Samoa Industrial Waterfront
Preliminary Transportation Access Plan

Samoa Peninsula
Humboldt County, California

December 5, 2013

Prepared For:
Humboldt Bay Harbor, Recreation & Conservation District

Prepared By:
LACO Associates, Inc.
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Project No. 7591.00

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EXECUTIVE SUMMARY

In June 2012, the Humboldt Bay Harbor, Recreation & Conservation District requested professional services from LACO Associates for preparation of the Samoa Industrial Waterfront Preliminary Transportation Access Plan (hereafter, Plan). Funded by the Federal Highway Administration through a grant administered by the California Department of Transportation, the Plan is a planning-level site reconnaissance, outreach, and report preparation effort to identify a Preferred Alternative Route for a roadway to support enhanced commercial and industrial transportation on the Samoa Peninsula. Preliminary consideration of railroad connectivity is also part of the Plan. These roadway and rail routes will provide connectivity between waterfront properties and infrastructure on the Samoa Peninsula in Humboldt County, California, and major inland transportation networks, including the National Highway System. These waterfront properties are owned by HBHRCD and private parties. Historically a hub of industrial activity associated with the local timber and maritime economies, the Samoa Peninsula has experienced significant decline in utility and prominence as a key transportation node for North Coast industrial commerce. As part of a larger strategy to revitalize waterfront areas of Humboldt Bay, the goal of the Plan is to provide a "road map" for future public funding solicitations for road (and potentially rail) improvements to facilitate goods movement and connectivity between marine, highway, and rail transit systems to accommodate shipping to and from the Samoa Peninsula/Humboldt Bay waterfront.

Development of the Plan has involved coordinating two outreach events for property owners and local, state, and federal land use and transportation agencies; holding meetings with individual stakeholders; conducting field surveys to evaluate biological resources, geology, hydrology, utilities systems, and transportation infrastructure; hosting an interagency meeting with regulatory agencies; meeting with tribal representatives; and requesting a records search for cultural and historic resources from outside agencies. The resulting Plan identifies the Preferred Alternative Route across seven distinct road segments, and a conceptual-level railroad loop track and storage tracks. Each road segment and the potential rail development is described and reviewed individually as a potential distinct project for future development. The seven road segments were prioritized for future funding opportunities based on a number of criteria, including the existing site conditions, projected road improvement or construction costs, HBHRCD priorities, and property owner interest. The conceptual railroad loop track was not evaluated with an equal level of detail, as the road improvements are considered much more feasible in the short- to mid-term. Therefore, the railroad was not assessed for site constraints, nor was it evaluated for prioritization against the road segments.

As summarized in the table below, it was determined that in considering the various road segment prioritization criteria, a pragmatic, needs-based approach would best serve the goals of the Plan. Based on the current efforts of private and public entities on the Samoa Peninsula to revitalize operations within the vicinity of the Preferred Alternative Route, and to increase operational efficiencies for existing property uses, the road segments that would most immediately serve the needs of those revitalization efforts were given the highest priority. Future development of each road segment will require independent site reviews, project-specific field surveys, compliance with permitting and NEPA and CEQA requirements, and preparation of detailed construction plans and specifications.

HBHRCD's vision of an enhanced transportation network on the Samoa Peninsula involves the establishment of an AASHTO-standard roadway system along the Preferred Alternative Route, and the potential development of a rail system connecting to either the existing North-South rail line or a proposed

East-West rail line, that will accommodate freight traffic to and from existing and future terminals on Humboldt Bay. HBHRCD anticipates "Major Collector" functional classification designation for all seven road segments and inclusion of the entire Preferred Alternative Route in the National Highway System. This NHS designation will extend to State Route 255 between New Navy Base Road and U.S. Highway 101, as any roads proposed for NHS designation must be contiguous to existing NHS roadways. Steps to complete this conversion are further described in the Plan. Future implementation of the Plan may involve the following tasks:

- Procurement of permanent access easements or fee title acquisition of roadways
- Construction of new road "spurs" from existing roads to waterfront parcels
- Widening and resurfacing of existing roads, such as Vance Avenue
- Improvement and installation of safety features at key intersections
- Installation of security features to protect private property and sensitive port facilities
- Relocation of above-ground utilities to underground facilities

This preliminary plan is the first step in a projected 15- to 20-year process to improve goods movement on the Samoa Peninsula. The detailed discussion in the Plan prepares HBHRCD and project partners for this effort and provides ample justification for targeted public investment in improved transportation infrastructure across the Preferred Alternative Route. The future of the Samoa Peninsula is promising, and expansion of commercial and industrial enterprises on Humboldt Bay can be achieved while preserving the unique ecology of our state's second-largest estuary.

Road Segment Prioritization Summary

Priority No.	Segment No.	Description	Estimated Improvement Cost	Current Ownership	Proposed Ownership	Justification
1	3	Vance Ave - Bay Street to Samoa Pulp Lane	$2,336,000	Private	HBHRCD (Fee Title or Easement)	Road improvements will immediately improve internal circulation within the PAR to benefit current property owners and short-term future development scenarios. Access for the greatest number of property owners.
2	4	Vance Ave - Samoa Pulp Lane to North Spur	$1,094,000	Private	HBHRCD (Fee Title or Easement)	Road improvements will immediately improve internal circulation within the PAR to benefit current property owners and short-term future development scenarios.
3	5	Samoa Pulp Lane - New Navy Base Road to Vance Ave	$239,000	County	County	While currently sufficient for short-term use, road improvements will provide better connection from New Navy Base Road to the industrial properties.
4	2	Bay Street - New Navy Base Road to Vance Ave	$978,000	County	County	Road improvements will support secondary access to internal circulation, as well as improved access to waterfront properties in Fairhaven.
5	7	South Spur off Vance Avenue	$1,033,000	HBHRCD	HBHRCD (Fee Title)	Significant biological, geologic, and regulatory constraints exist. There is an existing short-term, unofficial, alternate access route to Redwood Berth 2. Future dock improvements and Segment 7 road construction will improve utility.
6	6	North Spur off Vance Avenue	$746,000	Private	HBHRCD (Fee Title or Easement)	Redwood Berth 1 is in advanced disrepair, requiring signficant investment. Plans for renovation or relocation are not yet developed. Potential future benefit as a major shipping facility.
7	1	New Navy Base Road - Bay Street to SR 255	$1,929,000	County	County	Improvements to this road segment are directly tied to Samoa Town Master Plan and 30-year build-out scenario. No immediate need for improvements, as the road segment meets AASHTO standards for NHS.

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LIST OF ACRONYMS

AASHTO	American Association of State Highway and Transportation Officers
ACEC	American Council of Engineering Companies
CCC	California Coastal Commission
CERES	California Environmental Resources Evaluation System
CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information System
CRC	California Redwood Company
DEIR	Draft Environmental Impact Report
DFW	California Department of Fish & Wildlife
EA	Environmental Assessment
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ESHA	Environmentally Sensitive Habitat Area
FEIR	Final Environmental Impact Report
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
HBHRCD	Humboldt Bay Harbor, Recreation & Conservation District
HCAOG	Humboldt County Association of Governments
IS	Initial Study
LAPM	Local Assistance Procedures Manual
LID	Low Impact Development
MAP-21	Moving Ahead for Progress in the 21st Century Act
MOU	Memorandum of Understanding
NCRA	North Coast Railroad Authority
NEPA	National Environmental Policy Act
NHS	National Highway System
NOA	Notice of Availability
NOD	Notice of Determination
NOI	Notice of Intent
NWIC	Northwest Information Center
PAR	Preferred Alternative Route
PE	Preliminary Engineering
PES(NI)	Preliminary Environmental Screening for Non-Infrastructure Projects
PS&E	Plans, Specifications and Estimate
ROD	Record of Decision
RFQ	Request for Qualifications
RTP	Regional Transportation Plan
SER	Standard Environmental Reference
SHPO	State Historic Preservation Officer
STAA	Surface Transportation Assistance Act
TEA-21	Transportation Equity Act for the 21st Century
THPO	Tribal Historic Preservation Officer
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish & Wildlife Service

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1.0 INTRODUCTION

1.1 Background

The Humboldt Bay Harbor, Recreation & Conservation District (HBHRCD) was formed in 1973 for the purpose of the overseeing and developing the harbors and ports of Humboldt County for "multiple purpose use and for the benefit of the people" (HBHRCD, 2013). The HBHRCD is a county-wide agency with permit jurisdiction over all tide, submerged, and other lands granted to the District including all of Humboldt Bay. Its responsibilities include the following:

- Acquisition, construction, maintenance, operation, development and regulation of harbor works and improvements, including rail, road, water, and air terminal facilities
- Development, operation, maintenance, control, regulation and management of Humboldt Bay upon the tidelands and lands lying under the inland navigable waters of Humboldt Bay
- Development and protection of the natural resources of the area
- Promotion of commerce, navigation, fisheries, and recreation thereon

HBHRCD logo

HBHRCD is directed by five commissioners who serve staggered four-year terms, and who are supported by 11 full time employees (HBHRCD 2013). HBHRCD's office is located on Woodley Island in the City of Eureka, California.

In January 2012, HBHRCD was awarded a grant from the California Department of Transportation (Caltrans) for Federal–Aid Project No. HP21L-6302(002) for Port Access Enhancement – Humboldt County, a highway and freight rail access improvement project on the Samoa Peninsula (see Figure 1, Location Map). This grant was funded through the Demonstration Program under the 1998 Transportation Equity Act for the Twenty-First Century (TEA-21). Administered by Caltrans, the expenditure of these funds must follow the Caltrans Local Assistance Procedures Manual (LAPM).

The deliverable for the scope of work for this federal grant is the preparation of this Samoa Industrial Waterfront Preliminary Transportation Access Plan (hereafter, Plan). In alignment with the Humboldt Bay Management Plan (HBHRCD, 2007), and in support of HBHRCD meeting Goal 1 of the Draft (8/11/11) Five-Year Strategic Plan, HBHRCD's goal for the Plan is to improve highway and freight rail access to the Redwood Marine Berth 1(see Figure 2, Samoa Peninsula Berths Map). Goal 1 of the HBHRCD's Draft Five-Year Strategic Plan involves creation of a marine-based, planned-use development incorporating modernized public dock facilities at the Redwood Marine Terminal and Business Park. Uses could include aquaculture, marine industrial, light industrial, commercial, and import/export.

