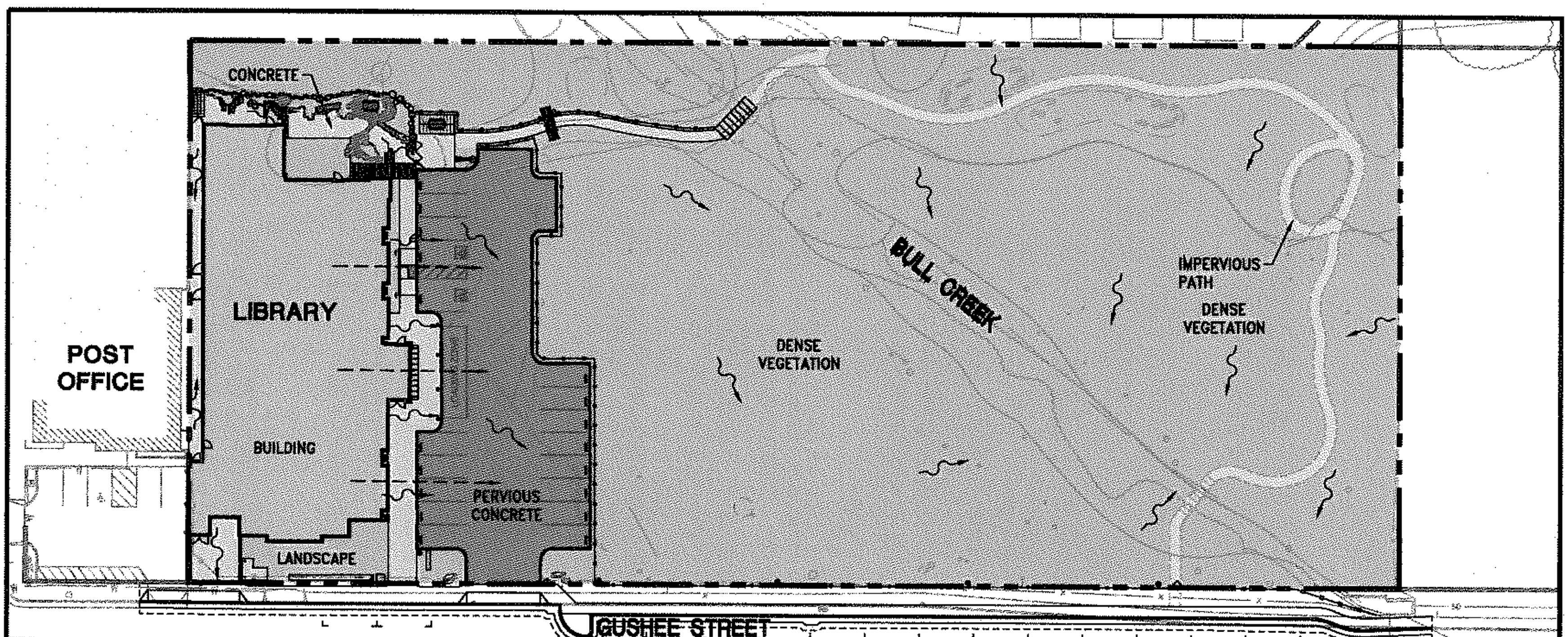
HATCH LEGEND

- BUILDING & ROOF AREA
- CONCRETE AREA
- IMPERVIOUS PATH AREA
- PERVIOUS CONCRETE AREA
- LANDSCAPE & VEGETATION AREA

40' 0 20' 40' 80'

GRAPHIC SCALE: 1 INCH = 40 FEET

FIGURE 2B - PROPOSED PERVIOUS & IMPERVIOUS AREAS



IFLAND ENGINEERS
CIVIL ENGINEERING | LAND PLANNING | STRUCTURAL DESIGN
5300 SOQUEL AVE. SUITE 101
SANTA CRUZ, CA 95062
TEL (831) 426-5313
FAX (831) 426-1763
www.iflandengineers.com

JOB NO. 12038
DESCRIPTION FIG. 2B - PROPOSED PERVIOUS AND IMPERVIOUS AREAS
CALCULATED BY JJM
PAGE NO. 6
SCALE 1" = 40'
DATE 7/5/2017

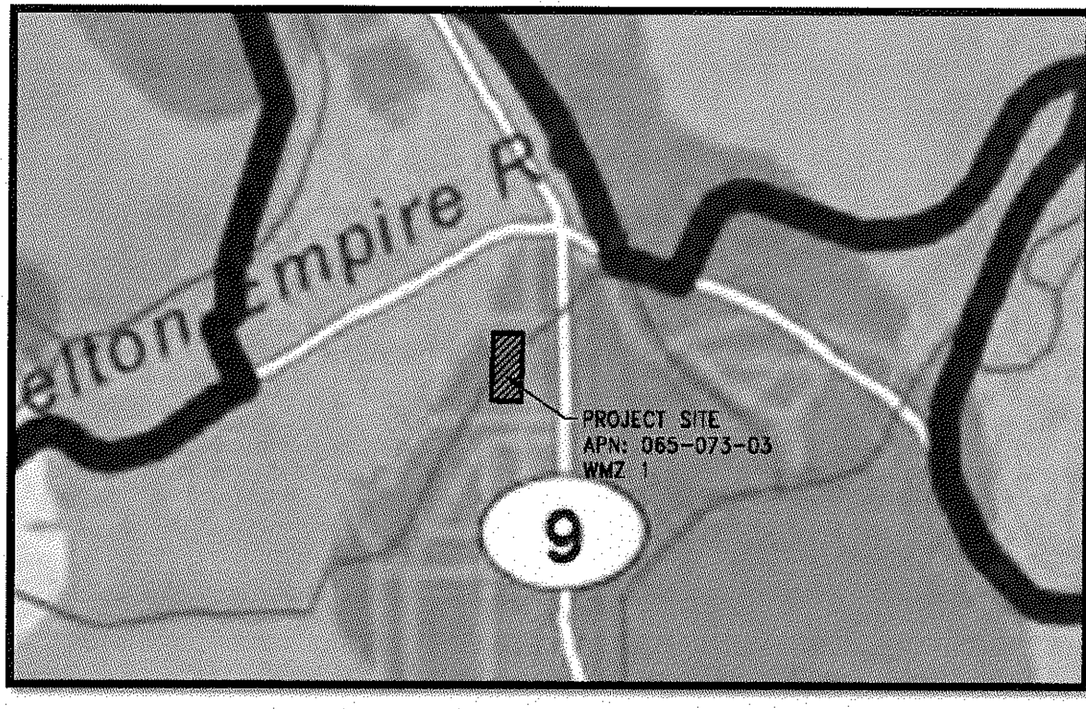


Figure 3 – Watershed Management Zone Map
Not to scale – Source: Stillwater Sciences, 2012

Stormwater Management Strategy

As the proposed development in this report will create approximately 20,000 sf of impervious area, well above the 5,000 sf threshold for Large Projects, it will be required to comply with all of the requirements summarized above. The following section is an outline of the strategies that will be used to meet the runoff mitigation requirements, with detailed information and sizing calculations to follow.

To minimize runoff and pollution from the development, a number of LID measures will be implemented on the project. The building and improvements are located in the existing clearing to the south of the site to minimize impacts to the natural drainage features. There will be minimal impact to Bull Creek and the vegetated riparian areas that compose the majority of the site. The 48 inch culvert will be removed and replaced with a bridge spanning the creek, which will allow for a more natural creek channel, and will remove a bottleneck. The total amount of impervious surface will also be reduced through the use of pervious concrete, allowing infiltration of runoff & ground water recharge, which will minimize the total amount of runoff leaving the site.

Retention and detention of runoff from the site will be achieved using a bed of permeable material located below the pervious concrete. Runoff from the library building and flatwork surrounding it will be directed to the pervious concrete either by sheet flow or piping it directly into the bed beneath. The permeable bed will have an underdrain which will separate it into two zones, with runoff to be retained stored below the underdrain and runoff to be detained stored above it. An outlet control structure located near the driveway for the project will collect runoff from the underdrain, and will release it through an orifice located on the inlet pipe. An overflow riser will also be installed to allow water to bypass the orifice for storms larger than the 10 – year, 15 – minute design storm. After passing through the outlet control structure, water will be released to the storm drain system in Gushee Street, where it will then continue on to outfall into Bull Creek.

Proposed Drainage Management Areas

Based upon site improvements and grading, the site will be divided into two separate Drainage Management Areas (DMA's), which are described below. See Figure 4 – Stormwater Management Plan for more information about each DMA.

- DMA 1 is located at the south end of the site. It encompasses the majority of the improvements that will be built as part of this project. It is 23,580 sf, and will be 73% impervious. Mitigation for this area will be provided within the pervious concrete parking lot.
- DMA 2 makes up the majority of the site, and will mostly be left in its existing state. Bull Creek and the majority of the vegetated riparian area fall within DMA 2. This DMA is 64,549 sf, and will be 4% impervious at project completion. The trail improvements in DMA 2 will be graded to drain to the riparian areas, where runoff will be retained on site.

Runoff Retention Bed Sizing

The retention bed located beneath the pervious concrete parking lot was preliminarily sized using the Storage Percolation Method outlined in the Design Criteria. Calculations were performed using the County spreadsheet Figure SWM-24. All preliminary stormwater calculations have included as Appendix E to this report. The calculator uses the Modified Rational Method to determine the required runoff retention volume based upon the geometric parameters of the retention bed, soil infiltration rates and void space of the storage material. Through iteration, the calculator will compute the required retention depth below the underdrain. A porosity of 40% was used for the Class 2 Permeable Material in the retention bed, and a local infiltration rate of 0.68 inches/hour was used based upon values from the Web Soil Survey. Given the proposed site design, a retention bed depth of 1 foot below the underdrain would provide sufficient capacity to retain the necessary 2,464 cubic feet of retention volume. See Figure 5 for the pervious concrete detail showing the retention and detention bed.

AREA SUMMARY TABLE

	DMA 1	DMA 2	TOTAL
BUILDING & ROOF AREA	9,679 SF	0 SF	9,679 SF
IMPERVIOUS PATH AREA	0 SF	2,560 SF	2,560 SF
CONCRETE AREA	4,008 SF	0 SF	4,008 SF
IMPERVIOUS AREA	17,456 SF	2,560 SF	20,016 SF
LANDSCAPE & VEGETATION AREA	2,626 SF	61,989 SF	64,615 SF
PERVIOUS CONCRETE AREA	7,537 SF	0 SF	7,537 SF
PERVIOUS AREA	6,395 SF	61,989 SF	68,384 SF
TOTAL AREA	23,850 SF	64,549 SF	88,399 SF

HATCH LEGEND

BUILDING & ROOF AREA

CONCRETE AREA

IMPERVIOUS PATH AREA

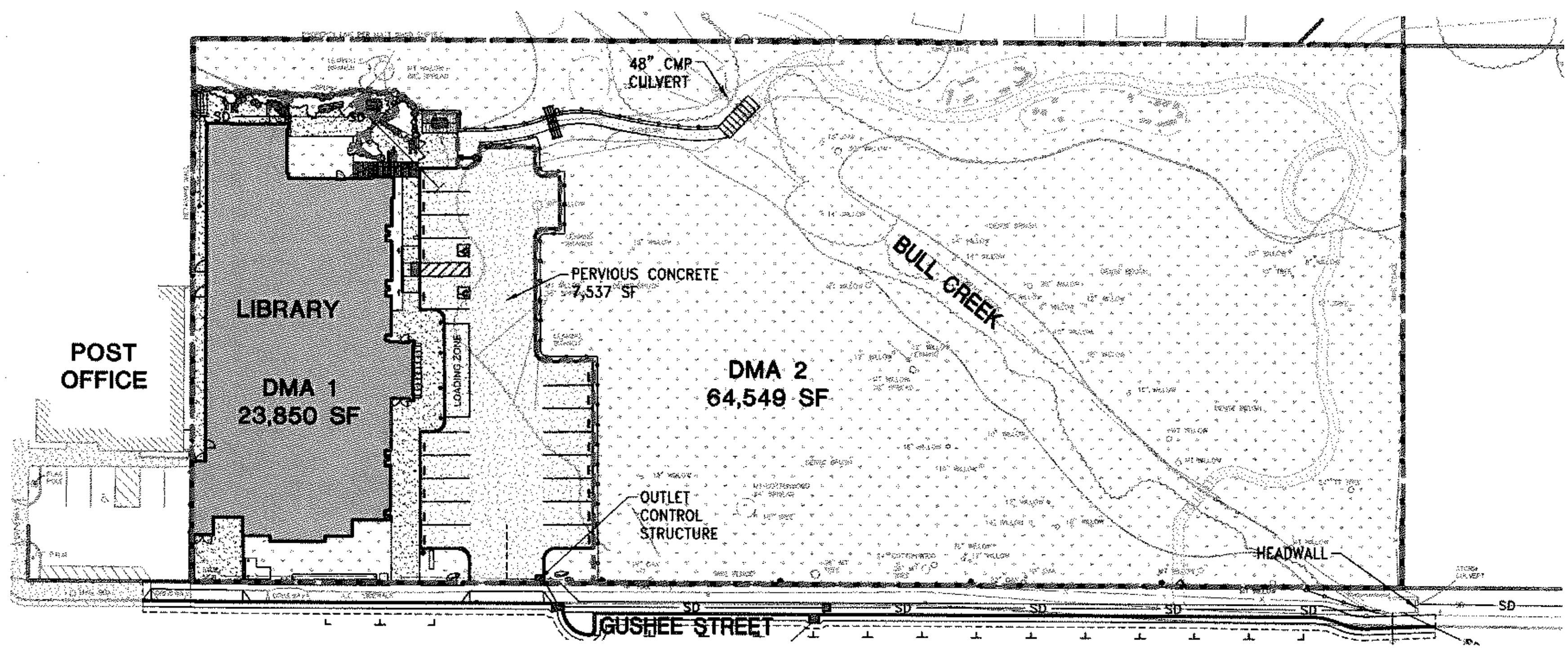
PERVIOUS CONCRETE AREA

LANDSCAPE & VEGETATION AREA

40' 0 20' 40' 80'