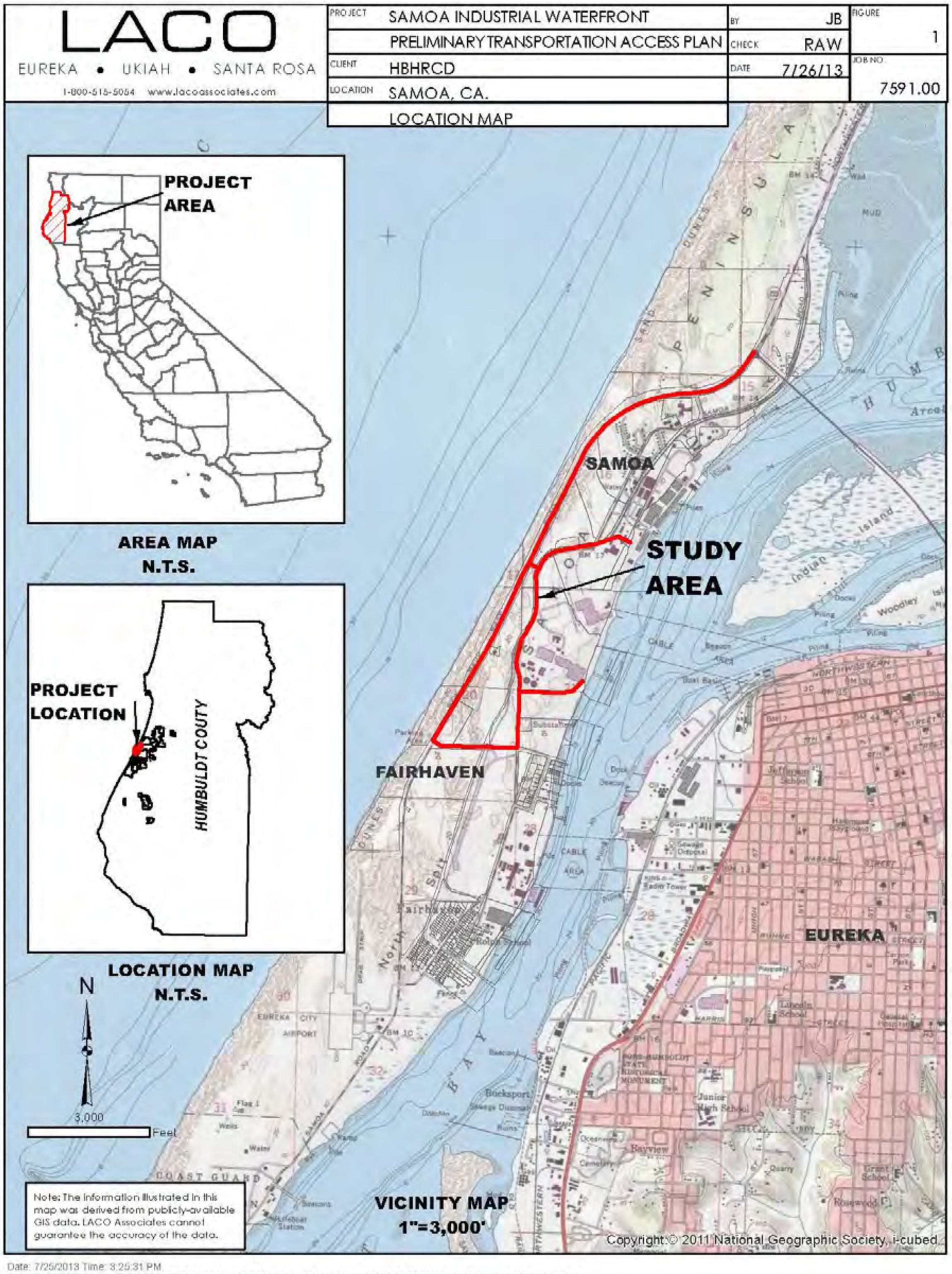

Figure 1. Location Map

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Figure 2. Samoa Peninsula Berths Map

On February 16, 2012, HBHRCD circulated a Request for Qualifications (RFQ) for the Plan, as is required per Chapter 10 of the Caltrans Local Assistance Procedures Manual. Through a competitive selection process, LACO Associates (LACO) was awarded a contract to provide engineering and planning services for the development of the Plan. In cooperation with the following project partners, LACO has implemented its contracted scope of services:

- HBHRCD
- Planwest Partners (contract administrator for HBHRCD)
- Kelly-O'Hern Associates (contracted by HBHRCD to conduct specific surveys and title research)
- Whitlock and Weinberger Transportation, Inc. (W-Trans, subcontracted by LACO for specific transportation tasks)
- Caltrans District 1 Local Assistance staff (contract administrator for FHWA)

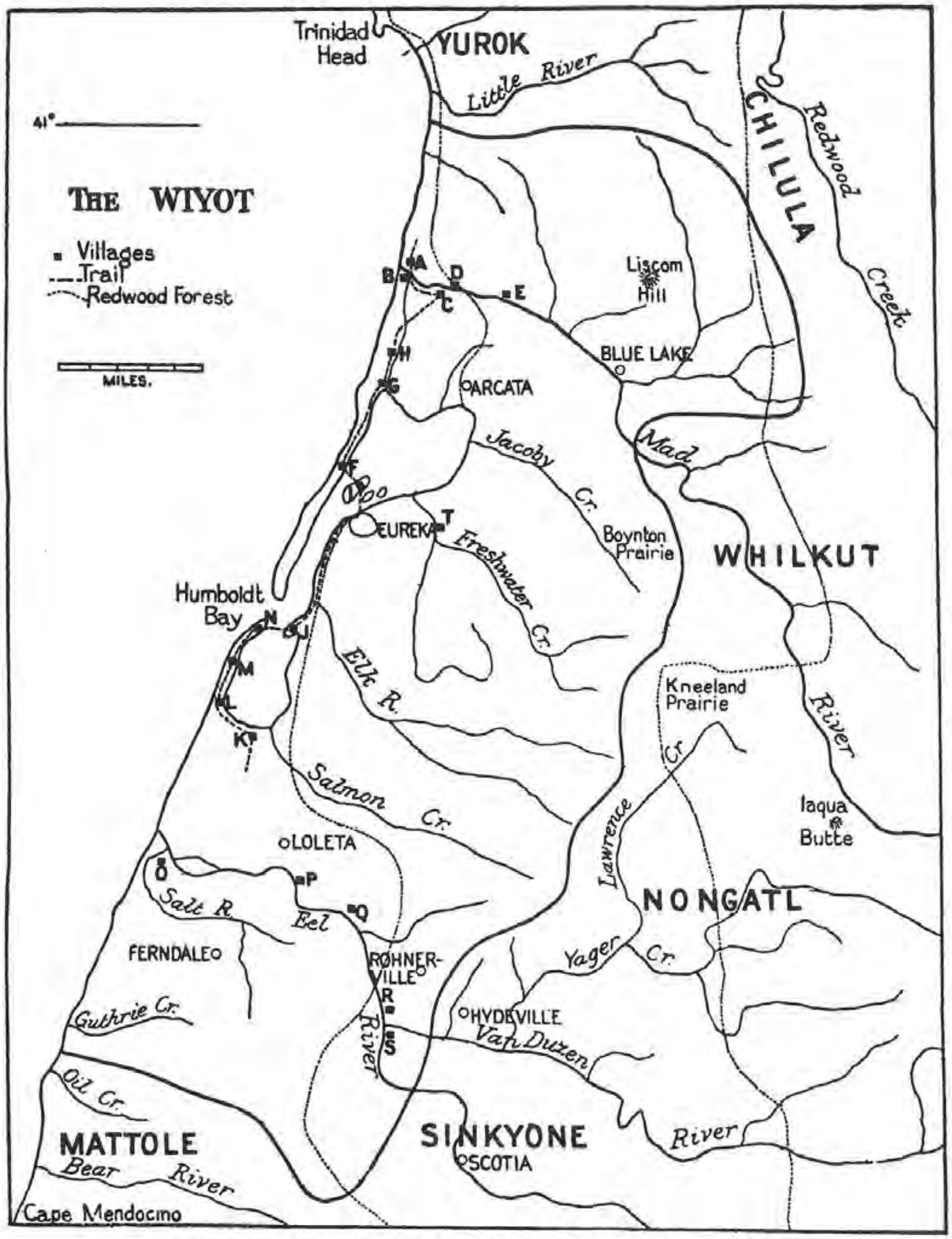
The culmination of our scope of services is the preparation and delivery of this Plan. The following sections provide a detailed discussion of the stakeholder outreach, consultations with permitting agencies, records research, field surveys, technical studies, and numerous meetings conducted over the past eighteen months that have led us to this stage. Later sections of this Plan identify opportunities and constraints discovered through the planning process, potential permitting requirements, and a work plan to begin implementation of the Plan.

1.2 Historic and Current Land Use

The Samoa Peninsula (also known as the North Spit) is an approximately 8.2-mile-long sand spit that runs roughly from northeast to southwest. The width of the peninsula averages approximately 0.6 miles, but varies from 0.47 miles to 0.85 miles. The peninsula separates the northern portion of Humboldt Bay, known as Arcata Bay (stretching from the northern margin of the Bay to the State Route [SR] 255 bridges linking the City of Eureka to the peninsula), and the central portion, known as Entrance Bay (which extends from the State Route 255 bridges to the town of King Salmon), from the Pacific Ocean. The peninsula hosts an assortment of coastal habitats, including beaches and dunes, coastal coniferous and deciduous forests, freshwater and brackish wetlands, and woody and herbaceous hollows. Portions of the Bay along the eastern edge of the peninsula contain mud flats, eelgrass beds, and salt marshes.

According to Humboldt State University linguist, Victor Golla, the Wiyots arrived in the Humboldt Bay area approximately 2,000 years ago, inhabiting a lagoon environment that afforded the use of coastal resources (Golla, 2007). The Wiyots lived in villages that were uniformly close to water, for they were people of the wetlands, where their sustenance often came from bay or river, and where their way could often most easily be made by canoe rather than on foot. Their traditional homeland ranged from the Mad River, through Humboldt Bay (including the present city of Eureka), to the lower Eel River basin. Inland, their territory was heavily forested in ancient redwood. Their stretch of shoreland was mostly sandy dunes and tidal marsh (Powers, 1877; see Figure 3, Historic Wiyot Territory Map). The Wiki, or central division, occupied the Humboldt Bay shoreline, islands, and the project site. As identified in the records search response letter from the Northwest Information Center at Sonoma State University, there are five recorded Wiyot archaeological sites within the Area of Potential Effect (see Section 3.5.5 for a more detailed discussion).

Following Euro-American settlement of the area, Humboldt Bay became a major shipping hub, linking the timber-rich northern California coast with lumber-hungry San Francisco and surrounding communities. Due to the presence of a recurring sand bar at the mouth of the Bay, shipping traffic was often delayed. To remedy this, the U.S. Army Corps of Engineers began construction of jetties on either side of the Bay mouth from 1889-91. Periodic jetty reconstruction was necessary due to the relentless impact from the wave action; the installation of concrete dolosse in 1972 further stabilized the jetties.



Handbook of the Indians of California, A.L. Kroeber, 1925

Figure 3. Historic Wiyot Territory Map

A more (but not always) reliable shipping route into and out of the Bay supported a booming lumber-processing industry and associated operations on the Samoa Peninsula. By the late 1800s to early 1900s, shingle-sawing plants, lumber mills, and shipyards had sprung up along the peninsula from Fairhaven to Samoa. In the early 1890s the lumber town of Samoa was founded by John Vance. Many other efforts were made to build prosperous new settlements on the peninsula, all of which fell short of their optimistic goals. By the end of World War II, the largest lumber operation on the peninsula belonged to the Hammond Lumber Company, which had purchased the mill and nearby housing from John Vance in 1900. In 1948, the mill employed roughly 550 people, most of who lived in company housing on the peninsula, and had a milling capacity of approximately 400,000 board feet per day (Planwest, 2008).

The Georgia Pacific Company bought the Hammond operation in 1956, and expanded the operation to include a plywood plant, a stud mill, a bleached kraft pulp mill, and a redwood lumber mill. In the early 1980s, Georgia Pacific restructured its Samoa operation under the newly-formed Louisiana-Pacific Corporation (LP) (Planwest, 2008). At that time, between the LP and the Simpson Timber Company (Simpson) operations, approximately 850 individuals were employed by the principal companies or subcontractors on the peninsula. According to Richard Marks, a former LP employee who has lived on the Samoa peninsula for nearly 30 years, the LP stud mill closed its doors in 1979, and the LP sawmill operation moved to a newer facility just north of the original sawmill in 1980. Around that time, the LP pulp mill could receive up to 200 trucks per day, and would export pulp from the dock facility just to the south (Marks, 2013).

Detail from Sheet 7, Atlas of Humboldt County, California compiled from official records and private sources and surveys (Belcher Abstract & Title Co., 1922)

When the Simpson pulp mill closed in 1992, LP began using the Fairhaven Terminal for export, due to its larger capacity. In 2005, Simpson sold their pulp mill property to Sequoia Investments X, LLC, which converted the facility into an industrial and commercial business park, known as the Fairhaven Business Park. The site currently comprises office spaces for several small companies; warehouses for large commercial storage, processing, and shipping; and outdoor storage for raw and packaged materials.

The LP pulp mill has changed hands a number of times between 1998 and 2013, with the following companies or organizations holding title during this period:

- Louisiana Pacific Samoa, Inc. (title acquisition January 1998)
- Simpson Samoa Company (title acquisition June 1999)
- Evergreen Pulp (title acquisition 2005)
- Freshwater Tissue (title acquisition January 2009)
- Humboldt Bay Harbor, Recreation & Conservation District (title acquisition August 2013)

During this period of time, the pulp market steadily declined and remained below previous cyclical peak periods, which, combined with maintenance and upgrade requirements, reduced and eventually halted the output from the pulp mill in 2008 (UNECE/FAO, 2011). The site recently underwent partial demolition and asset divestment by Freshwater Tissue, and was purchased for cleanup and redevelopment by the HBHRCD in August 2013.

Samoa Peninsula in 1993 (from HBHRCD presentation, May 29, 2013)

Southwest of the former LP pulp mill site, at the intersection of Bay Street and New Navy Base Road, the DG Fairhaven Power Company operates a biomass energy plant. Constructed in 1986 and currently employing 22 people, the plant produces sufficient energy to power 16,000 residences. According to DG Fairhaven Plant Manager, Bob Marino, the plant processed 272,000 tons of material in 2012. The plant sells 100 percent of its power to Pacific Gas & Electric (PG&E) through a long-term contract. The energy is sent to the substation located on Vance Avenue, approximately 0.34 miles east of the power plant. The plant and biomass staging area comprises approximately 15 acres of the total approximately 78 acres owned by the company. The remaining undeveloped area is comprised of dunes and a small area of wetland created by site runoff. In 1980, the entire site was graded in anticipation of future development. Since then, the areas that remained undeveloped have re-established as dune habitats and hollows due to wind erosion and aggradation (Marino, 2013).

California Redwood Company (CRC) owns approximately 108 acres designated Industrial/Coastal Dependent land use in two non-adjacent properties, both of which are bordered by Humboldt Bay on the east and Vance Avenue on the west. The properties are currently used as temporary log storage decks. CRC also ships wood chips from their export dock (former North Coast Chip Export terminal). CRC uses privately-owned Vance Avenue for goods transport between the two properties.

The former Hammond Mill waterfront parcels are owned by HBHRCD, including the former LP Pulp Mill site (purchased from Freshwater Tissue in August 2013) and Redwood Marine Berths 1 and 2 (acquired from LP in 2004 and 2006, respectively). While Redwood Marine Berth 2 is intact, Redwood Marine Berth 1 is in a state of disrepair and needs significant rehabilitation prior to its use for cargo loading and offloading. The Hammond Mill waterfront parcels currently contain a small number of metal storage buildings leased to local commercial fishermen. Otherwise, the majority of the property remains underutilized despite its historic importance in the local commercial shipping economy of Humboldt Bay. A strategy for the rehabilitation of Redwood Marine Berths 1 and 2 is outlined in the Redwood Marine Terminal Business Plan (TranSystems, 2008; see Section 1.3, below).

1.3 Waterfront Growth Opportunities

Historically, outgoing cargo from Humboldt Bay consisted almost exclusively of forest product exports, such as wood chips, wood pulp, lumber, and logs. Humboldt Bay waterborne commerce peaked in 1991. In more recent decades, output by the North Coast timber industry has lessened, and today lumber exports are intermittent at best. Incoming cargo to Humboldt Bay includes unprocessed logs from New Zealand

and Canada, as well as imported wood chips. (Humboldt Bay Management Plan, May 2007). This trend is evident in Figure 4.

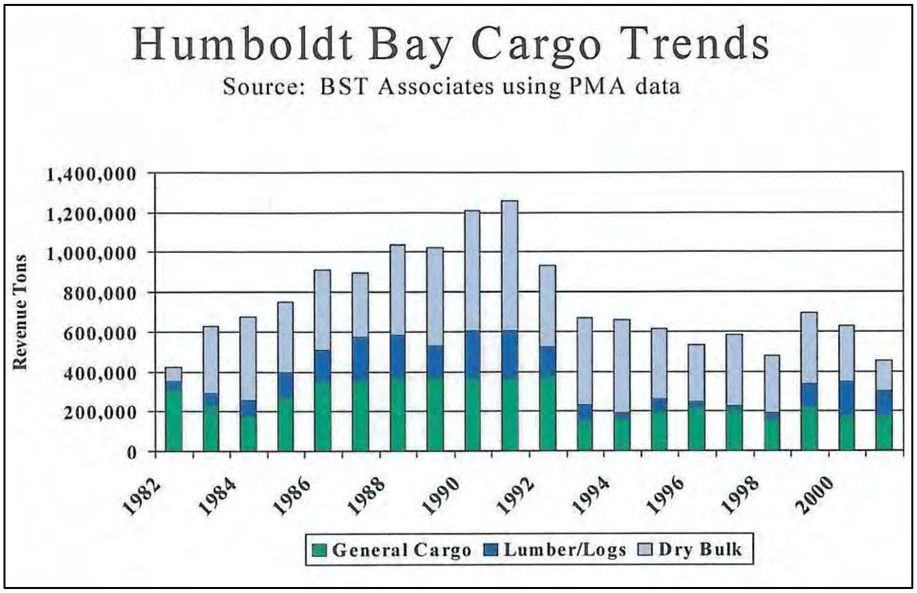


Figure 4. Humboldt Bay Cargo Trends (from HBHRCD presentation, May 29, 2013)

The market competitiveness of any port depends to a considerable extent on efficient connections to inland areas by truck and rail transportation modes (Harbor Revitalization Plan, HCAOG 2004). State Transportation Assistance Act (STAA) truck length restrictions on U.S. Highway 101 to the south at Richardson Grove, and State Route 299 east at Buckhorn Summit, limit the length of trucks able to enter and leave Humboldt County, thereby stifling the potential for efficient truck-based freight transport linking the ports on Humboldt Bay to inland highway networks. Caltrans is currently pursuing realignment projects at these two locations to address these restrictions (Caltrans, 2012).