GRAPHIC SCALE: 1 INCH = 40 FEET

FIGURE 4 - STORMWATER MANAGEMENT PLAN



IFLAND ENGINEERS
CIVIL ENGINEERING LAND PLANNING STRUCTURAL DESIGN
5300 SOQUEL AVE. SUITE 101
SANTA CRUZ, CA 95062
TEL (831) 426-5313
FAX (831) 426-1763
www.iflandengineers.com

JOB NO. 12038

DESCRIPTION FIG. 4 - STORMWATER MANAGEMENT PLAN

CALCULATED BY JJM

PAGE NO. 9

SCALE 1" = 40'

DATE 7/5/2017

ATTACHMENT 15

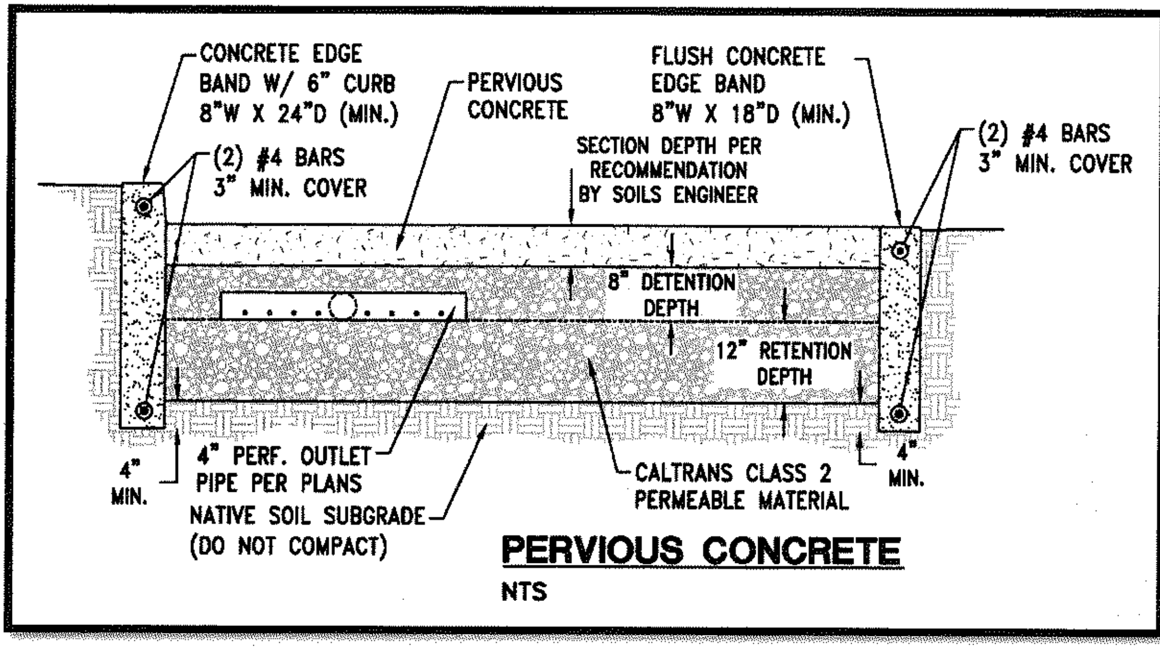


Figure 5 – Pervious Concrete Section
Not to scale

Runoff Detention Bed Sizing

Because of the amount of impervious area proposed, stormwater control measures will be required to offset the peak discharge from the site for the 10 – year design storm. The method of detaining runoff from the site will be to store it within the permeable material bed below the pervious concrete and mete out the runoff through an orifice located within the outlet control structure. The orifice will be on an endcap connected to the underdrain, with an overflow riser which allows larger storm events to bypass the orifice. See Figure 6 for a detail of the Outlet Control Structure

The required detention volume was determined using the Santa Cruz County Figure SWM-17 Calculator. This calculator is used to determine runoff detention using the Modified Rational Method for the 10 – year design storm. It determines the volume of storage required to detain the maximum difference in runoff volume for the pre-construction 10 – year, 15 – minute storm and post-construction 10-year storm across a variety of times of concentration. Based upon the proposed site, the required 10 – year detention volume is 1,736 cubic feet of water, with a discharge rate of 0.284 cubic feet/second. To provide this storage capacity, a detention depth of 8 inches of storage material above the underdrain invert will be necessary.

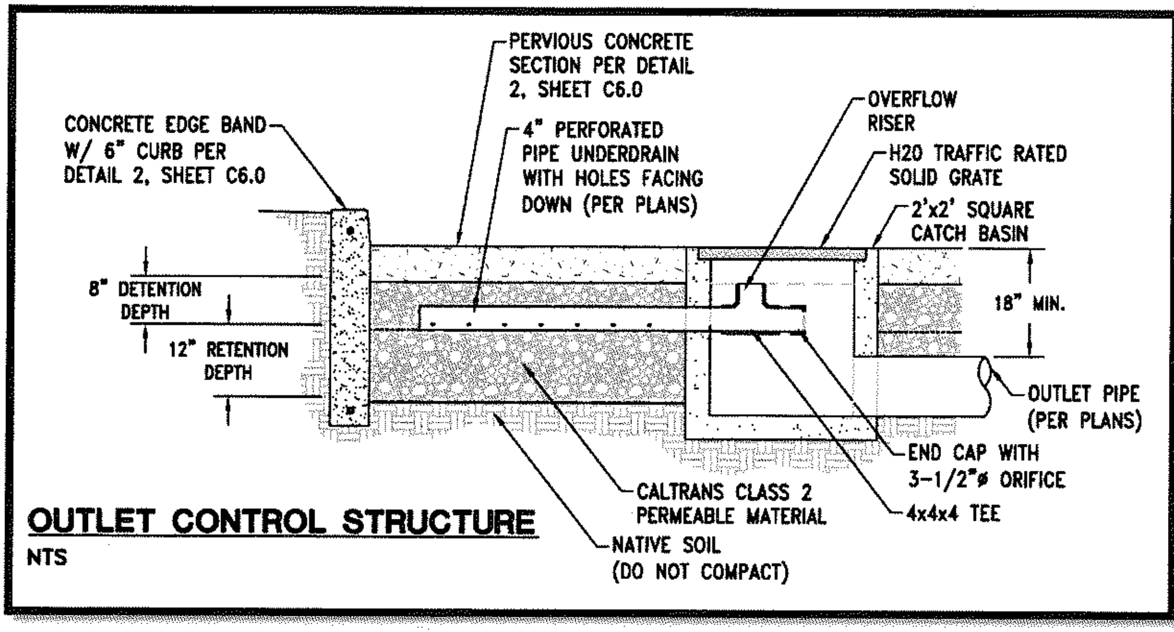


Figure 6 – Outlet Control Structure
Not to scale

To ensure that post-construction discharge rates do not exceed pre-construction rates, the orifice located on the underdrain was sized using the following equations:

$$A = \frac{Q}{C_d \times \sqrt{2gh}}$$

where

$$A = Orifice\ Area$$
$$Q = Pre-construction\ Flow\ Rate$$
$$C_d = Coefficient\ of\ Discharge\ (0.61)$$
$$g = Acceleration\ of\ Gravity$$
$$h = Hydrostatic\ Head$$

and

$$d = 2\sqrt{\frac{A}{\pi}}$$

where

$$d = Maximum\ Orifice\ Diameter$$

Using these equations, the 10 – year orifice diameter is 3.61 inches. Therefore, the orifices will be conservatively rounded to 3-1/2 inches diameter for ease of fabrication of the outlet control structure.

Operations and Maintenance Requirements

Prior to completion and issuance of the certificate of occupancy for this project, an Operation and Maintenance Agreement with the County of Santa Cruz shall be prepared. This agreement shall be recorded against the property with the County Recorder's Office, and it will be binding on all subsequent owners of the property. This Maintenance Agreement shall remain in place for the life of the project.

The maintenance agreement will set forth a schedule of maintenance tasks, to be performed by the library staff, which are required for safe and efficient function of the on-site stormwater treatment, retention & detention facilities. It will also specify procedures for yearly inspections and record keeping of inspections, maintenance and repairs performed. Refer to the County of Santa Cruz Design Criteria for more information regarding the Operation and Maintenance Agreement requirements.

See Attachment 7

~~APPENDIX A~~

GEOTECHNICAL INVESTIGATION – BAULDRY ENGINEERING

See Attachment 12

~~APPENDIX B~~
100-YEAR FLOODPLAIN ANALYSIS OF BULL CREEK

ATTACHMENT 15

See Attachment 11

~~APPENDIX C~~
FELTON LIBRARY
DOWNSTREAM DRAINAGE ANALYSIS

APPENDIX D
CIVIL IMPROVEMENT PLANS

LEGEND

EXISTING	DESCRIPTION	PROPOSED
	AIR RELEASE VALVE	
	AREA DRAIN	
	BACKFLOW PREVENTION DEVICE	
	BLOW-OFF VALVE	
	CATCH BASIN	
	CURB INLET	
	CLEANOUT STRUCTURE	
	FIRE HYDRANT	
	GUY ANCHOR	
	JUNCTION BOX	
	MANHOLE STRUCTURE	
	WATER METER	
	WATER VALVE	
	ELECTRICAL LINE	E
	FIBER OPTIC LINE	FO
	FIRE WATER LINE	FW
	GAS LINE	G
	IRRIGATION LINE	IRR
	JOINT TRENCH LINE	JT
	OVERHEAD LINE	OH
	RECYCLED WATER LINE	RW
	STORM DRAIN LINE	SD
	SANITARY SEWER LINE	SS
	TELEPHONE LINE	T
	CABLE TV LINE	TV
	WATER LINE	W

ABBREVIATIONS

AB	AGGREGATE BASE	INT	INTERSECTION
AD	AREA DRAIN	INV	INVERT
ARV	AIR-RELEASE VALVE	IRR	IRRIGATION
BFP	BACKFLOW PREVENTER	JB	JUNCTION BOX
BO	BLOW-OFF VALVE	JT	JOINT TRENCH
BRW	BOTTOM OF RETAINING WALL	LF	LINEAR FOOT
BSW	BACK OF SIDEWALK	LIP	LIP OF GUTTER
BVC	BEGIN VERTICAL CURVE	LOG	LIMIT OF GRADING
BW	BACK OF WALK	LP	LOW POINT
CATV	CABLE TELEVISION	MFS	MECHANICAL FILTRATION SYSTEM
CB	CATCH BASIN	MH	MANHOLE
CI	CURB INLET	N	NORTH
CIP	CAST IRON PIPE	NE	NORTHEAST
CL	CENTERLINE	NW	NORTHWEST
CMP	CORRUGATED METAL PIPE	OCS	OUTLET CONTROL STRUCTURE
CMU	CONCRETE MASONRY UNIT	OH	OVERHEAD
CO	CLEANOUT	PCC	PORTLAND CEMENT CONCRETE
CONC	CONCRETE	PP	POWER POLE
COTG	CLEANOUT TO GRADE	PL	PROPERTY LINE
DIP	DUCTILE IRON PIPE	PRC	POINT OF REVERSE CURVE
DTL	DETAIL	PIV	POST-INDICATOR VALVE
DWG	DRAWING	PV	PAVEMENT
DWY	DRIVEWAY	PVC	POLYVINYL CHLORIDE PIPE
E	EAST, ELECTRICAL	R	RADIUS
EG	EXISTING GROUND	RCP	REINFORCED CONCRETE PIPE
EP	EDGE OF PAVEMENT	ROW	RIGHT-OF-WAY
(E)	EXISTING	RPPB	REDUCE PRESSURE PRINCIPLE BACKFLOW
EX.	EXISTING	RW	RECYCLED WATER
FC	FACE OF CURB	S	SOUTH, SLOPE
FDC	FIRE DEPARTMENT CONNECTION	SD	STORM DRAIN
FG	FINISH GRADE	SE	SOUTHEAST
FF	FINISH FLOOR	SDMH	STORM DRAIN MANHOLE
FH	FIRE HYDRANT	SS	SANITARY SEWER
FL	FLOWLINE	SSMH	SANITARY SEWER MANHOLE
FNC	FENCE	STA	STATION
FO	FIBER OPTIC	STD	STANDARD
FOW	FACE OF WALL	SW	SIDEWALK, SOUTHWEST
FT	FOOT/FEET	T	TELEPHONE
FW	FIRE WATER	TC	TOP OF CURB
G	GAS	TRAN	TRANSFORMER
GB	GRADE BREAK	TRW	TOP OF RETAINING WALL
GFF	GARAGE FINISH FLOOR	TW	TOP OF WALL
HT	HEIGHT	USA	UNDERGROUND SERVICE ALERT
HDPE	HIGH-DENSITY POLYETHYLENE	W	WEST, WATER
HP	HIGH POINT	WM	WATER METER
		WV	WATER VALVE