The Northwestern Pacific Railroad line, which has historically been a key part of the transportation system on the Samoa Peninsula, has been out of service since 1997, after the line washed out at several points in the Eel River canyon. The line was closed by the Federal Railroad Authority in 1998. Since that time the North Coast Railroad Authority (NCRA), the current owner of the line, has pursued state and federal funding and support for restoring service on the line. (Humboldt Bay Management Plan, May 2007). HBHRCD and its partners have recently evaluated the feasibility of restoring rail service to the Samoa Peninsula, either through restoration of the existing North Coast Railroad line or through construction of a new east-west rail corridor linking the Humboldt Bay region with the mainline rail system near Red Bluff. See Appendix 1 (*Humboldt Bay Alternative Rail Corridor Concept Level Construction Cost and Revenue Analysis* [BST Associates, 2013]) for a detailed analysis.

The former LP pulp mill property and surrounding properties, currently owned by HBHRCD and Freshwater Tissue Company, LLC, are adjacent to Humboldt Bay to the east and Vance Avenue to the west. The Northwest Pacific Railroad line runs along Vance Avenue adjacent to the properties. The future use of these facilities and properties, primarily designated Industrial/Coastal Dependent land use, is uncertain.

The site offers the following assets:

- Approximately 156 acres in total
- 250,000 sq. ft. of building area
- 30 million gal/day water treatment system
- 1.5 miles of ocean outfall pipe
- Direct access to Redwood Marine Berth 2 (see below) and Vance Avenue
- Adjacent to Northwest Pacific Railroad

Potential uses of the property include wood chip and hog fuel export, log and lumber export, general cargo-domestic barge facility, mill facility for bio-char-pellet for export, indoor aquaculture and research, wave energy buoy manufacture, and offshore wind turbine manufacture (Crider, 2013).

HBHRCD's ownership of Redwood Marine Berths 1 and 2 presents an opportunity for HBHRCD to attract new business and stimulate local economic development. In 2008, HBHRCD commissioned the development of a business plan for the "construction of a multipurpose berth to allow [HBHRCD] to capitalize on short to medium term opportunities, and generate revenues to support long term development" (TranSystems, 2008). According to this business plan, Redwood Marine Berth 2 is expected to provide the best opportunity for a multi-purpose public dock, as it offers deep-water access, a general cargo-heavy load capacity dock, 100 acres of adjacent upland property, access to warehouse storage, and industrial zoning with low off-site impacts.

The Samoa Town Master Plan is currently going through review by local and state agencies. The proposed plan will re-designate and rezone approximately 220 acres of land owned by Samoa Pacific LLC, including the historic timber company town of Samoa. Based on the proposed new land use designations, the redeveloped town of Samoa could include approximately 47.9 acres of low and medium density residential uses, 15.3 acres of commercial and business park uses, 35.3 acres of coastal dependent industrial uses, and 50.6 acres of natural resources uses, as well as smaller acreages of public facilities, public recreation, and commercial recreation uses (Kelly O'Hern, 2013). Most of the lands included in the Samoa Town Master Plan would use Cookhouse Road for access from New Navy Base Road, although some southern parcels, particularly the business park land, would use Samoa Pulp Lane.

The southern Samoa Peninsula includes several other under-utilized parcels designated Industrial General or Industrial/Coastal Dependent land use. From work on other projects, and through stakeholder outreach, we have learned of several other development efforts currently in-progress or under consideration on the peninsula. These ventures include aquaculture/mariculture businesses, log processing, soil and fertilizer production, warehousing, and materials transport, and will be associated with improvements to the Fairhaven Terminal.

The potential to most efficiently use the southern Samoa Peninsula properties is limited by four primary constraints: (1) the lack of sufficient modern commercial docks, berthing facilities, and loading/unloading facilities; (2) the lack of sufficient transportation infrastructure between the Humboldt Bay waterfront and New Navy Base Road; (3) the limited availability of utility infrastructure, including communications (high-speed cable), sanitary sewer, water, and electric power; and (4) lack of an operational railroad connection to the San Francisco Bay area and/or the Central Valley of California. Coordinated efforts across all four of these areas offer the greatest opportunity for orderly growth and development.

For example, construction of new docks and berthing facilities is most cost effective with better transportation networks (roads and/or railroad) to move goods to and from docks. Likewise, an upgraded transportation system will require improved port facilities to effectively use its expanded capacity. Property owners have also stated that improved utility infrastructure will support their commercial ventures in the area.

1.4 Purpose of the Plan

The Plan is a preliminary, planning-level document to primarily evaluate portions of the Samoa Peninsula to identify a Preferred Alternative Route (PAR) for improved and enhanced road-based commercial and industrial freight transport from Humboldt Bay to inland transportation networks. A secondary purpose of the Plan is to present a conceptual-level analysis of railroad connectivity to the Samoa Peninsula. While both road and rail are integral elements to revitalization of commercial and industrial enterprises on the Samoa Peninsula, the analysis is more focused on the identification and detailed discussion of a PAR for road-based transport, including permitting, engineering, right-of-way, construction, and cost considerations, because it has a more immediate possibility for funding and development, as well as a direct tie-in to nearby existing infrastructure. The conceptual-level analysis of rail connectivity, as found in Appendix 1, is less detailed since development of a railroad connection is considered a larger financial investment and includes more challenging considerations when assessing feasibility.

As identified in the contract between LACO and HBHRCD, dated June 12, 2012, the planning effort consisted of field surveys, preliminary technical studies, and records research for a number of parameters that influence the viability of a proposed road network; stakeholder outreach; coordination with transportation and regulatory agencies; and preparation of this Plan. Concurrent with the development of the Plan, and as an initial step to establishing the PAR as a primary conduit for goods transfer to and from Humboldt Bay, LACO has coordinated the future designation of the PAR as part of the National Highway System, and facilitated “Major Collector” functional classification designation of the PAR with Humboldt County.

At the inception of this planning exercise, the PAR was presumed to be located solely on HBHRCD property, requiring the construction of up to 1.25 miles of new roadway along the Humboldt Bay waterfront to provide access to existing and future port facilities (see Section 4.1). Following the first joint stakeholder meeting on August 17, 2012, and further discussions with individual property owners and HBHRCD, it was determined that a PAR encompassing a larger geographic area and utilizing the existing and currently underperforming road network would increase the utility and benefit of the project. The resulting PAR links SR 255 and the Humboldt Bay/Samoa Peninsula, and is intended to promote coastal dependent and general industrial and commercial development.

Through multiple iterations, the PAR has been developed to provide access to waterfront parcels owned in fee by HBHRCD (see Figure 5, HBHRCD-owned Parcels on the Samoa Peninsula). The eastern extent of the PAR, namely the North and South Spurs, is limited to the western boundaries of HBHRCD parcels to retain flexibility for waterfront development to meet current and anticipated future needs. Because the PAR covers a total length of approximately 4.63 miles (24,420 feet), is was separated into seven distinct road segments to allow for segment-specific analysis, including identification of opportunities and constraints, and estimated potential project costs, so that each segment can be separately permitted and constructed. As shown later in this Plan (see Section 9.0), the seven segments were compared to one another to establish an order of priority. Given the realities of competitive public transportation funding, this Plan will serve as a “road map” to an improved transportation network on the Samoa Peninsula, and will guide HBHRCD and partner agencies in funding solicitation, permitting, and road construction. It is acknowledged that construction of the enhanced PAR road network will likely take upwards of 15-20 years. Section 10.0 identifies the subsequent steps to turn this Plan into reality.

Figure 5. HBHRCD-owned Parcels on the Samoa Peninsula

2.0 DESCRIPTION OF ALTERNATIVES INVESTIGATED

2.1 Early Iterations

In June 2012, LACO was awarded the contract from HBHRCD to conduct the preliminary planning for the Samoa Industrial Waterfront Preliminary Transportation Access Plan. As identified in the Request for Qualifications (RFQ), the focus of the highway and rail connection plan was to be the HBHRCD-owned parcels in the Samoa waterfront area. The identification and detailed discussion of the road-based Preferred Alternative Route (PAR) has taken precedence over rail connectivity and feasibility, as roads have a more immediate possibility for funding and development, as well as a direct tie-in to nearby existing infrastructure. Discussion of opportunities for rail connectivity is included below in Section 2.5, as well as in Appendix 1. At the preliminary scoping meeting, Planwest Partners (the Contract Administrator) provided LACO with GIS shapefiles of three alternative transportation access routes on HBHRCD's Samoa property (see Figure 6, Preferred Alternative Route, ver. 1). The three alternatives connected with New Navy Base Road, and ultimately SR 255, via Cookhouse Road and entered into HBHRCD property around a proposed roundabout and via a gate located north of the Samoa Cookhouse. The three alternative routes then turned southwest through the HBHRCD property, terminating at either Samoa Pulp Lane to the west or Redwood Marine Berth 2 to the south. These three road route alternatives were the focus of preliminary field surveys for biological, geologic, cultural, and hydrologic characteristics, and were the subject of discussion at the first of two stakeholder outreach meetings (see Section 2.2, below).

Observing the condition of Redwood Marine Berth 1

Through the preliminary field surveys additional physical and regulatory constraints were identified, including vicinity to the waterfront, railroad alignment, potentially sensitive habitat areas, and potential future uses, and future sea level rise considerations. Based on this data it became evident the construction of an entirely new roadway on HBHRCD property to provide access to Redwood Marine Berth 1 would not be the option with lowest environmental impact, highest benefit, and greatest support from stakeholders. LACO reviewed the site constraints identified in the field surveys of HBHRCD property, and held additional consultation with property owners and HBHRCD. As a result, the PAR was reconfigured numerous times (see Figures 7–9, Preferred Alternative Route vers. 2-4). These reconfigurations served to retain the initial goals of the project while avoiding biological and operational constraints, and to provide greater benefit to a larger number of property owners and users on the Samoa Peninsula. In addition, because the PAR is primarily located on existing roadways, the need to procure of right of way or access easements on currently private roadways will be a critical constraint to realizing the current PAR (see section 4.4).

Figure 6. Preferred Alternative Route, ver. 1

Figure 7. Preferred Alternative Route, ver. 2

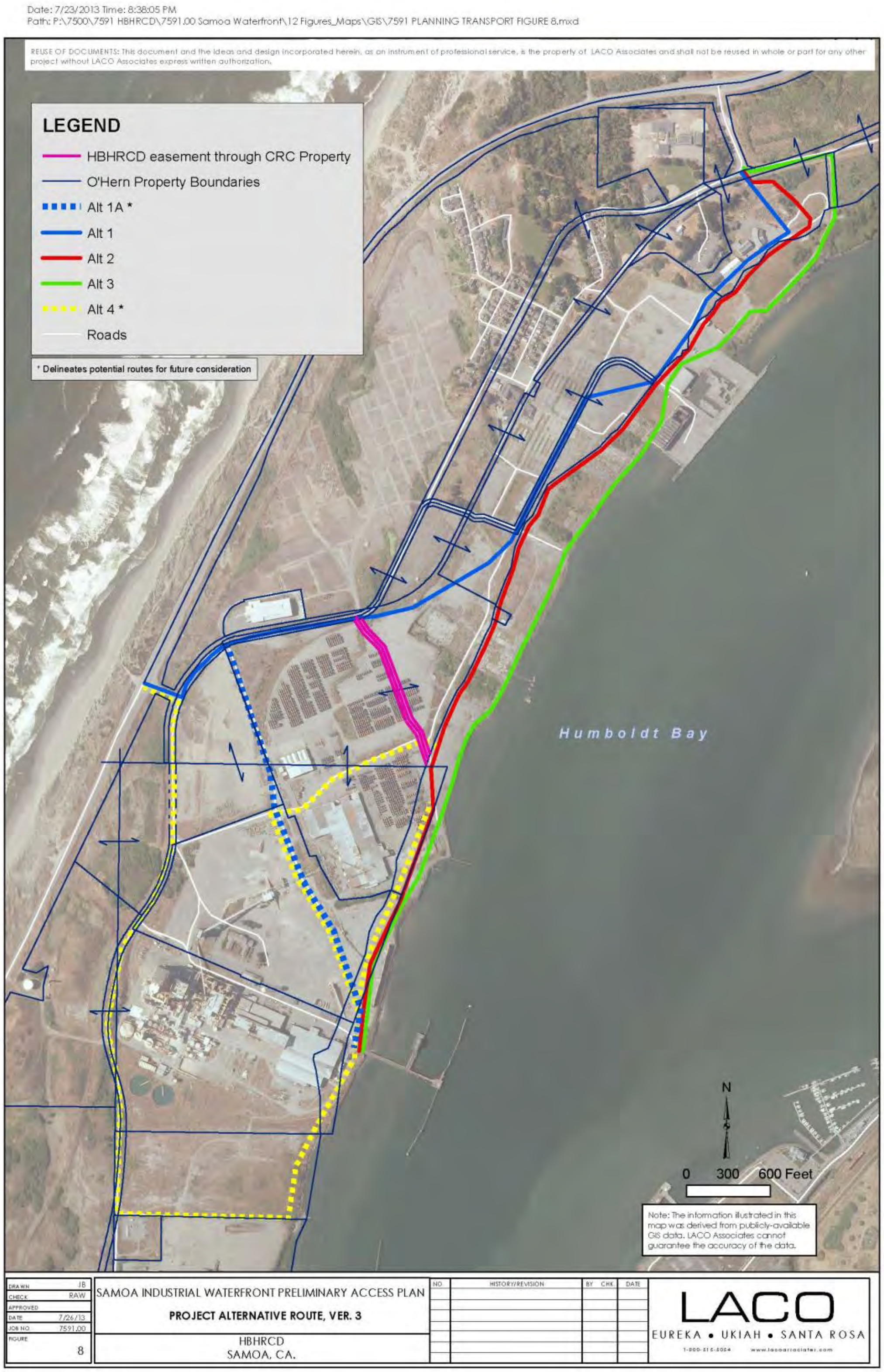


Figure 8. Preferred Alternative Route, ver. 3

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Figure 9. Preferred Alternative Route, ver. 4

2.2 Stakeholder Outreach

As the intent of the Plan is to improve waterfront commercial and industrial opportunities for property owners and users, while recognizing and accommodating the sensitive biological resources on the peninsula, LACO conducted a high level of stakeholder outreach, which included property owners and users, transportation planning entities (i.e. Caltrans and Humboldt County Association of Governments [HCAOG]), Humboldt County Public Works, and local tribes.

2.2.1 Property Owners

LACO held two outreach events to provide an overview to affected stakeholders, as well as to solicit input and buy-in from those likely to be affected most by the Plan. The first was an open meeting with property owners, agencies, and interest groups, while the second meeting was focused on property owners in the immediate vicinity of the PAR.

August 17, 2012 site walk on HBHRCD property

On August 17, 2012, LACO held a Joint Stakeholder Meeting at the Samoa Women's Club on the Samoa Peninsula to present the project as an early iteration, to discuss potential opportunities and constraints, and to provide a venue for stakeholders to ask questions and provide input. LACO provided large format maps and a PowerPoint presentation to introduce the project and share work to date. The event was well-attended by property owners and users, transportation agencies, and local government representatives (a total of 16 attendees). Following the presentation and question-and-answer period, LACO hosted a brief site walk that extended roughly from Samoa Cookhouse Road, along the HBHRCD-owned waterfront, to property owned by California Redwood Company. Regulatory agencies were not invited to this meeting because the PAR had not yet been identified, and it was agreed that regulatory considerations were better addressed with a specific project route in mind. Following the meeting, LACO provided meeting minutes, a copy of the PowerPoint presentation, and additional resources from the meeting, to invitees and the HBHRCD (see Appendix 2 for meeting deliverables and a complete list of invitees).

To gauge the level of property owner support for the PAR once it was developed through several iterations (see Section 5.1), LACO sent out a letter on January 21, 2013 to the following property owners along the PAR:

- California Redwood Company
- Sequoia Investments X, LLC
- Samoa Pacific Group, LLC
- Freshwater Tissue Company, LLC
- DG Fairhaven Power Company

If the addressee property owner was in general agreement with the PAR and in general support of HBHRCD's continuation of preliminary route design and solicitation of additional funding for the project, the letter requested that the property owner sign the provided statement to that effect. LACO received two signed statements, and alternate responses from the remaining property owners. While all of the property owners were in general support of the project, some had specific concerns with regard to public access, utilities, or interruption of existing operations, among other issues. Copies of the letters sent to, and received from, the property owners identified above are included in Appendix 3.

On April 30, 2013, a second, more focused, outreach meeting was held at the HBHRCD Conference Room on Woodley Island. As the intent of this meeting was to provide property owners and users an opportunity for candid dialogue, the invitee list was limited to those who owned or held a lease on the properties within or adjacent to the PAR. LACO prepared a PowerPoint presentation and provided meeting packets to those in attendance. The meeting was sparsely attended (five property owners or their representatives, including HBHRCD). Despite the small group, LACO received helpful input that contributed to the completion of the field surveys, trip generation for road geometry analysis, and road functional classification and NHS designations. Following the meeting, LACO provided meeting minutes and a copy of the PowerPoint presentation to meeting invitees and HBHRCD (see Appendix 4 for meeting deliverables).

2.2.2 Humboldt County Association of Governments

The Humboldt County Association of Governments (HCAOG) is a Joint Powers Agency comprising seven incorporated cities (Arcata, Blue Lake, Eureka, Ferndale, Fortuna, Rio Dell, and Trinidad) and the County of Humboldt. HCAOG is largely responsible for programming state highway and local street improvements, public transportation resources, and the roadside call box program. HCAOG also bears responsibility for preparing and implementing the Humboldt Regional Transportation Plan (RTP). The RTP is a long-range transportation planning document for Humboldt County. Through the RTP, the HCAOG Board of Directors adopts goals, policies, and action plans for building and maintaining an integrated regional transportation system including roadways, highways, public transit and paratransit, bicycle, pedestrian, aviation, trucking, rail, and marine transport and travel (HCAOG, 2013).

For each transportation mode identified above, the RTP includes the following elements:

1. System Description
2. Needs Assessment
3. Goals, Policies, and Objectives
4. Action Plan
5. Financial Summary
6. Performance Measures
7. Accomplishments Since the Previous RTP was Adopted

The RTP also includes priority road improvement projects for each member jurisdiction (City or County) within HCAOG. As the intent of this Plan is to identify the PAR to improve eligibility for public funding for PAR construction, a critical step was to include the PAR into the RTP, which was last updated in 2008 and is currently being updated for 2013.

On September 25, 2012, LACO met with HCAOG Executive Director, Marcella Clem, and District Local Assistance Engineer for Caltrans District 1, Suzi Theiss. The purpose of the meeting was to discuss functional classifications, National Highway designation, and potential public funding opportunities for future construction of the PAR. At the time, the PAR had not been fully developed and was a prior iteration from that which is being considered in this Plan. However, the goals of the Plan were the same, and LACO received valuable input on a strategic approach to improving the competitiveness of the PAR for public transportation funding. A summary of the meeting on September 25, 2012, is found in Appendix 5.

Following the meeting with HCAOG and Caltrans representatives, LACO worked with Planwest Partners to prepare the required documentation to include the PAR in the RTP update.

2.2.3 Tribal Representatives

As discussed in greater detail in Section 3.5.5, LACO conducted preliminary outreach with local Tribal Historic Preservation Officers (THPO) and the State Historic Preservation Officer (SHPO) through written correspondence and a pre-consultation meeting. An informal consultation request letter was delivered to the following THPOs on June 4, 2013 (see Appendix 6):

- Wiyot Tribe THPO (Position vacant at the time of letter delivery. Subsequently, Tom Torma was hired as the Wiyot THPO.)
- Janet P. Eidsness, THPO for the Blue Lake Rancheria Tribe of Indians
- Erika Collins, THPO for the Bear River Band of the Rohnerville Rancheria
- Carol Roland-Nawi, Ph. D, California SHPO

A summary of cultural resources consultations identified above was delivered to Caltrans District 1 Heritage Resources Coordinator, Tim Keefe, in a letter dated June 4, 2013.