CIVIL SHEET INDEX

SHEET NO.	DESCRIPTION
C1.0	PRELIMINARY NOTES
C2.0	PRELIMINARY EXISTING CONDITIONS & DEMOLITION PLAN
C3.0	PRELIMINARY PAVING PLAN
C4.0	PRELIMINARY GRADING & DRAINAGE PLAN
C5.0	PRELIMINARY UTILITY PLAN
C6.0	PRELIMINARY STORMWATER CONTROL PLAN

UNDERGROUND FIRE PROTECTION NOTES

1. THE UNDERGROUND FIRE PROTECTION SYSTEM SHOWN ON THESE PLANS IS SCHEMATIC ONLY AND IS NOT INTENDED TO BE AN INSTALLATION DRAWING. THIS DRAWING SHALL NOT BE USED AS A BASE SHEET FOR SHOP DRAWINGS WITHOUT WRITTEN APPROVAL FROM IFLAND ENGINEERS.
2. THE UNDERGROUND FIRE PROTECTION SYSTEM INSTALLER SHALL PREPARE SHOP DRAWINGS SHOWING ALL INFORMATION REQUIRED BY NFPA 13, 24, AND THE LOCAL FIRE MARSHAL. THE SHOP DRAWINGS SHALL ALSO COMPLY WITH ALL OTHER NFPA REQUIREMENTS IN ADDITION TO LOCAL AND STATE REGULATIONS AND CODES.
3. SHOP DRAWINGS SHALL BE SUBMITTED TO THE LOCAL FIRE MARSHAL FOR REVIEW AND APPROVAL, THE RATING AGENCY, AND THE ARCHITECT.
4. THE UNDERGROUND FIRE PROTECTION SYSTEM INSTALLER SHALL OBTAIN ALL NECESSARY PERMITS AND APPROVALS PRIOR TO START OF WORK.
5. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF COMPLIANCE OF SHOP DRAWINGS TO ALL PLANS AND SPECIFICATIONS IN ADDITION TO CITY OR AGENCY STANDARD DETAILS AND SPECIFICATIONS.
6. GENERAL CONTRACTOR AND UNDERGROUND FIRE PROTECTION SYSTEM INSTALLER IS RESPONSIBLE FOR VERIFICATION OF ALL DIMENSIONS AND EQUIPMENT LOCATIONS IN ADDITION TO SPACE CONSTRAINTS, REQUIRED PAD AREAS, AND CLEARANCES FROM OTHER UTILITIES, TREES, OR PERMANENT STRUCTURES.
7. PROVISIONS SHALL BE MADE IN THE SHOP DRAWINGS FOR MONITORING ALL VALVES AS REQUIRED BY THE LOCAL FIRE MARSHAL. SHOP DRAWINGS PREPARED BY THE UNDERGROUND FIRE PROTECTION SYSTEM INSTALLER SHALL COORDINATE WITH THE ELECTRICAL DESIGNER FOR INSTALLATION OF ALL ALARM SYSTEMS AS REQUIRED BY THE LOCAL FIRE MARSHAL.
8. CONTRACTOR SHALL OBTAIN A PERMIT FROM THE LOCAL FIRE MARSHAL PRIOR TO INSTALLATION.

ACCESSIBILITY NOTES

1. ALL NEW WORK SHALL CONFORM TO TITLE 24 OF THE CALIFORNIA ADMINISTRATIVE CODE AND THE AMERICANS WITH DISABILITIES ACT (ADA).
2. NEW CURB RAMPS SHALL NOT EXCEED A SLOPE OF 1:12 (8.33%).
3. ALL NEW ENTRANCE WALKS TO BUILDINGS SHALL NOT EXCEED A SLOPE OF 1:20 (5%) LONGITUDINALLY UNLESS RAILINGS ARE PROVIDED IN WHICH CASE THE SLOPE SHALL NOT EXCEED 1:12 (8.33%). SEE ARCHITECTURAL OR LANDSCAPE PLANS FOR RAILING REQUIREMENTS IF NOT IN THE SCOPE OF THE CIVIL PLANS.
4. LANDINGS SHALL BE PROVIDED AT BUILDING ENTRANCES DESIGNATED AS ACCESSIBLE WITH A 2% MAXIMUM SLOPE IN ALL DIRECTIONS. CONTRACTOR SHALL VERIFY THAT ALL LANDINGS AT NEW BUILDING ENTRANCES COMPLY WITH CBC 2013 SECTION 11B-404.
5. RAMPS ARE DEFINED AS ANY WALKWAY WITH A LONGITUDINAL SLOPE BETWEEN 1:20 (5%) AND 1:12 (8.33%). RAMPS SHALL HAVE A MINIMUM WIDTH OF 48" AND A MAXIMUM CROSS-SLOPE OF 2%. RAMPS EXCEEDING 30" VERTICAL DROP SHALL HAVE INTERMEDIATE (2% MAXIMUM SLOPE) LANDINGS HAVING A MINIMUM LENGTH IN THE DIRECTION OF TRAVEL OF 60". LANDINGS AT THE BOTTOM OF A RAMP OR CHANGES IN RAMP DIRECTION SHALL HAVE A MINIMUM LENGTH OF 72".
6. MAXIMUM CROSS-SLOPE ON ANY SIDEWALK OR RAMP SHALL BE 2%. MAXIMUM SLOPE IN ANY DIRECTION WITHIN PARKING STALLS DESIGNATED AS ACCESSIBLE PARKING STALLS SHALL BE 2%.
7. ANY CATCH BASINS OR DRAINAGE INLETS LOCATED WITHIN DESIGNATED ACCESSIBLE PATHS OF TRAVEL SHALL BE INSTALLED WITH HEEL PROOF GRATES.
8. CONTRACTOR SHALL ENSURE AND CONSTRUCT ALL IMPROVEMENTS WITH ADA COMPLIANCE. THIS SHALL INCLUDE BUT NOT LIMITED TO PATHWAYS, RAMPS, BUILDING ENTRANCES, ROADWAYS, ETC.

IFLAND ENGINEERS STANDARD NOTES

1. ALL GRADING WORK AND CONSTRUCTION OF IMPROVEMENTS SHALL BE DONE IN ACCORDANCE WITH RECOMMENDATIONS PROVIDED IN THE GEOTECHNICAL REPORT PREPARED FOR THIS PROJECT. "GEOTECHNICAL INVESTIGATION FOR FELTON BRANCH LIBRARY, GUSHEE STREET, FELTON, CALIFORNIA, APN 065-073-03", BY BAULDRY ENGINEERING, AND DATED DECEMBER 2003, AS WELL AS "GEOTECHNICAL INVESTIGATION REPORT UPDATE, FELTON BRANCH LIBRARY, GUSHEE STREET, FELTON, CALIFORNIA, APN 065-073-03", BY PACIFIC CREST ENGINEERING INC., AND DATED MAY 26, 2017. THE GEOTECHNICAL ENGINEER SHALL INSPECT THE COMPLETED PROJECT AND VERIFY IN WRITING THAT ALL GRADING AND COMPACTION OPERATIONS HAVE BEEN CONSTRUCTED IN CONFORMANCE WITH THE GEOTECHNICAL REPORT. THE GEOTECHNICAL ENGINEER SHALL ALSO INSPECT AND VERIFY ALL STORMWATER GRAVEL STORAGE PITS AND BIORETENTION SOIL MIXES.
2. ALL ORGANIC MATERIAL COVERING THE SITE SHALL BE STRIPPED AND STOCKPILED. THE STRIPPINGS SHALL BE USED TO BACKFILL ALL ROUGH GRADED MOUND AREAS OR LANDSCAPE PLANTERS AS APPROVED BY THE LANDSCAPE ARCHITECT, TO WITHIN 0.1' OF GRADES SHOWN. EXCESS STRIPPINGS AND EXCAVATED MATERIALS SHALL BE REMOVED FROM THE SITE BY THE GRADING CONTRACTOR IF EARTHWORK BALANCE CANNOT BE ACHIEVED.
3. COMPACTION TO BE DETERMINED USING THE LATEST EDITION OF ASTM D1557.
4. THE TYPES, LOCATIONS, SIZES, AND/OR DEPTHS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THE IMPROVEMENT PLANS WERE OBTAINED FROM SOURCES OF VARYING RELIABILITY. THE CONTRACTOR IS CAUTIONED THAT ONLY ACTUAL EXCAVATION WILL REVEAL THE TYPES, EXTENT, SIZES, LOCATIONS, AND DEPTHS OF SUCH UNDERGROUND UTILITIES. (A REASONABLE EFFORT HAS BEEN MADE TO LOCATE AND DELINEATE ALL KNOWN UNDERGROUND UTILITIES). HOWEVER, THE ENGINEER CAN ASSUME NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF THE DELINEATION OF SUCH UNDERGROUND UTILITIES WHICH MAY BE ENCOUNTERED, BUT WHICH ARE NOT SHOWN ON THESE DRAWINGS. CONTRACTOR TO CONTACT USA AT 811 PRIOR TO START OF WORK.
5. CONTRACTOR TO VERIFY ALL EXISTING INVERT ELEVATIONS FOR STORM DRAIN AND SANITARY SEWER CONSTRUCTION PRIOR TO ANY SITE WORK. ALL WORK FOR STORM AND SANITARY INSTALLATION SHALL BEGIN AT THE DOWNSTREAM CONNECTION POINT. ALLOW FOR ANY NECESSARY ADJUSTMENTS TO BE MADE PRIOR TO THE INSTALLATION OF THE ENTIRE LINE.
6. SHOULD DISCREPANCIES EXIST BETWEEN THE ACTUAL ELEVATIONS AND LOCATIONS OF EXISTING UTILITY CONNECTIONS AND THOSE AS SHOWN ON THESE PLANS, THE CONTRACTOR SHALL NOTIFY IFLAND ENGINEERS BEFORE ADJUSTING THE UTILITY DESIGN.
7. CONTRACTOR SHALL UNCOVER AND EXPOSE ALL EXISTING UTILITY LINES WHERE THEY ARE TO BE CROSSED ABOVE OR BELOW BY THE NEW UTILITY LINE BEING CONSTRUCTED IN ORDER TO VERIFY THE GRADES AND CLEARANCES. IF ASSISTANCE IS REQUIRED, CONTRACTOR SHALL ARRANGE FOR A SURVEY CREW TO VERIFY THE ELEVATIONS AT THE CROSSINGS. PIPE SHALL NOT BE STRUNG NOR TRENCHING COMMENCED UNTIL ALL CROSSINGS HAVE BEEN VERIFIED FOR CLEARANCE.
8. CONTRACTOR SHALL SET HIS STRING OR WIRE THROUGH AT LEAST THREE GRADE STAKES TO VERIFY THE UTILITY GRADES. IF THE STAKES DO NOT PRODUCE A UNIFORM GRADE, NOTIFY THE ENGINEER IMMEDIATELY AND HAVE THE GRADES CHECKED PRIOR TO TRENCHING.
9. ALL UTILITY STRUCTURES TO REMAIN, INCLUDING BUT NOT LIMITED TO MANHOLES, CATCH BASINS, WATER VALVES, FIRE HYDRANTS, TELEPHONE AND ELECTRICAL VAULTS, AND PULL BOXES THAT REMAIN WITHIN AREAS EFFECTED BY THE CONSTRUCTION WORK ON THIS PROJECT SHALL BE ADJUSTED TO GRADE BY THE CONTRACTOR OR THE RESPECTIVE UTILITY COMPANY WHETHER SHOWN ON THESE PLANS OR NOT. CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH ALL PUBLIC OR PRIVATE UTILITY COMPANIES.
10. STORM DRAIN PIPES DESIGNATED AS "SD" FROM 4" TO 24" IN DIAMETER SHALL BE SDR-35 P.V.C. OR APPROVED EQUAL, HDPE STORM DRAIN PIPE WITH SMOOTH INTERIOR AND ANNULAR EXTERIOR CORRUGATIONS, MEETING AASHTO M252, TYPE S, AASHTO M294, TYPE S, OR ASTM F2306 SPECIFICATIONS, WITH WATER-TIGHT INTEGRATED BELL JOINTS PER ASTM D3212 OR APPROVED EQUAL WITH CLASS 1 BACKFILL, OR D.I.P. (DUCTILE IRON PIPE) IF SPECIFIED ON THE PLANS. NO MATERIAL SUBSTITUTION SHALL BE ALLOWED FOR DUCTILE IRON PIPE IF DESIGNATED ON THE PLANS. ANY PIPES LARGER THAN 24" IN DIAMETER SHALL BE CLASS III REINFORCED CONCRETE PIPE (RCP). HDPE AND PVC PIPES SHALL ONLY BE USED IF DESIGNATED ON THE PLANS. NO OTHER PIPE MATERIALS MAY BE USED UNLESS APPROVED BY THE ENGINEER.
11. ALL AREAS TO BE GRADED ACCORDING TO THE GRADES SHOWN ON THESE PLANS. A 1% MINIMUM SLOPE FOR DRAINAGE SHALL BE APPLIED IF NO GRADES ARE SHOWN, SUBJECT TO THE APPROVAL OF THE PROJECT ENGINEER. FLOWLINE OF CURBS AND VALLEY GUTTERS MAY BE GRADED AT LESS THAN 1% IF SLOPES ARE DESIGNATED ON THESE PLANS.
12. CONTRACTOR SHALL GRADE EVENLY BETWEEN SPOT ELEVATIONS.
13. PROPOSED SPOT GRADES (ELEVATIONS) SHOWN HEREON ARE FINISHED PAVEMENT GRADES OR FINISHED SURFACE GRADES, NOT TOP OF CURB GRADES, UNLESS NOTED OTHERWISE.
14. WHEN A GRADING PERMIT IS ISSUED ON THIS PROJECT, THE AGENCY APPROVAL APPLIES ONLY TO GRADING. THE CONTRACTOR IS RESPONSIBLE FOR SECURING ALL OTHER NECESSARY PERMITS TO CONSTRUCT THE PROPOSED SITE WORK.
15. APPROVED PLANS FOR ROADWAYS CONSTITUTE APPROVAL FOR THE CONSTRUCTION OF THE ROADWAY ONLY. ALL OTHER NECESSARY PERMITS STILL APPLY.
16. ESTIMATED EARTHWORK QUANTITIES SHOWN (SHEET C4.0) ON THESE PLANS ARE APPROXIMATE ONLY AND SHOWN FOR THE PURPOSES OF CALCULATING GRADING PERMIT FEES. CONTRACTOR IS RESPONSIBLE FOR VERIFYING INDEPENDENTLY BOTH CUT AND FILL QUANTITIES. IFLAND ENGINEERS ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THESE NUMBERS.
17. CONTRACTOR SHALL VERIFY THE CONTENTS AND THICKNESS OF THE BUILDING SLAB SECTION (I.E. CONCRETE, SAND, ROCK) WITH THE STRUCTURAL PLANS AND GEOTECHNICAL REPORT PRIOR TO COMMENCEMENT OF GRADING OPERATIONS.
18. ALL GRADING, TRENCHING, SHORING, PAVING, AND CONSTRUCTION WORK SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE O.S.H.A REGULATIONS.
19. ALL STAKING REQUESTS SHALL REQUIRE 48-HOUR PRIOR NOTICE.
20. CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF THE CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONNEL AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. CONTRACTOR AGREES TO DEFEND, INDEMNIFY, AND HOLD DESIGN PROFESSIONALS AND COUNTY REPRESENTATIVES HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE DESIGN PROFESSIONAL.
21. WHERE DRIVEWAY APPROACHES ARE TO BE CONSTRUCTED, DRIVEWAY SHALL NOT BE CONSTRUCTED UNTIL THE OFF-SITE IMPROVEMENTS ARE INSTALLED. THE ON-SITE DRIVEWAY SHALL CONFORM TO THE COMPLETED OFF-SITE DRIVEWAY APPROACH.
22. CONTRACTOR TO DESIGNATE A "DISTURBANCE COORDINATOR" TO RESPOND TO CITIZEN COMPLAINTS AND INQUIRIES REGARDING CONSTRUCTION NOISE AND DUST. THE NAME, PURPOSE, AND TELEPHONE NUMBER OF THE DISTURBANCE COORDINATOR SHALL BE POSTED ON A SIGN EASILY VISIBLE FROM OFF-SITE DURING THE ENTIRE TIME PROJECT GRADING AND CONSTRUCTION OCCURS. THE DISTURBANCE COORDINATOR SHALL INVESTIGATE THE CONCERN AND TAKE REMEDIAL ACTION, IF NECESSARY, WITHIN 24 HOURS OF RECEIVING A COMPLAINT OR AN INQUIRY.
23. NO CHANGES ON THESE PLANS SHALL BE MADE WITHOUT PRIOR APPROVAL OF IFLAND ENGINEERS AND THE CITY ENGINEER.
24. EROSION CONTROL PLANS AND STORM WATER POLLUTION PREVENTION PLANS SHALL BE PERMITTED AND FILED WITH THE APPLICABLE AGENCIES PRIOR TO ANY CONSTRUCTION OR GRADING OPERATIONS.
25. THE CONTRACTOR SHALL APPLY WATER TO ALL EXPOSED EARTH SURFACES AT INTERVALS SUFFICIENT TO PREVENT AIRBORNE DUST FROM LEAVING THE PROJECT SITE. ALL EXPOSED EARTH SHALL BE WATERED DOWN AT THE END OF THE WORK DAY.
26. WHILE IN TRANSIT TO AND FROM THE PROJECT SITE, ALL TRUCKS TRANSPORTING FILL MATERIAL SHALL BE COVERED WITH TARPS.
27. IF AT ANY TIME DURING SITE PREPARATION, EXCAVATION, OR OTHER GROUND DISTURBANCE ASSOCIATED WITH THIS DEVELOPMENT, ANY ARTIFACT OR OTHER EVIDENCE OF AN HISTORIC ARCHEOLOGICAL RESOURCE OR A NATIVE AMERICAN CULTURAL SITE IS DISCOVERED, THE RESPONSIBLE PERSONS SHALL IMMEDIATELY CEASE AND DESIST FROM ALL FURTHER SITE EXCAVATION AND NOTIFY THE SHERIFF-CORONER IF THE DISCOVERY CONTAINS HUMAN REMAINS, OR THE PLANNING DIRECTOR IF THE DISCOVERY CONTAINS NO HUMAN REMAINS.
28. THE DIRECTOR OF PUBLIC WORKS, OR HIS AUTHORIZED REPRESENTATIVE, SHALL HAVE THE AUTHORITY TO "STOP WORK" IF THE WORK IS NOT BEING DONE IN ACCORDANCE WITH THE APPROVED PLANS.
29. THE CONTRACTOR SHALL NOTIFY THE COUNTY ENGINEER 24 HOURS PRIOR TO START OF CONSTRUCTION.
30. THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO, OR USES OF, THESE PLANS. ALL CHANGES MUST BE IN WRITING AND MUST BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.
31. IF A SWPPP IS REQUIRED FOR THE PROJECT, IT SHALL BE KEPT WITHIN THE JOB-SITE OFFICE AT ALL TIMES DURING CONSTRUCTION.