LACO staff met with Ms. Eidsness, Ms. Collins, and Mr. Torma on June 26, 2013, to discuss current cultural resource knowledge for the project area and to receive recommendations for appropriate site reconnaissance procedures prior to road segment enhancement construction activities. LACO staff followed up the June 26 meeting with a short letter confirming the points and recommendations discussed. These recommendations should be included in future road segment-specific analysis, design, and NEPA/CEQA compliance. Copies of LACO's follow-up letter and written THPO responses are included in Appendix 7.

2.3 Preliminary Agency Consultation

To identify regulatory requirements and potential constraints associated with subsequent stages of the project (i.e. implementation of the Plan in segment-specific phases), LACO consulted with local, state, and federal agencies that may have permitting jurisdiction over the PAR. The PAR lies within the California coastal zone, is located within the vicinity of County-designated Environmentally Sensitive Habitat Areas (ESHAs), and crosses public and private ownerships. While the segment-specific permitting requirements will be identified at later project stages, a preliminary evaluation of regulatory requirements would aid in the evaluation of segment construction feasibility and prioritization.

February 4, 2013 Caltrans site visit

On February 4, 2013, LACO hosted a site walk and consultation with Caltrans District 1 Local Assistance staff: Local Assistance Engineer, Jen Buck; Senior Environmental Planner, Brandon Larsen; North Region Division of Right of Way, Lisa Spellenberg; and Heritage Resources Coordinator, Tim Keefe. During the site walk, Caltrans staff clarified the appropriate path to assigning updated functional classification designations to the PAR (see Section 4.4.1), identified potential historic resources for further consideration and made a recommendation to conduct informal consultation with THPOs (as described above in Section 2.2.3), and identified the appropriate documentation to comply with the National Environmental Policy Act (NEPA) for this planning-level stage of the project (see Section 7.3). The site visit was followed up by multiple phone and e-mail consultations to clarify some of the points discussed. LACO and HBHRCD met with Jen Buck on February 27, 2013, to further discuss functional classification and National Highway system designation processes.

On June 11, 2013, LACO contacted Melissa Kraemer, Coastal Planner for the California Coastal Commission (CCC), by phone to request a meeting to discuss the Plan and potential regulatory implications from the CCC's perspective. Ms. Kraemer stated that she would be unavailable to meet until August 2013. As a result, LACO decided to send an informal consultation request letter to Ms. Kraemer, retaining the option to schedule a meeting in August should the need arise.

To more accurately identify permitting requirements for future phases of the project, namely segment-specific planning, design, and construction, LACO sent a letter on June 24, 2013 (copy of sample letter included in Appendix 8), to state and federal resource agencies with presumed jurisdiction over the PAR. This letter was addressed and delivered to the following agencies:

- California Department of Fish & Wildlife (DFW; Michael van Hattem, Environmental Scientist, Eureka Field Office)
- U.S. Army Corps of Engineers (USACE; Kelly Reid, Northern Field Office)
- North Coast Regional Water Quality Control Board (NCRWQCB; Mona Dougherty, Core Regulatory)
- California Coastal Commission (CCC; Melissa Kraemer, Coastal Planner, North Coast District Office)
- U.S. Fish & Wildlife Service (USFWS; Greg Schmidt, Fish and Wildlife Biologist, Arcata Fish and Wildlife Office)

On July 3, 2013, LACO held a phone consultation with Michael van Hattem, DFW Environmental Scientist. The discussion was focused on the potential for the presence of rare and listed plant species, primarily those in native dune mat habitats, as well as considerations for osprey nest sites along the PAR. Mr. van Hattem requested an opportunity for further consultation on-site as part of future design and environmental compliance tasks. A more detailed discussion regarding osprey nest sites is found in Section 3.5.3.

On July 9, 2013, LACO received an e-mail response from Melissa Kraemer at the CCC to our letter dated June 24, 2013. The e-mail reiterated CCC's interest in conducting a meeting to discuss the Plan and confirm regulatory requirements. . We recommend scheduling a meeting with CCC staff in the future and adding any substantive information from that meeting as an addendum to this Plan at a later date. A copy of Ms. Kraemer's e-mail is located in Appendix 8.

LACO held a follow-up interagency meeting at the HBHRCD conference room on Woodley Island on Wednesday, September 11, 2013, to discuss the administrative draft Plan and to receive input regarding regulatory requirements for future road and rail construction. While over twenty-five agency representatives were invited to the meeting, it was only attended by three agency staff members. Agency comments at the meeting included the following:

Diane Ashton, Fishery Biologist, National Marine Fisheries Service
Care should be taken to ensure that the construction of the new or upgraded roadways and rails not introduce more runoff into the existing drainage system, which empties directly into Humboldt Bay. There is already a distinct difference in habitat value in areas near the drainage outfalls, and introduction of runoff

contaminants and larger plumes of fresh water will likely have a detrimental impact to Humboldt Bay aquatic habitats.

Laurie Monarres, Regulatory Project Manager, U.S. Army Corps of Engineers
To address NEPA requirements, an overall project need and purpose must be clearly defined. Project design will have to consider County road standards and AASHTO standards for road construction and stormwater runoff. With regard to Waters of the United States in the project area, the total potential impacts from the entire PAR (under a worst case scenario) and compensatory mitigation will need to be considered for the 404 permit. The USACE 404 nationwide permit requires avoidance and minimization of impacts to Waters of the United States, including jurisdictional wetlands. If more than one-half acre of Waters of the United States is detrimentally impacted by the project, a 404 Individual permit is required. A "Least Environmentally Damaging Practicable Alternative" (LEDPA) analysis must be conducted as part of the 404 Individual permit submittal.

2.4 Development of the Preferred Alternative Route

Based on the cumulative feedback from property owners, transportation agencies, Tribal representatives, and HBHRCD, the PAR was further defined, resulting in the road alignment as presented in this Plan. To support a strategic funding approach for future construction, given the limited public funding available and the competitive nature of the funding, the PAR was separated into seven distinct road segments (see Figure 10, Preferred Alternative Route, current version), which are described as follows:

- Segment 1, approximately 13,176 linear feet, extends along New Navy Base Road from its intersection with State Route 255 to its intersection with Bay Street.
- Segment 2, approximately 2,103 linear feet, is on Bay Street from its intersection with New Navy Base Road, to its intersection with Vance Avenue.
- Segment 3, approximately 4,612 linear feet, extends along Vance Avenue from its intersection with Bay Street to its intersection with Samoa Pulp Lane.
- Segment 4, approximately 1,788 linear feet, extends along Vance Avenue from its intersection with Samoa Pulp Lane to the property line between Samoa Pacific Group (APN 401-031-065) and California Redwood Company (CRC) (APN 401-031-061), where this property line intersects with Vance Avenue.
- Segment 5, approximately 224 linear feet, covers the entirety of Samoa Pulp Lane (formerly known as LP Drive), which connects New Navy Base Road and Vance Avenue.
- Segment 6, approximately 872 linear feet, extends northeast from the northern terminus of Segment 4, leaving Vance Avenue and the adjacent railroad track, and follows the northern boundary of APN 401-031-061 and then 401-031-054 (both owned by CRC) until the Segment ends at the western boundary of APN 401-031-040, owned by HBHRCD.
- Segment 7, approximately 1,645 linear feet, begins at Vance Avenue, approximately 1,380 feet north of the intersection of Vance Avenue and Bay Street. The Segment extends east from Vance Avenue, following the southern boundary of APN 401-112-021 (owned by HBHRCD), approximately midway between the existing fence line to the north and the utility line to the south. Toward the eastern end of the peninsula, the Segment takes a turn northward to tie into the existing paved roadway along the waterfront on APN 401-112-021. The Segment ends where the existing paved road intersects with the eastern boundary of APN 401-112-011 (owned by the State of California).

Segment No.	Length (L.F.)	Roadway
1	13,176	New Navy Base Road - Bay Street to HWY 255
2	2,103	Bay Street - New Navy Base Road to Vance Ave
3	4,612	Vance Ave - Bay Street to Samoa Pulp Lane
4	1,788	Vance Ave - Samoa Pulp Lane to north spur
5	224	Samoa Pulp Lane - New Navy Base Road to Vance Ave
6	872	North Spur off Vance Avenue
7	1,645	South Spur off Vance Avenue

Figure 10. Preferred Alternative Route, current version

Following agreement on the PAR, LACO and its project partners conducted document research and a series of field surveys to further characterize the PAR and determine potential opportunities, constraints, and regulatory considerations; to prepare for development of the 10% engineered design drawings (see Appendix 9); and to prepare preliminary cost estimates for each segment. Detailed results from these activities are found in the following sections. Tables summarizing the preliminary characterization of each road segment resulting from the field surveys and document research, and comparisons between road segments leading to prioritization, are found in Section 8.0.

2.5 Development of a Conceptual Rail Alignment and Feasibility

As road improvements and rail connectivity are both factors contributing to the revitalization of commercial and industrial enterprises on the Samoa Peninsula, this Plan includes a conceptual-level analysis of the feasibility of connecting the peninsula to railroad mainlines in the San Francisco Bay area and the Central Valley of California. The analysis, conducted by BST Associates and Burgel Rail Group, involved two main tasks. In the first task, the Burgel Rail Group developed preliminary cost estimates for constructing a new east-west alignment to the Red Bluff vicinity, as well as for reconstructing the existing North Coast Rail corridor. In the second task, BST Associates estimated the volume of cargo that would be required to cover construction costs if the project were to be self-financed, based on the net revenue generated per ton of cargo.

The analysis concluded that rail service to Humboldt County will require a major financial investment, through either a new east-west rail alignment or through reconstruction of the former north-south line. For this investment to be financially feasible, the rail line would need to generate large volumes of cargo. A rail line to Humboldt County would face strong competition from existing ports, primarily those on the U.S. West Coast. Humboldt County would face several competitive disadvantages relative to these other ports, including the need to cover the cost of constructing the new line, and the lack of a rail distance advantage.

In addition to the lack of rail infrastructure, waterborne exports of large volumes of bulk commodities (or containers) would likely require substantial investments in new cargo terminals. Also, the Humboldt Bay navigation channel is not as deep as channels at most of the competing ports, which would require a substantial investment. The analysis concluded that development of rail service to Humboldt County is likely to be both high cost and high risk.