FOR PLAN CHECK ONLY

DAVID HENNICKSEN (RCE NO. 49167) DATE

IFLAND ENGINEERS

CIVIL ENGINEERING • LAND PLANNING • STRUCTURAL DESIGN

PRELIMINARY NOTES

FELTON PUBLIC LIBRARY

GUSHEE STREET, FELTON, CALIFORNIA

APN 065-073-03

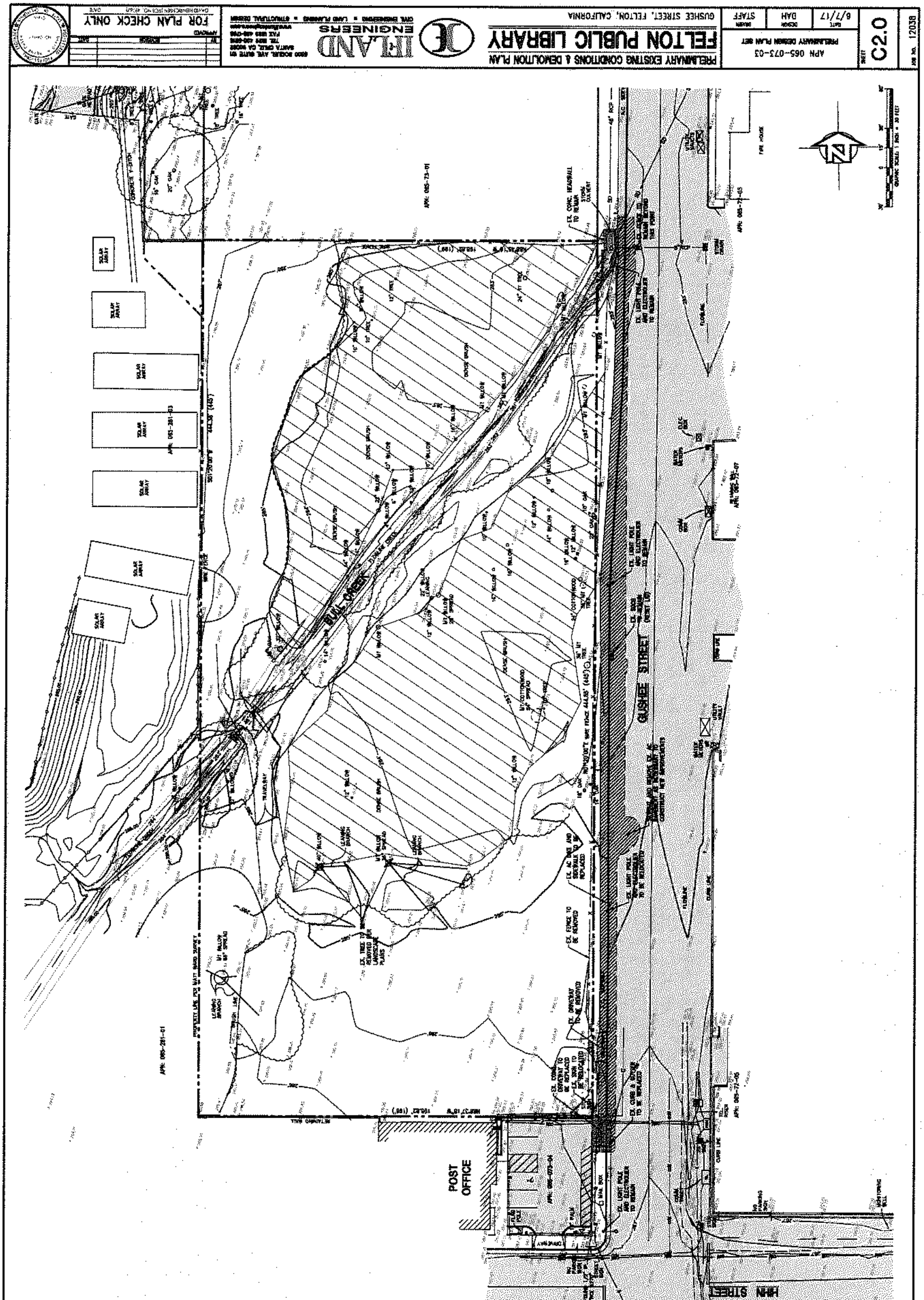
PRELIMINARY DESIGN PLAN SET

DATE 6/7/17 | DESIGN DAH | DRAWN STAFF

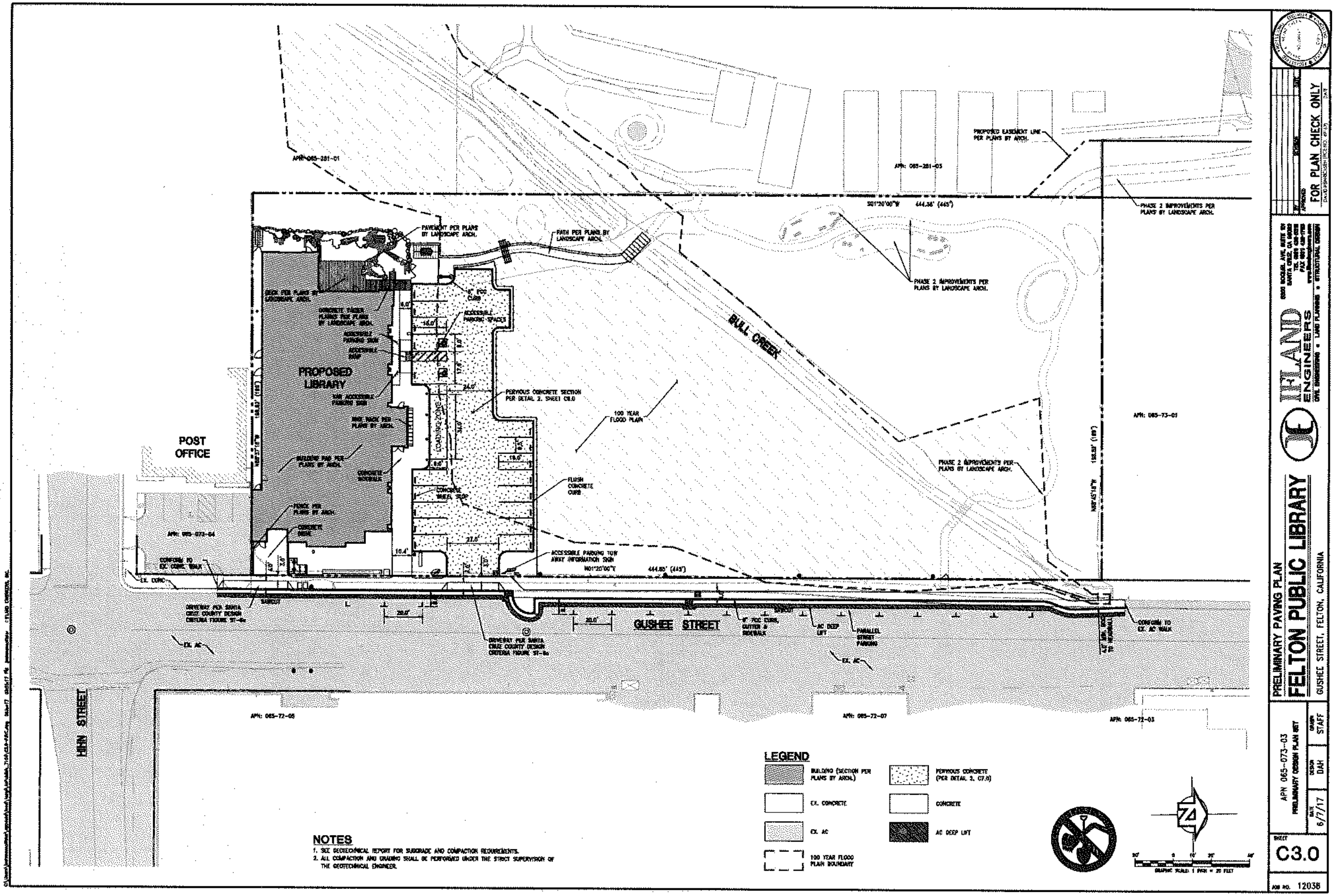
SHEET C1.0

JOB NO. 12038

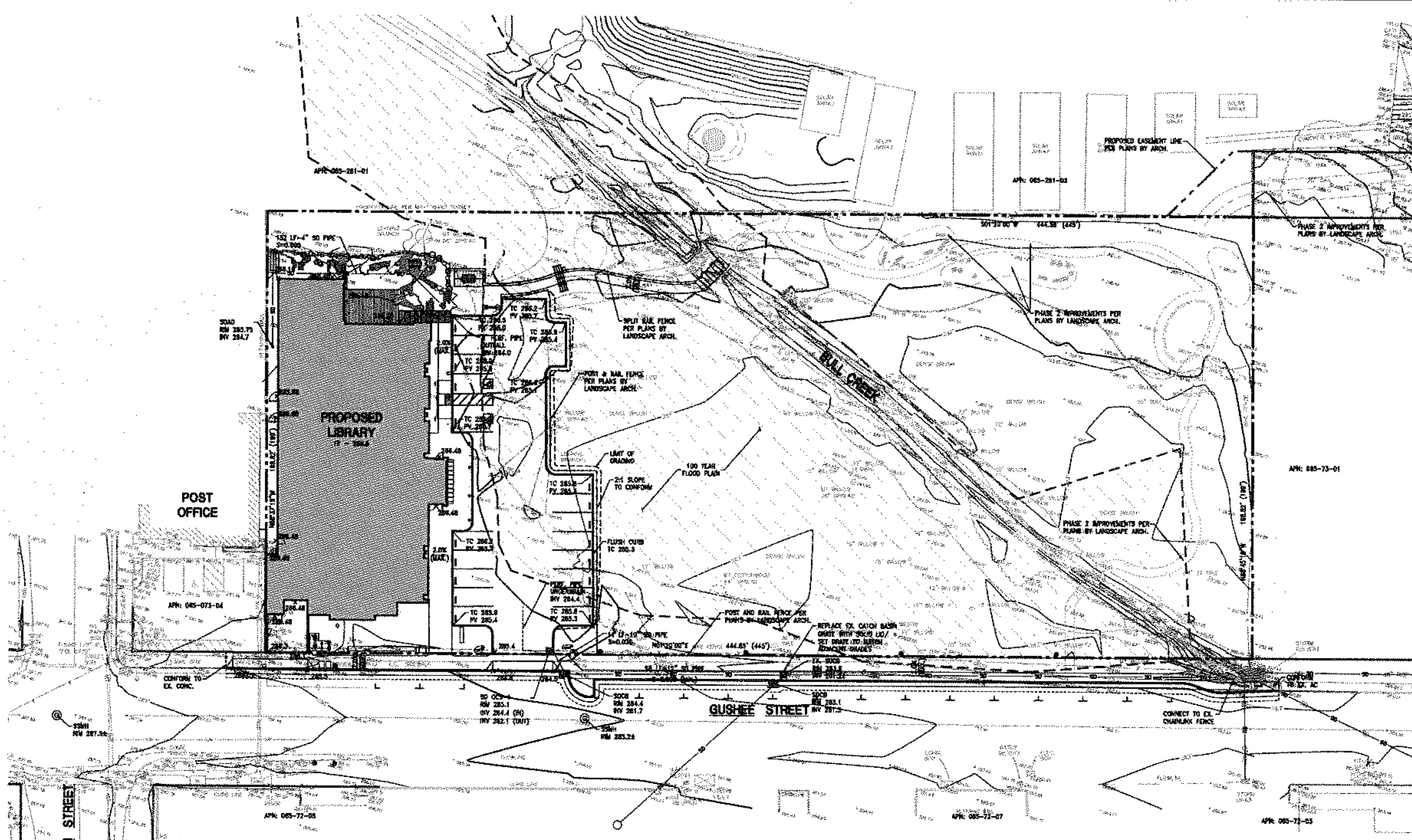
ATTACHMENT 15



ATTACHMENT 15



ATTACHMENT 15



ESTIMATED EARTHWORK QUANTITIES

575±	CUBIC YARDS EXCAVATION (PROJECT TOTAL)
95±	CUBIC YARDS EMBANKMENT (PROJECT TOTAL)
480±	CUBIC YARDS EXPORT (PROJECT TOTAL)

NOTES:
1. ESTIMATE DOES NOT INCLUDE BUILDING OR RETAINING WALL FOUNDATIONS, UTILITY TRENCH VOLUMES OR ANY OVEREXCAVATION, IF REQUIRED BY SITE CONDITIONS.
2. ESTIMATE ASSUMES A 15% COMPACTION FACTOR ON ALL FILL MATERIAL AND A 0% EXPANSION FACTOR ON ALL CUT MATERIAL.
3. PRIOR TO COMMENCEMENT OF WORK CONTRACTOR SHALL CONFIRM THAT ESTIMATES ARE CORRECT.

ESTIMATED FILL WITHIN FLOOD PLAIN

200 CUBIC YARDS FILL (CALCULATED FROM FINISH GRADE)

GRADING NOTES

1. ALL COMPACTION AND GRADING SHALL BE PERFORMED UNDER THE STRICT SUPERVISION OF THE GEOTECHNICAL ENGINEER.
2. ALL GRADING WORK AND CONSTRUCTION OF IMPROVEMENTS SHALL BE DONE IN ACCORDANCE WITH RECOMMENDATIONS PROVIDED IN THE GEOTECHNICAL REPORT PREPARED FOR THIS PROJECT, "GEOTECHNICAL INVESTIGATION FOR FELTON BRANCH LIBRARY, GUSHEE STREET, FELTON, CALIFORNIA, APN 065-073-03", BY BAULDRY ENGINEERING, AND DATED DECEMBER 2003, AS WELL AS "GEOTECHNICAL INVESTIGATION REPORT UPDATE, FELTON BRANCH LIBRARY, GUSHEE STREET, FELTON, CALIFORNIA, APN 065-073-03", BY PACIFIC CREST ENGINEERING INC., AND DATED MAY 26, 2017.
3. CONTRACTOR TO VERIFY WITH THE GEOTECHNICAL REPORT AND ANY SUBSEQUENT ADDENDUM LETTERS FOR FINAL THICKNESS OF THE BUILDING PAD PRIOR TO CONSTRUCTION.
4. CONTRACTOR TO VERIFY THE STRUCTURAL SECTION FOR SLAB ON GRADE FLOORS WITH ARCHITECTURAL AND STRUCTURAL DRAWINGS PRIOR TO CONSTRUCTION.

FOR PLAN CHECK ONLY

IFLAND ENGINEERS
CIVIL ENGINEERING • LAND PLANNING • STRUCTURAL DESIGN

PRELIMINARY GRADING & DRAINAGE PLAN
FELTON PUBLIC LIBRARY
GUSHEE STREET, FELTON, CALIFORNIA

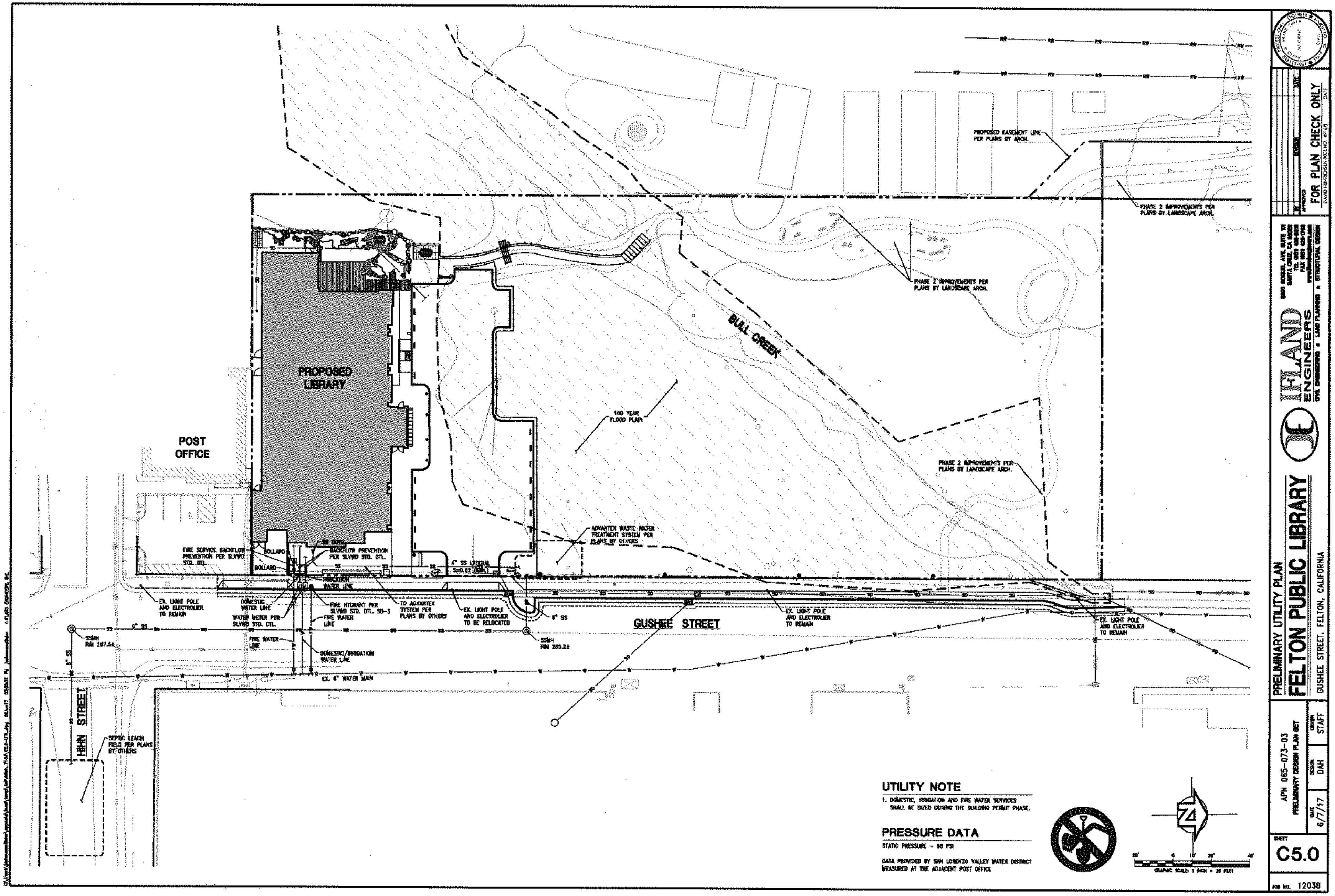
APN 065-073-03
PRELIMINARY DESIGN PLAN SET

DATE	DESIGN	DRAWN
6/7/17	DAH	STAFF

SHEET C4.0

JOB NO. 12038

ATTACHMENT 15



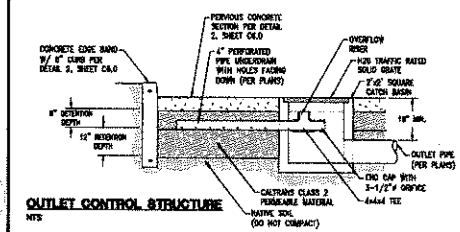
ATTACHMENT 15

AREA SUMMARY TABLE

	DMA 1	DMA 2	TOTAL
ROOF AREA	9,679 SF	0 SF	9,679 SF
CONCRETE AREA	4,008 SF	0 SF	4,008 SF
PATH AREA	0 SF	2,560 SF	2,560 SF
IMPERVIOUS AREA	13,687 SF	2,560 SF	16,247 SF
LANDSCAPE AREA	2,626 SF	0 SF	2,626 SF
PERVIOUS CONCRETE AREA	7,537 SF	0 SF	7,537 SF
UNDISTURBED AREA	0 SF	61,989 SF	61,989 SF
PERVIOUS AREA	10,163 SF	61,989 SF	72,152 SF
TOTAL AREA	23,850 SF	64,549 SF	88,399 SF

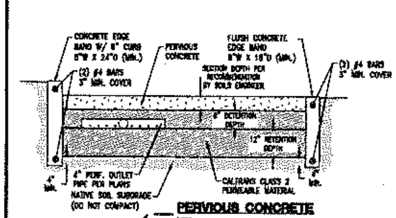
10-YEAR ORIFICE SIZING CALCULATION

PREDEVELOPMENT DISCHARGE RATE (FT³/S)	0.284
DISCHARGE COEFFICIENT	0.61
HEADWATER DEPTH (FT)	0.67
TAILWATER DEPTH (FT)	0
ORIFICE AREA (IN²)	10.23
ORIFICE DIAMETER (IN)	3.61
VELOCITY (FT/S)	4.00
FINAL ORIFICE DIAMETER (IN)	3 1/2