See Appendix 1 for the *Humboldt Bay Alternative Rail Corridor Concept Level Construction Cost and Revenue Analysis*.

3.0 EXISTING SITE CONDITIONS

3.1 Existing Road Geometrics

Following is a summary of the existing road geometrics for each road segment in the PAR. The road geometrics include total segment length, pavement and shoulder widths, sidewalks, travel lanes and turn pockets, speed limit, and daily traffic volume. This section also includes a description of existing railroad facilities in the project area.

3.1.1 Segment 1: New Navy Base Road - Bay Street to SR 255.

This segment of New Navy Base Road is approximately 13,176 feet long, with an average width of 36.2 feet *including* 2 to 4-foot-wide shoulders on both sides and no sidewalks. This segment is owned by Caltrans and is designated as a Major Collector for functional classification. This segment has one travel lane in each direction, except turning pockets at the intersections. There are no railroad crossings on this segment. The posted speed limit on this segment of New Navy Base Road is 55 mph. The average daily traffic volume (*DTV*) on this segment is 1,560, out of which 45 percent is truck traffic.

3.1.2 Segment 2: Bay Street - New Navy Base Road to Vance Ave

This segment of Bay Street is approximately 2,103 feet long with an average paved width of 30.3 feet, including 2- to 3-foot-wide paved shoulders, and no sidewalks. This segment is owned by the County of Humboldt and designated as a Local Street. There are two railroad crossings on this segment. The posted speed limit on this segment is 35 mph. The average DTV on this segment is 456, out of which 41 percent is truck traffic.


Segment 2, facing west

3.1.3 Segment 3: Vance Ave - Bay Street to Samoa Pulp Lane

This segment of Vance Avenue is approximately 4,612 feet long with an average paved width of 20.6 feet, with no shoulder or sidewalk. This segment is privately owned and gated. There are no railroad crossings on this segment.

3.1.4 Segment 4: Vance Ave - Samoa Pulp Lane to North Spur

This segment of Vance Avenue is approximately 1,788 feet long with an average paved width of 23 feet, with no shoulder or sidewalk. This segment is privately owned.

3.1.5 Segment 5: Samoa Pulp Lane - New Navy Base to Vance Ave

This segment of Samoa Pulp Lane is approximately 224 feet long with an average paved width of 28 feet, with no shoulder or sidewalk. This segment is owned by the County and designated as a Local Street. There is a railroad crossing on this segment.

3.1.6 Segment 6: North Spur off Vance Avenue

This road segment is approximately 872 feet long. 70 to 80 percent of the segment length is paved. However, the paving is from previous industrial land use and not associated with a designated street.

3.1.7 Segment 7: South Spur off Vance Avenue

This road segment is approximately 1,645 feet long, and is undeveloped.

Existing roadway geometry along the PAR is summarized in Table 1.

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Table 1. Existing Road Geometry by Road Segment

Road Design/Geometry Element	Segment 1 New Navy Base Road Bay Street to Highway 255	Segment 2 Bay Street - New Navy Base Road to Vance Ave	Segment 3 Vance Ave - Bay Street to Samoa Pulp Lane	Segment 4 Vance Ave - Samoa Pulp Lane to North Spur	Segment 5 Samoa Pulp Lane - New Navy Base to Vance Ave	Segment 6 North Spur off Vance Avenue	Segment 7 South Spur off Vance Avenue
Daily Traffic Volume (veh/ day)	1,560	613	NA	NA	NA	NA	NA
Posted/Design Speed (mph)	55	35	35	35	35	NA	NA
Length (ft)	13,176	2,103	4,612	1,788	224	872	1,645
Cross Slope (%)	varies (2-5)	varies (2-5)	varies (2-5)	varies (2-5)	varies (2-5)	NA	NA
Medians		none	none	none	none	NA	NA
Sidewalk	none	none	none	none	none	NA	NA
Parking	none	none	none	none	none	NA	NA
Super Elevation	unknown	unknown	unknown	unknown	unknown	NA	NA
Number of Lanes	1 in each direction	1 in each direction	1 in each direction	1 in each direction	1 in each direction	NA	NA
Average Paved Width of the Road (ft)	36	30.3	20.6	23	28	0	0
Shoulder (ft)	4	0 to 3	0 to 2	0 to 2	0 to 2	0	0
Grades	varies , < 5	varies , < 5	varies , < 5	varies , < 5	varies , < 5	NA	NA
Passing Lanes/Turnouts	N	N	N	N	N	NA	NA
ROW (ft)	200	60	60	60		NA	NA
Railroad-Highway Grade Crossing	N	Y	Y	Y	Y	Y	Y
Provision for Utility	Y	Y	Y	Y	Y	Y	Y
Lighting	Y	Y	Y	Y	Y	NA	NA

3.2 Existing Pedestrian/Bicycle Conditions

Pedestrian and bicycle traffic was absent or relatively light during the two-hour site visit performed by LACO staff on April 30, 2013. The pedestrian and bicycle combined flow rates were less than 3 per hour on Segment 1 (New Navy Base Road). No bicycles or pedestrians were observed on Segments 2 to 7 during the site visit. It appears that a lack of pedestrian and bicycle facilities may discourage multimodal transportation on the Samoa Peninsula.

3.3 Accidents/Collision Log

Accident and collision information (1998 to present) in the vicinity of the project was obtained from the California Highway Patrol, Humboldt Area Office (A.E. Jager, Captain. July 9, 2013). The data showed that in the last three years there have been a total of five documented traffic collisions. All five collisions were designated as property damage only; there were zero injury collisions and zero fatalities. Detailed accident log information is presented in Appendix 10 of this report. The accident location descriptions identify the nearest cross street and do not precisely identify the location.

3.4 Intersection Conditions

The PAR contains seven road intersections; six are existing intersections and two are new. All seven intersections are depicted on Figure 11 (Preferred Alternative Route Intersection Map). The sight distances at these intersections were assessed based on the minimum required distances as determined by American Association of State Highway and Transportation Officials (AASHTO) Geometric Design of Highways and Streets Exhibit 9-55. Table 2, below, compares the AASHTO standards to actual sight distances, and shows the average roadway widths at the intersections and speed limits for the Major Roads.

3.4.1 Intersection No. 1: New Navy Base Road and Bay Street

This is a four-way intersection with a stop control on both legs of Bay Street (Minor Road) and free flow on New Navy Base Road (Major Road). The average width of New Navy Base Road is 65.5 in the vicinity of the intersection. There are left- and right-turn pockets on New Navy Base Road for eastbound traffic to Bay Street. The posted speed limit on New Navy Base Road is 55 mph; the posted speed limit on Bay Street is 35 mph. The average width of Bay Street in the vicinity of the intersection is 30 feet. There are no right- or left-turn pockets on Bay Street for traffic turning onto New Navy Base Road. Pedestrian crosswalk markings are not present at this intersection. The posted speed limit on New Navy Base Road is 55 mph, and posted speed limit on Bay Street is 35 mph.

Intersection 1, facing west

3.4.2 Intersection 2: Bay Street and Vance Avenue

This is a four-way intersection with a stop control on both legs of Vance Avenue (Minor Road) and free flow on Bay Street (Major Road). In the vicinity of the intersection the average paved width of Bay Street is 100 feet and the average paved width of Vance Avenue is 70 feet. Pedestrian crosswalk markings are not present at this intersection. There are no right- or left-turn pockets on either street at this intersection.

Table 2. Existing Street Widths, Speed Limits and Minimum Required Sight Distances

Intersection Name	Existing or Proposed	Speed Limit on Major Road (miles/hour)	Minimum Recommended Corner Sight Distance* (feet)	Actual Sight Distance (feet)	Average Roadway Width in the vicinity of the intersection Major Rd./ Minor Rd. (feet)
Intersection No. 1 New Navy Base Road and Bay Street	Existing	55	605	> 605	65.5 / 30
Intersection No. 2 Bay Street and Vance Ave	Existing	35	385	> 385	100 / 70
Intersection No. 3 Vance Avenue and South Spur	Proposed	35	385	> 385	28 / NA
Intersection No. 4 Vance Ave and Private Driveway	Existing	35	385	> 385	NA / NA
Intersection No. 5 Samoa Pulp Lane and Vance Ave	Existing	35	385	> 385	52 / 54
Intersection No. 6 New Navy Base Road and Samoa Pulp Lane	Existing	35	385	> 385	105/143
Intersection No. 7 Vance Ave and Former Arcata Community Recycling Center Drive Way	Existing	35	385	> 385	NA / NA
Intersection No. 8 Vance Ave and North Spur	Proposed	35	385	> 385	23/ NA

* Reference: Caltrans Highway Design Manual, 2008

3.4.3 Intersection No. 3: Vance Avenue and South Spur

Currently this intersection does not exist. The proposed intersection would be a three-way intersection with a stop control at South Spur and free flow on Vance Avenue. The average paved width of Vance Avenue in the vicinity of the proposed intersection is 28 feet.

3.4.4 Intersection No. 4: Vance Avenue and Private Driveway

This is a three-way intersection with no stop controls. The average width of Vance Avenue in the vicinity of the intersection is 21 feet. Pedestrian crosswalk markings are not present.

3.4.5 Intersection No. 5: Samoa Pulp Lane and Vance Avenue

This is a three-way intersection with no stop controls. The average width of Vance Avenue is 54 feet in the vicinity of the intersection. The average paved width of Samoa Pulp Lane is 52 feet at the intersection.

3.4.6 Intersection No. 6: New Navy Base Road and Samoa Pulp Lane

Intersection 6, facing west

This is a four-way intersection with a stop control on the east leg of Samoa Pulp Lane (Minor Road) and free flow on New Navy Base Road (Major Road). Westbound Samoa Pulp Lane is primarily a beach access route. There is no stop control on the west leg of Samoa Pulp Lane at the intersection. The average paved width of New Navy Base Road is 105 feet in the vicinity of the intersection. There are left- and right-turn pockets on New Navy Base Road for traffic turning onto Samoa Pulp Lane. The average paved width of Samoa Pulp Lane in the vicinity of the intersection is 143 feet. There is a right-turn pocket separated by a striped island on the east leg of Samoa Pulp Lane for traffic turning north onto New Navy Base Road. Marked pedestrian crosswalks are not present at this intersection. The posted maximum speed limit on New Navy Base Road is 55 mph; there is no posted speed limit on Samoa Pulp Lane.