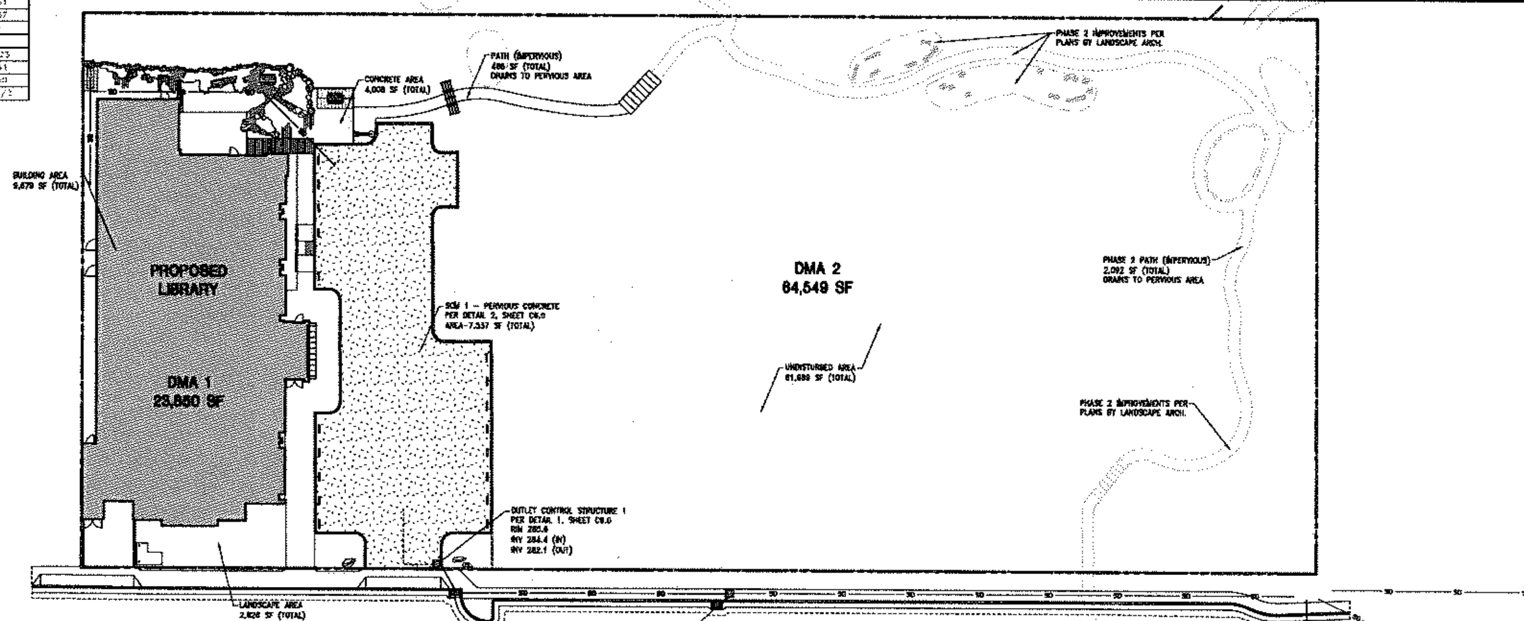
OUTLET CONTROL STRUCTURE
NTS

1



PERVIOUS CONCRETE
NTS

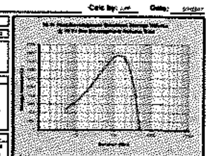
2

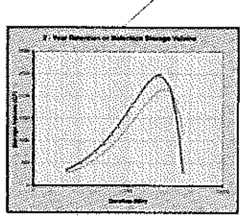


PROJECT: Felton Library - APN: 065-073-03

RUNOFF DETENTION BY THE MODIFIED RATIONAL METHOD

[illegible]





PROJECT: Felton Library - APN: 065-073-03

RUNOFF RETENTION BY THE STORAGE PERCOLATION METHOD

[illegible]

STORMWATER NOTE

1. PHASE 2 PATH IMPROVEMENTS ARE ASSUMED TO BE IMPERVIOUS AREA THAT WILL DRAIN TO A PERVIOUS AREA. MATERIAL WILL BE DETERMINED DURING BUILDING PERMIT PHASE.

GRAPHIC SCALE: 1 INCH = 20 FEET

FOR PLAN CHECK ONLY

IFLAND ENGINEERS
CIVIL ENGINEERING • LAND PLANNING • STRUCTURAL DESIGN

PRELIMINARY STORMWATER CONTROL PLAN
FELTON PUBLIC LIBRARY
GUSHEE STREET, FELTON, CALIFORNIA

APN 065-073-03
PRELIMINARY DESIGN PLAN SET

DATE	DESIGN	DRAWN
6/7/17	DAH	STAFF

SHEET C6.0

JOB No. 12038

ATTACHMENT 15

APPENDIX E
PRELIMINARY STORMWATER CALUCLATIONS

ATTACHMENT 15

PROJECT: Felton Library - APN: 065-073-03 **Calc by:** JJM **Date:** 7/5/2017

RUNOFF DETENTION BY THE MODIFIED RATIONAL METHOD

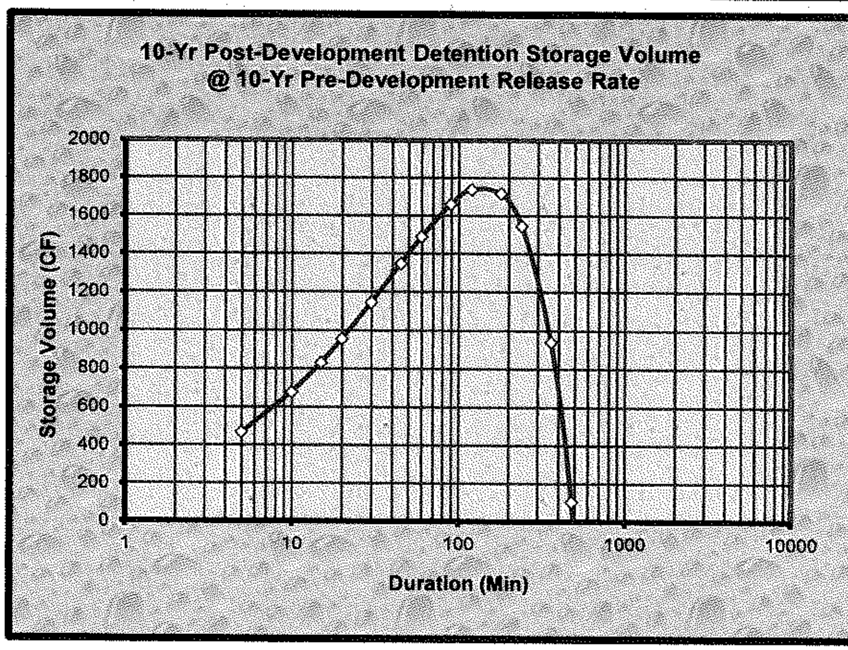
Data Entry: PRESS TAB & ENTER DESIGN VALUES SS Ver: 1.0

Site Location P60 Isopleth:	2.10		Fig. SWM-2 in County Design Criteria
Rational Coefficients Cpre:	0.25		See note # 2
Cpost:	0.90		See note # 2
Impervious Area:	21224	ft²	See note # 2 and # 4

STRUCTURE DIMENSIONS FOR DETENTION

1736	ft³ storage volume calculated			
40	% void space assumed			
4341	ft³ excavated volume needed			
Structure	Length	Width*	Depth*	*For pipe, use the square
Ratios	160.00	47.11	0.67	root of the sectional area
Dimen. (ft)	**152.38**	**44.87**	**0.63**	

10 - YEAR DESIGN STORM				DETENTION @ 15 MIN.	
Storm Duration (min)	10 - Year Intensity (in/hr)	10 - Yr. Release Qpre (cfs)	10 - Year Qpost (cfs)	Detention Rate To Storage (cfs)	Specified Storage Volume (cf)
1440	0.43	0.053	0.192	-0.092	-9959
1200	0.46	0.057	0.205	-0.079	-7106
960	0.50	0.062	0.222	-0.061	-4426
720	0.56	0.069	0.247	-0.037	-1983
480	0.65	0.080	0.287	0.003	104
360	0.72	0.089	0.319	0.035	940
240	0.84	0.103	0.370	0.086	1546
180	0.93	0.114	0.411	0.127	1715
120	1.08	0.132	0.477	0.193	1736
90	1.20	0.147	0.530	0.246	1660
60	1.39	0.171	0.615	0.331	1489
45	1.55	0.190	0.683	0.399	1348
30	1.79	0.220	0.793	0.509	1145
20	2.08	0.256	0.920	0.636	954
15	2.31	**0.284**	1.022	0.738	831
10	2.68	0.329	1.186	0.902	677
5	3.46	0.425	1.529	1.245	467



Notes & Limitations on Use:

1) The modified rational method, and therefore the standard calculations are applicable in watersheds up to 20 acres in size.
2) Required detention volume determinations shall be based on all net new impervious area both on and off-site, resulting from the proposed project. Pervious areas shall not be included in detention volume sizing; an exception may be made for incidental pervious areas less than 10% of the total area.
3) Gravel packed detention chambers shall specify on the plans, aggregate that is washed, angular, and uniformly graded (of single size), assuring void space not less than 35%.
4) A map showing boundaries of both regulated impervious areas and actual drainage areas routed to the hydraulic control structure of the detention facility is to be provided, clearly distinguishing between the two areas, and noting the square footage.
5) The EPA defines a class V injection well as any bored, drilled, or driven shaft, or dug hole that is deeper than its widest surface dimension, or an improved sinkhole, or a subsurface fluid distribution system. Such storm water drainage wells are "authorized by rule". For more information on these rules, contact the EPA. A web site link is provided from the County DPW Stormwater Management web page.
6) Refer to the County of Santa Cruz Design Criteria, for complete method criteria.

ATTACHMENT 15

PROJECT: Felton Library - APN: 065-073-03 **Calc by:** JJM **Date:** 7/5/2017

RUNOFF RETENTION BY THE STORAGE PERCOLATION METHOD

Data Entry: PRESS TAB KEY & ENTER DESIGN VALUES

Notes & Limitations on Use:

SS Ver:1.0

Site Location P60 Isopleth:	2.10	Fig. SWM-2
Rational Coefficients Cpre:	0.25	
Cpost:	0.90	
Impervious Area:	21224	ft^2
Saturated Soil Permeability:	0.68	in/hr

Saturated soil permeability values may be used conservatively from the USDA-NRCS soil survey, or use actual test values.

Site selection and design shall give proper consideration to the path for excess flows downstream of the designated retention area.

Retention site location on, or immediately above, slopes exceeding 15% will require consulting a geotechnical engineer.

Gravel packed structures shall use washed, angular, uniformly graded aggregate providing not less than 35% void space.

Refer to the County of Santa Cruz Design Criteria, Stormwater Management - Section H, for complete method criteria.

2 - YEAR DESIGN STORM				RETENTION @ 120 MIN.		DETENTION @ 60 MIN.	
Storm Duration (min)	2 - Year Intensity (in/hr)	Qpre (cfs)	Qpost (cfs)	Retention Rate To Storage (cfs)	Specified Retained Volume (cf)	Detention Rate To Storage (cfs)	Specified Detained Volume (cf)
1440	0.28	0.034	0.123	0.038	318	0.013	1158
1200	0.30	0.036	0.131	0.046	1086	0.022	1576
960	0.32	0.040	0.142	0.058	1736	0.033	1905
720	0.36	0.044	0.158	0.073	2222	0.049	2113
480	0.42	0.051	0.184	0.099	2464	0.074	2139
360	0.46	0.057	0.204	0.119	2441	0.095	2045
240	0.54	0.066	0.237	0.152	2261	0.127	1835
180	0.59	0.073	0.263	0.178	2078	0.154	1660
120	0.69	0.085	0.305	0.220	1794	0.196	1410
90	0.77	0.094	0.339	0.254	1592	0.230	1241
60	0.89	0.109	0.394	0.309	1324	0.284	1023
45	0.99	0.121	0.437	0.353	1152	0.328	886
30	1.15	0.141	0.507	0.423	938	0.398	717
20	1.33	0.164	0.589	0.504	757	0.479	575
15	1.48	0.182	0.654	0.569	647	0.545	490
10	1.72	0.211	0.759	0.674	516	0.650	390
5	2.21	0.272	0.979	0.894	346	0.869	261

STRUCTURE DIMENSIONS FOR RETENTION

2464	ft^3 storage volume calculated		
40	% void space assumed		
6159	ft^3 excavated volume needed		
Structure	Length	Width*	Depth* #
Ratios	160.00	47.11	1.00
Dimen. (ft)	**149.58**	**44.04**	**0.93**
6950	ft^2 internal surface area		
4865	ft^2 effective surface area		
8.9	hrs estimated structure drainage time		

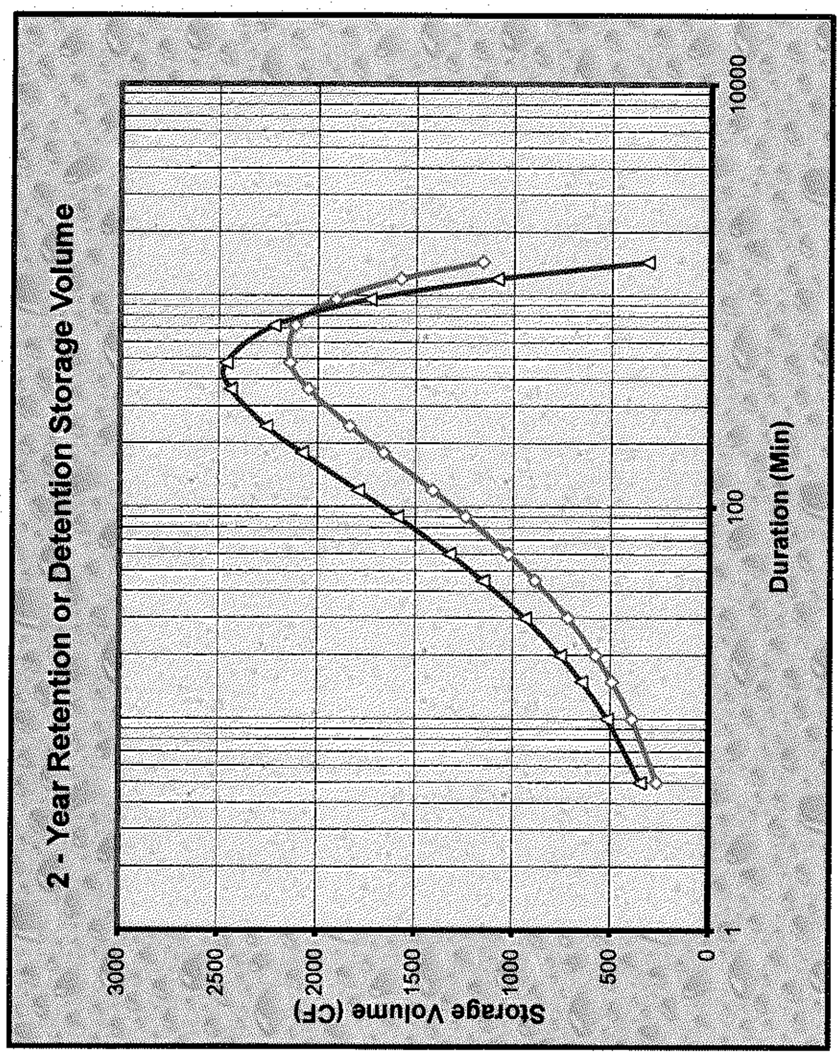
* For pipe, use the square root of the sectional area.

\# If cell values displayed are corrupted, enter zero for depth, then re-enter a positive numeric value within allowed range.

STRUCTURE DIMENSIONS FOR DETENTION

2139	ft^3 storage volume calculated		
100	% void space assumed		
2139	ft^3 excavated volume needed		
Structure	Length	Width*	Depth*
Ratios	160.00	48.18	0.67
Dimen. (ft)	**119.46**	**35.97**	**0.50**

ATTACHMENT 15



ATTACHMENT 15

10-YEAR ORIFICE SIZING CALCULATION	
PREDEVELOPMENT DISCHARGE RATE (FT^3/S)	0.283
DISCHARGE COEFFICIENT	0.61
HEADWATER DEPTH (FT)	0.67
TAILWATER DEPTH (FT)	0
ORIFICE AREA (IN^2)	10.20
ORIFICE DIAMETER (IN)	**3.60**
VELOCITY (FT/S)	4.00
FINAL ORIFICE DIAMETER (IN)	3-1/2

ATTACHMENT 15

IFLAND ENGINEERS
Civil Engineering | Structural Design | Development Planning
5300 Soquel Avenue, Suite 101
Santa Cruz, CA 95062
P.831.426.5313 F.831.426.1763
www.iflandengineers.com

MEMORANDUM

TO: Teall Messer

RE: Felton Library Flood Plain and Proposed Creek Crossings

FROM: David Heinrichsen

PROJECT #: 12038

DATE: August 22, 2017

CREEK CROSSINGS & FLOOD PLAIN

The analysis that Ifland Engineers, Inc. prepared in 2007 and updated May, 2017, describes the calculated water surface elevation and extents for a flood following a 100-year storm over the approximate 400-acre drainage basin of Bull Creek based on current conditions, including the existing on-site 48-inch diameter CMP culvert located about 30 feet downstream from where Bull Creek crosses the western boundary of the project site. The analysis shows that the existing on-site culvert, which has an accumulation of sediment about 1.5' deep, significantly reduces the total flow within the Bull Creek channel from approximately 70 CFS immediately upstream to just 35 CFS downstream of the culvert. The first phase of the project proposes to remove the approximately 20' long culvert and reestablish a creek channel matching the adjacent conditions immediately up and down stream. A new pedestrian bridge crossing will span Bull Creek at the new section of creek channel. It is expected that the channel improvements will allow the flow within the channel to increase. However, additional analysis of flow within Bull Creek is required to assess impacts to the water surface elevation. That analysis can only be completed once the channel and bridge design have been substantially completed.

Design of the proposed Phase 1 pedestrian bridge is expected to locate the bridge support foundations outside of the channel, and the lowest portions of the bridge span will be set nominally higher than the calculated 100-year flood elevation at that location (per 8/18/2017 voicemail that you received from Annette Olson with County of Santa Cruz Planning Department, 0 inches of freeboard are required). The bridge is expected to be designed with a significant, but accessibility compliant, camber that will raise the middle of the span an additional amount above the surface of the flood plain. The bridge support foundations will be nominally aligned with the direction of flow, and any required fill wedges for approaches to the bridge are expected to be just long enough for an accessible approach to the span. Because of the improved capacity of the channel, impediments to flow caused by the bridge, including flow restrictions due to accumulation of flotsam by the bridge structure, are not expected to be significant. However, as noted in the paragraph above, confirmation of our expectations will require additional analysis of flow within Bull Creek based on the completed channel and bridge design.

The site improvements for the Phase 2 project include a second proposed pedestrian bridge crossing Bull Creek at a location approximately 220 feet downstream from the proposed Phase 1 pedestrian bridge. While design of Phase 2 improvements, including the bridge, is not included in our current scope of services, we expect that the design of the Phase 2 pedestrian bridge will be nominally the same as the Phase 1 span.

LIBRARY BUILDING & FLOOD PLAIN

As shown on the Preliminary Improvement Plans, the proposed library building has been located outside the limits of the floodplain, as determined by the analysis completed by Ifland Engineers for this project, as noted above. With the proposed finish floor set at an elevation of 286.50, the floor of the library building will be a minimum of 1.06 feet above the highest calculated base flood elevation on the project site close to the proposed building (at Station 4+50 the calculated base flood elevation is 285.44). As described in the paragraphs above, the proposed removal of the existing culvert and establishment of channel improvements in its place are expected to provide for increased flow within the Bull Creek channel. Improvements providing for increased flow within the Bull Creek channel would be expected to result in a lowering of base flood elevations for the areas identified as "Overbank Channel" in the 100-Year Flood Plain Analysis. Confirmation of these expectations will require additional analysis of flow within Bull Creek based on the final design of channel, bridge and other site improvements.

Fill within the limits of the flood plain for construction of the proposed library parking lot has been calculated to be approximately 44 cubic yards. An offsetting removal of an equivalent volume of soil within the flood plain will be made, if found to be necessary by the additional analysis described elsewhere in this memo, to reduce risks associated with raising the base flood elevation that might otherwise result from the fill.

CONCLUSION

In conclusion, it is our expectation that the proposed CD phase analysis of flow in Bull Creek will demonstrate that the flow capacity gains to be made by removing the existing 48" diameter culvert and the construction of an open creek channel will not be significantly reduced by construction of the proposed bridges or other site improvements.

Felton Library Project

Santa Cruz County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Library	9.70	1000sqft	0.22	9,700.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	61
Climate Zone	5			**Operational Year**	2019
Utility Company	Pacific Gas & Electric Company				
CO_2 Intensity (lb/MWhr)	641.35	**CH_4 Intensity (lb/MWhr)**	0.029	**N_2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Actual lot size

Construction Phase - No demolition required. Site is undeveloped.

Trips and VMT - No demolition would occur. The site is currently undeveloped.

Demolition -

Grading - Total area disturbed by project.

Mobile Land Use Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	OperationalYear	2014	2019

ATTACHMENT 1

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.1730	0.5985	0.4477	6.7000e-004	3.7100e-003	0.0380	0.0417	1.1700e-003	0.0350	0.0362	0.0000	60.0136	60.0136	0.0173	0.0000	60.3768
Total	**0.1730**	**0.5985**	**0.4477**	**6.7000e-004**	**3.7100e-003**	**0.0380**	**0.0417**	**1.1700e-003**	**0.0350**	**0.0362**	**0.0000**	**60.0136**	**60.0136**	**0.0173**	**0.0000**	**60.3768**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.1730	0.5985	0.4477	6.7000e-004	3.7100e-003	0.0380	0.0417	1.1700e-003	0.0350	0.0362	0.0000	60.0135	60.0135	0.0173	0.0000	60.3767
Total	**0.1730**	**0.5985**	**0.4477**	**6.7000e-004**	**3.7100e-003**	**0.0380**	**0.0417**	**1.1700e-003**	**0.0350**	**0.0362**	**0.0000**	**60.0135**	**60.0135**	**0.0173**	**0.0000**	**60.3767**

ATTACHMENT 1 7

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0491	0.0000	1.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.4000e-004	2.4000e-004	0.0000	0.0000	2.5000e-004
Energy	1.3400e-003	0.0122	0.0103	7.0000e-005		9.3000e-004	9.3000e-004		9.3000e-004	9.3000e-004	0.0000	36.6293	36.6293	1.3100e-003	4.6000e-004	36.8001
Mobile	0.2768	0.4554	2.4348	4.4200e-003	0.3077	5.5900e-003	0.3133	0.0824	5.1600e-003	0.0876	0.0000	315.2024	315.2024	0.0169	0.0000	315.5572
Waste						0.0000	0.0000		0.0000	0.0000	1.8127	0.0000	1.8127	0.1071	0.0000	4.0624
Water						0.0000	0.0000		0.0000	0.0000	0.0963	0.9611	1.0574	9.9300e-003	2.4000e-004	1.3412
Total	**0.3273**	**0.4676**	**2.4452**	**4.4900e-003**	**0.3077**	**6.5200e-003**	**0.3142**	**0.0824**	**6.0900e-003**	**0.0885**	**1.9090**	**352.7931**	**354.7021**	**0.1353**	**7.0000e-004**	**357.7610**

ATTACHMENT 17

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0491	0.0000	1.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.4000e-004	2.4000e-004	0.0000	0.0000	2.5000e-004
Energy	1.3400e-003	0.0122	0.0103	7.0000e-005		9.3000e-004	9.3000e-004		9.3000e-004	9.3000e-004	0.0000	36.6293	36.6293	1.3100e-003	4.6000e-004	36.8001
Mobile	0.2768	0.4554	2.4348	4.4200e-003	0.3077	5.5900e-003	0.3133	0.0824	5.1600e-003	0.0876	0.0000	315.2024	315.2024	0.0169	0.0000	315.5572
Waste						0.0000	0.0000		0.0000	0.0000	1.8127	0.0000	1.8127	0.1071	0.0000	4.0624
Water						0.0000	0.0000		0.0000	0.0000	0.0844	0.8726	0.9570	8.7100e-003	2.1000e-004	1.2056
Total	**0.3273**	**0.4676**	**2.4452**	**4.4900e-003**	**0.3077**	**6.5200e-003**	**0.3142**	**0.0824**	**6.0900e-003**	**0.0885**	**1.8971**	**352.7046**	**354.6017**	**0.1340**	**6.7000e-004**	**357.6255**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.03	0.03	0.90	4.29	0.04

3.0 Construction Detail

Construction Phase

ATTACHMENT 17

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	4/16/2018	4/16/2018	5	1	
2	Grading	Grading	4/17/2018	4/18/2018	5	2	
3	Building Construction	Building Construction	4/19/2018	9/5/2018	5	100	
4	Paving	Paving	9/6/2018	9/12/2018	5	5	
5	Architectural Coating	Architectural Coating	9/13/2018	9/19/2018	5	5	

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 14,550; Non-Residential Outdoor: 4,850 (Architectural Coating – sqft)

OffRoad Equipment

ATTACHMENT 17

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
	Graders	1	8.00	174	0.41
	Concrete/Industrial Saws	1	8.00	81	0.73
	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Cranes	1	4.00	226	0.29
	Rubber Tired Dozers	1	1.00	255	0.40
	Tractors/Loaders/Backhoes	2	6.00	97	0.37
	Cranes	1	4.00	226	0.29
	Forklifts	2	6.00	89	0.20
Building Construction	Forklifts	2	6.00	89	0.20
	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Graders	1	8.00	174	0.41
	Cement and Mortar Mixers	4	6.00	9	0.56
	Pavers	1	7.00	125	0.42
Paving	Pavers	1	7.00	125	0.42
	Rollers	1	7.00	80	0.38
	Tractors/Loaders/Backhoes	1	7.00	97	0.37
	Air Compressors	1	6.00	78	0.48
Paving	Rollers	1	7.00	80	0.38
Grading	Rubber Tired Dozers	1	1.00	255	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37

ATTACHMENT 1

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	1	1.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	4.00	2.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.7000e-004	0.0000	2.7000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.5000e-004	5.4700e-003	3.5000e-003	0.0000		3.3000e-004	3.3000e-004		3.0000e-004	3.0000e-004	0.0000	0.4257	0.4257	1.3000e-004	0.0000	0.4285
Total	**5.5000e-004**	**5.4700e-003**	**3.5000e-003**	**0.0000**	**2.7000e-004**	**3.3000e-004**	**6.0000e-004**	**3.0000e-005**	**3.0000e-004**	**3.3000e-004**	**0.0000**	**0.4257**	**0.4257**	**1.3000e-004**	**0.0000**	**0.4285**

ATTACHMENT 17

3.2 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	1.0000e-005	1.2000e-004	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0169	0.0169	0.0000	0.0000	0.0170
Total	**1.0000e-005**	**1.0000e-005**	**1.2000e-004**	**0.0000**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0169**	**0.0169**	**0.0000**	**0.0000**	**0.0170**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.7000e-004	0.0000	2.7000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.5000e-004	5.4700e-003	3.5000e-003	0.0000		3.3000e-004	3.3000e-004		3.0000e-004	3.0000e-004	0.0000	0.4257	0.4257	1.3000e-004	0.0000	0.4285
Total	**5.5000e-004**	**5.4700e-003**	**3.5000e-003**	**0.0000**	**2.7000e-004**	**3.3000e-004**	**6.0000e-004**	**3.0000e-005**	**3.0000e-004**	**3.3000e-004**	**0.0000**	**0.4257**	**0.4257**	**1.3000e-004**	**0.0000**	**0.4285**

ATTACHMENT 1

3.2 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	1.0000e-005	1.2000e-004	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0169	0.0169	0.0000	0.0000	0.0170
Total	**1.0000e-005**	**1.0000e-005**	**1.2000e-004**	**0.0000**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0169**	**0.0169**	**0.0000**	**0.0000**	**0.0170**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.5000e-004	0.0000	7.5000e-004	4.1000e-004	0.0000	4.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0500e-003	9.3200e-003	8.3500e-003	1.0000e-005		6.1000e-004	6.1000e-004		5.9000e-004	5.9000e-004	0.0000	1.0649	1.0649	2.1000e-004	0.0000	1.0692
Total	**1.0500e-003**	**9.3200e-003**	**8.3500e-003**	**1.0000e-005**	**7.5000e-004**	**6.1000e-004**	**1.3600e-003**	**4.1000e-004**	**5.9000e-004**	**1.0000e-003**	**0.0000**	**1.0649**	**1.0649**	**2.1000e-004**	**0.0000**	**1.0692**

ATTACHMENT 17

3.3 Grading - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	5.0000e-005	4.7000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0677	0.0677	0.0000	0.0000	0.0678
Total	**3.0000e-005**	**5.0000e-005**	**4.7000e-004**	**0.0000**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0677**	**0.0677**	**0.0000**	**0.0000**	**0.0678**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.5000e-004	0.0000	7.5000e-004	4.1000e-004	0.0000	4.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0500e-003	9.3200e-003	8.3500e-003	1.0000e-005		6.1000e-004	6.1000e-004		5.9000e-004	5.9000e-004	0.0000	1.0649	1.0649	2.1000e-004	0.0000	1.0692
Total	**1.0500e-003**	**9.3200e-003**	**8.3500e-003**	**1.0000e-005**	**7.5000e-004**	**6.1000e-004**	**1.3600e-003**	**4.1000e-004**	**5.9000e-004**	**1.0000e-003**	**0.0000**	**1.0649**	**1.0649**	**2.1000e-004**	**0.0000**	**1.0692**

ATTACHMENT 17

3.3 Grading - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	5.0000e-005	4.7000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0677	0.0677	0.0000	0.0000	0.0678
Total	**3.0000e-005**	**5.0000e-005**	**4.7000e-004**	**0.0000**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0677**	**0.0677**	**0.0000**	**0.0000**	**0.0678**

3.4 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0539	0.5479	0.3862	5.7000e-004		0.0353	0.0353		0.0325	0.0325	0.0000	51.7208	51.7208	0.0161	0.0000	52.0589
Total	**0.0539**	**0.5479**	**0.3862**	**5.7000e-004**		**0.0353**	**0.0353**		**0.0325**	**0.0325**	**0.0000**	**51.7208**	**51.7208**	**0.0161**	**0.0000**	**52.0589**

3.4 Building Construction - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1000e-003	7.9100e-003	0.0150	2.0000e-005	6.3000e-004	1.2000e-004	7.6000e-004	1.8000e-004	1.1000e-004	2.9000e-004	0.0000	2.0127	2.0127	2.0000e-005	0.0000	2.0130
Worker	7.0000e-004	1.0500e-003	9.3800e-003	2.0000e-005	1.5800e-003	1.0000e-005	1.6000e-003	4.2000e-004	1.0000e-005	4.3000e-004	0.0000	1.3540	1.3540	8.0000e-005	0.0000	1.3558
Total	**1.8000e-003**	**8.9600e-003**	**0.0244**	**4.0000e-005**	**2.2100e-003**	**1.3000e-004**	**2.3600e-003**	**6.0000e-004**	**1.2000e-004**	**7.2000e-004**	**0.0000**	**3.3667**	**3.3667**	**1.0000e-004**	**0.0000**	**3.3687**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0539	0.5479	0.3862	5.7000e-004		0.0353	0.0353		0.0325	0.0325	0.0000	51.7208	51.7208	0.0161	0.0000	52.0589
Total	**0.0539**	**0.5479**	**0.3862**	**5.7000e-004**		**0.0353**	**0.0353**		**0.0325**	**0.0325**	**0.0000**	**51.7208**	**51.7208**	**0.0161**	**0.0000**	**52.0589**

ATTACHMENT 17

3.4 Building Construction - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1000e-003	7.9100e-003	0.0150	2.0000e-005	6.3000e-004	1.2000e-004	7.6000e-004	1.8000e-004	1.1000e-004	2.9000e-004	0.0000	2.0127	2.0127	2.0000e-005	0.0000	2.0130
Worker	7.0000e-004	1.0500e-003	9.3800e-003	2.0000e-005	1.5800e-003	1.0000e-005	1.6000e-003	4.2000e-004	1.0000e-005	4.3000e-004	0.0000	1.3540	1.3540	8.0000e-005	0.0000	1.3558
Total	**1.8000e-003**	**8.9600e-003**	**0.0244**	**4.0000e-005**	**2.2100e-003**	**1.3000e-004**	**2.3600e-003**	**6.0000e-004**	**1.2000e-004**	**7.2000e-004**	**0.0000**	**3.3667**	**3.3667**	**1.0000e-004**	**0.0000**	**3.3687**

3.5 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.2700e-003	0.0216	0.0178	3.0000e-005		1.2600e-003	1.2600e-003		1.1700e-003	1.1700e-003	0.0000	2.3909	2.3909	6.7000e-004	0.0000	2.4051
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.2700e-003**	**0.0216**	**0.0178**	**3.0000e-005**		**1.2600e-003**	**1.2600e-003**		**1.1700e-003**	**1.1700e-003**	**0.0000**	**2.3909**	**2.3909**	**6.7000e-004**	**0.0000**	**2.4051**

ATTACHMENT 17

3.5 Paving - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.6000e-004	2.4000e-004	2.1100e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	9.0000e-005	0.0000	1.0000e-004	0.0000	0.3047	0.3047	2.0000e-005	0.0000	0.3050
Total	**1.6000e-004**	**2.4000e-004**	**2.1100e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**9.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3047**	**0.3047**	**2.0000e-005**	**0.0000**	**0.3050**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.2700e-003	0.0216	0.0178	3.0000e-005		1.2600e-003	1.2600e-003		1.1700e-003	1.1700e-003	0.0000	2.3909	2.3909	6.7000e-004	0.0000	2.4051
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.2700e-003**	**0.0216**	**0.0178**	**3.0000e-005**		**1.2600e-003**	**1.2600e-003**		**1.1700e-003**	**1.1700e-003**	**0.0000**	**2.3909**	**2.3909**	**6.7000e-004**	**0.0000**	**2.4051**

ATTACHMENT 17

3.5 Paving - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.6000e-004	2.4000e-004	2.1100e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	9.0000e-005	0.0000	1.0000e-004	0.0000	0.3047	0.3047	2.0000e-005	0.0000	0.3050
Total	**1.6000e-004**	**2.4000e-004**	**2.1100e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**9.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3047**	**0.3047**	**2.0000e-005**	**0.0000**	**0.3050**

3.6 Architectural Coating - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1124					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.5000e-004	5.0100e-003	4.6400e-003	1.0000e-005		3.8000e-004	3.8000e-004		3.8000e-004	3.8000e-004	0.0000	0.6383	0.6383	6.0000e-005	0.0000	0.6396
Total	**0.1132**	**5.0100e-003**	**4.6400e-003**	**1.0000e-005**		**3.8000e-004**	**3.8000e-004**		**3.8000e-004**	**3.8000e-004**	**0.0000**	**0.6383**	**0.6383**	**6.0000e-005**	**0.0000**	**0.6396**

ATTACHMENT 1

3.6 Architectural Coating - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	1.0000e-005	1.2000e-004	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0169	0.0169	0.0000	0.0000	0.0170
Total	**1.0000e-005**	**1.0000e-005**	**1.2000e-004**	**0.0000**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0169**	**0.0169**	**0.0000**	**0.0000**	**0.0170**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1124					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.5000e-004	5.0100e-003	4.6400e-003	1.0000e-005		3.8000e-004	3.8000e-004		3.8000e-004	3.8000e-004	0.0000	0.6383	0.6383	6.0000e-005	0.0000	0.6396
Total	**0.1132**	**5.0100e-003**	**4.6400e-003**	**1.0000e-005**		**3.8000e-004**	**3.8000e-004**		**3.8000e-004**	**3.8000e-004**	**0.0000**	**0.6383**	**0.6383**	**6.0000e-005**	**0.0000**	**0.6396**

ATTACHMENT 17

3.6 Architectural Coating - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	1.0000e-005	1.2000e-004	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0169	0.0169	0.0000	0.0000	0.0170
Total	**1.0000e-005**	**1.0000e-005**	**1.2000e-004**	**0.0000**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0169**	**0.0169**	**0.0000**	**0.0000**	**0.0170**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2768	0.4554	2.4348	4.4200e-003	0.3077	5.5900e-003	0.3133	0.0824	5.1600e-003	0.0876	0.0000	315.2024	315.2024	0.0169	0.0000	315.5572
Unmitigated	0.2768	0.4554	2.4348	4.4200e-003	0.3077	5.5900e-003	0.3133	0.0824	5.1600e-003	0.0876	0.0000	315.2024	315.2024	0.0169	0.0000	315.5572

ATTACHMENT 17

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Library	545.53	451.54	247.25	829,615	829,615
Total	545.53	451.54	247.25	829,615	829,615

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Library	9.50	7.30	7.30	52.00	43.00	5.00	44	44	12

4.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.493201	0.037430	0.233751	0.143759	0.049898	0.006916	0.012991	0.004894	0.000938	0.002881	0.009199	0.000696	0.003446

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

ATTACHMENT 17

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	23.3366	23.3366	1.0600e-003	2.2000e-004	23.4265
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	23.3366	23.3366	1.0600e-003	2.2000e-004	23.4265
NaturalGas Mitigated	1.3400e-003	0.0122	0.0103	7.0000e-005		9.3000e-004	9.3000e-004		9.3000e-004	9.3000e-004	0.0000	13.2927	13.2927	2.5000e-004	2.4000e-004	13.3736
NaturalGas Unmitigated	1.3400e-003	0.0122	0.0103	7.0000e-005		9.3000e-004	9.3000e-004		9.3000e-004	9.3000e-004	0.0000	13.2927	13.2927	2.5000e-004	2.4000e-004	13.3736

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Library	249096	1.3400e-003	0.0122	0.0103	7.0000e-005		9.3000e-004	9.3000e-004		9.3000e-004	9.3000e-004	0.0000	13.2927	13.2927	2.5000e-004	2.4000e-004	13.3736
Total		**1.3400e-003**	**0.0122**	**0.0103**	**7.0000e-005**		**9.3000e-004**	**9.3000e-004**		**9.3000e-004**	**9.3000e-004**	**0.0000**	**13.2927**	**13.2927**	**2.5000e-004**	**2.4000e-004**	**13.3736**

ATTACHMENT 17

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Library	249096	1.3400e-003	0.0122	0.0103	7.0000e-005		9.3000e-004	9.3000e-004		9.3000e-004	9.3000e-004	0.0000	13.2927	13.2927	2.5000e-004	2.4000e-004	13.3736
Total		**1.3400e-003**	**0.0122**	**0.0103**	**7.0000e-005**		**9.3000e-004**	**9.3000e-004**		**9.3000e-004**	**9.3000e-004**	**0.0000**	**13.2927**	**13.2927**	**2.5000e-004**	**2.4000e-004**	**13.3736**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Library	80219	23.3366	1.0600e-003	2.2000e-004	23.4265
Total		**23.3366**	**1.0600e-003**	**2.2000e-004**	**23.4265**

ATTACHMENT 17

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Library	80219	23.3366	1.0600e-003	2.2000e-004	23.4265
Total		**23.3366**	**1.0600e-003**	**2.2000e-004**	**23.4265**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0491	0.0000	1.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.4000e-004	2.4000e-004	0.0000	0.0000	2.5000e-004
Unmitigated	0.0491	0.0000	1.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.4000e-004	2.4000e-004	0.0000	0.0000	2.5000e-004

ATTACHMENT 17

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0112					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0379					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	1.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.4000e-004	2.4000e-004	0.0000	0.0000	2.5000e-004
Total	**0.0491**	**0.0000**	**1.3000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.4000e-004**	**2.4000e-004**	**0.0000**	**0.0000**	**2.5000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0112					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0379					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	1.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.4000e-004	2.4000e-004	0.0000	0.0000	2.5000e-004
Total	**0.0491**	**0.0000**	**1.3000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.4000e-004**	**2.4000e-004**	**0.0000**	**0.0000**	**2.5000e-004**

7.0 Water Detail

ATTACHMENT 17

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Toilet

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.9570	8.7100e-003	2.1000e-004	1.2056
Unmitigated	1.0574	9.9300e-003	2.4000e-004	1.3412

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Library	0.303502 / 0.474709	1.0574	9.9300e-003	2.4000e-004	1.3412
Total		**1.0574**	**9.9300e-003**	**2.4000e-004**	**1.3412**

ATTACHMENT 17

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Library	0.26599 / 0.445752	0.9570	8.7100e-003	2.1000e-004	1.2056
Total		**0.9570**	**8.7100e-003**	**2.1000e-004**	**1.2056**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	1.8127	0.1071	0.0000	4.0624
Unmitigated	1.8127	0.1071	0.0000	4.0624

ATTACHMENT 1

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Library	8.93	1.8127	0.1071	0.0000	4.0624
Total		**1.8127**	**0.1071**	**0.0000**	**4.0624**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Library	8.93	1.8127	0.1071	0.0000	4.0624
Total		**1.8127**	**0.1071**	**0.0000**	**4.0624**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

ATTACHMENT 1