3.4.7 Intersection No. 7: Vance Avenue and Former Arcata Community Recycling Center Driveway

This is a four-way intersection with no stop controls. The average width of Vance Avenue in the vicinity of the intersection is 24 feet. Pedestrian crosswalks are not present at this intersection.

3.4.8 Intersection No. 8: Vance Avenue and North Spur

This intersection does not exist. The average paved width of Vance Avenue at the proposed intersection location is 23 feet.

Figure 11. Preferred Alternative Route Intersection Map

3.5 Railroad Facilities

The Samoa Peninsula previously contained a working rail system that transported timber products to and from the mill operations on the peninsula, including the Vance and Hammond lumber mills in the late 1800s and early 1900s. Timber was transported to the mills on the peninsula until 1962, and processed lumber products were transported out of the area via the Northwestern Pacific Railroad line toward the San Francisco Bay area until 1997 (Kellogg, 2013). A railroad mainline runs from the City of Arcata, by way of the western edge of northern Humboldt Bay, to the southern end of the Fairhaven Business Park. This rail line is controlled, either in fee or through easements, by the North Coast Railroad Authority (NCRA). Multiple privately-owned railroad spurs branch off of this mainline to reach destinations of past property uses; the railroad has not been in use since the line through the Eel River valley was impacted by major floods and landslides in 1997 (SunnyFortuna.com, 2013). Figure 12 illustrates the location of a number of the railroad lines on the Samoa Peninsula.

The railroad system on the Samoa Peninsula would need significant investment to repair the railroad base and lines, were it to accommodate rail transport in the future. While a section of the rail line north of the project area (from the Samoa Cookhouse northward approximately two miles to the town of Manila) has been restored to accommodate “speeder car” rides, it appears that most of the remaining rail system would need repair or replacement prior to operation. In addition, there are a number of crossings on the Samoa Peninsula (for example, at Samoa Pulp Lane) and in the vicinity of the City of Arcata that have been paved over; these crossings would need to be redeveloped and appropriate crossing controls established to accommodate safe rail passage.

Date: 11/21/2013 Time: 12:05:28 PM
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Figure 12. Existing Road Ownership and Railroad Map

3.6 Special Studies Results Summaries

To further characterize the PAR for preliminary planning purposes, and to identify opportunities and constraints associated with the PAR layout and future construction, LACO conducted a series of field surveys and site research from existing documents (collectively, special studies). To identify easements and utility alignments along the PAR, LACO worked with Kelly-O'Hern Associates land surveyors, who conducted property boundary surveys, prepared ownership maps, and provided existing survey information for properties along the PAR. As a preliminary railroad alignment was not developed as part of this Plan, special studies were not conducted for a railroad footprint. A suite of railroad-alignment-specific special studies will need to be conducted in the future if a preliminary design is developed and construction is pursued.

Summaries of the special studies for the PAR are included below.

3.6.1 Research and Map Existing Rights-of-Way and Easements

In coordination with Mike O'Hern of Kelly-O'Hern Associates, LACO conducted research into the ownership and easement status of the PAR road segments and adjacent areas, to determine the scope and scale of right-of-way acquisition needed to implement the Plan, and to identify railroad and utility easement-related constraints (see Section 4.0). Mr. O'Hern prepared a property boundary map based on ground survey and records search (see Figure 13). This map identifies the key property owners who are major stakeholders and who served as collaborators during the preparation of the Plan.

Mr. O'Hern also provided a brief memo identifying the ownership and easement status of each PAR road segment. This memo provides guidance on which road segments will require acquisition of rights-of-way by HBHRCD, either through fee title or easement (see Appendix 11). Most notably, Mr. O'Hern's research identified Samoa Pulp Lane as a County-owned roadway (acquired by the County in 2002); the public records readily available to the project team had identified Samoa Pulp Lane as a private road. Ownership status of each road segment in the PAR is illustrated in Figure 12. A summary of ownership and easement status for each PAR segment follows:

- Segment 1: New Navy Base Road is a County-owned and maintained road and will not require right-of-way acquisition.
- Segment 2: Bay Street is a County-owned and maintained road and will not require right-of-way acquisition.
- Segment 3: This portion of Vance Avenue is currently privately owned by California Redwood Company, Pacific Gas & Electric Company, Sequoia Investments X, Freshwater Tissue Company, and HBHRCD. Right-of-way acquisition will be necessary.
- Segment 4: This portion of Vance Avenue is currently owned in fee by Freshwater Tissue Company and California Redwood Company. A 2004 access easement agreement granted to HBHRCD had a continuous-use contingency that may have expired. The legal status of this access easement is undetermined at this time. Right-of-way acquisition will be necessary on any portions of this road segment not under a valid access easement.
- Segment 5: Samoa Pulp Lane, between New Navy Base Road and the west line of the railroad right-of-way owned in fee by NCRA, is owned and maintained by the County. Acquisition of right-of-way across the NCRA right-of-way will be needed.
- Segment 6: The proposed new road segment is located on property owned by California Redwood Company. Right-of-way acquisition will be required.

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- Segment 7: The proposed new road segment is located on property owned by HBHRCD. Right-of-way acquisition will not be required.

During records research, LACO was able to acquire copies of ALTA surveys and other property records from property owners. These documents were very helpful in identifying right-of-way and easement widths, and aided the project team in making modifications to the PAR to avoid or reduce impacts to or from the easements. Access and utility easements on or adjacent to the PAR, identified in the records and maps acquired by LACO, were manually drawn onto the 10% engineered design plan set to identify areas of potential encroachment. These easements are identified in the 10% engineered design plan set by width and use.

3.6.2 Geologic Reconnaissance

LACO conducted a geotechnical-related reconnaissance of the PAR to qualitatively identify potential geologic/geotechnical engineering constraints associated with development of the proposed road segments. Following review of subsurface data from prior explorations by LACO and others in the vicinity of the PAR, and a site visit on May 9, 2013 to observe surface conditions and identify potential geologic/geotechnical engineering constraints, LACO's Certified Engineering Geologist (CEG) prepared a Geotechnical Memorandum. A copy of LACO's report, *Geotechnical Memorandum*, dated July 26, 2013, is located in Appendix 12.

This Memorandum characterizes the geologic and geomorphic setting of the area containing the PAR as geologically-young unconsolidated Quaternary marine shoreline and eolian (dune) deposits susceptible to liquefaction. LACO's review of pertinent documents also revealed that the entire PAR is within a predicted tsunami inundation area (LACO, 2013).

The site observations and review of soil profile logs from prior subsurface explorations in the vicinity of the PAR revealed that the area consists of loose silty sands and loose poorly-graded fine sands, with topsoils and organic rich soils less than 12 inches or nonexistent. Much of the landscape within and around the PAR has been previously disturbed, with much of the area along the Humboldt Bay waterfront consisting of fill soils consisting of woody debris, building rubble, and mixed soils. Although emergent groundwater was not encountered during the site reconnaissance, prior groundwater reports from the vicinity of the PAR reveal that groundwater is generally located within 5 feet of the ground surface in low-lying areas.

In the Geotechnical Memorandum LACO's CEG identified six geologic and geotechnical constraints for the project site:

- Undocumented fill soils that will require excavation and re-compaction, replacement with imported structural fill, or both. The undocumented fill soils are anticipated to be ubiquitous within the project area with the thickest and poorest quality fill anticipated beneath the eastern end of Segment 6 and along the entire length of Segment 7.
- Groundwater within 5 feet of the project area ground surface in low lying areas.
- Soft, saturated, fine-grain native subgrade soils with anticipated high compressibility (large settlement potential), low bearing capacity, and high liquefaction potential, beneath the eastern end of Segments 6 and 7.
- Buried utilities throughout the project area.
- Remnants of old foundations associated with prior development in the vicinity of Segment 6.
- Potentially contaminated soil (and groundwater) throughout the project area that will require assessment, and possible special handling and disposal, depending on the extent and type of soil and groundwater disturbance during planned road improvements.

Figure 13. Property Boundary Map

The conducted geotechnical-related reconnaissance is only a preliminary assessment of site conditions based on visual observations of surface conditions and review of readily available soils data. Additional geotechnical and/or environmental site exploration are recommended prior to segment-specific design or construction. Recommended additional studies include the following:

- Subsurface exploration along each road segment that will be improved, to further characterize undocumented fill, native subgrade soils, and groundwater conditions, and to collect soil samples for laboratory testing such as Resistance (R-) value for pavement design recommendations, and compressibility for earthwork recommendations.
- Geophysical survey of the eastern end of Segment 6 and Segment 7 to help determine the probable location and depths of undocumented buried utilities, old foundations, and other debris (concrete/wood).
- Assessment and/or characterization of soil and groundwater within the project area and/or proposed road segments that will be improved as required by lenders and/or governing agencies. Potentially hazardous materials that are identified may require special handling and disposal during project construction.

3.6.3 Preliminary Biological Evaluation

The PAR is located in the California coastal zone, in an area known to contain federally-endangered plant species including Humboldt Bay wallflower (*Erysimum menziesii*) and beach layia (*Layia carnosa*), as well as habitats classified by the County of Humboldt and California Coastal Commission (CCC) as Environmentally Sensitive Habitat Areas (ESHAs). These ESHAs typically comprise the following:

1. Wetlands and estuaries, including Humboldt Bay and the mouth of the Mad River
2. Vegetated dunes along the North Spit to the Mad River and along the South Spit
3. Rivers, creeks, gulches, sloughs, and associated riparian habitats
4. Critical habitats for rare and endangered species listed on state or federal lists (County of Humboldt, 1995)

To identify potential biological constraints and impacts resulting from potential future road construction along the PAR, a preliminary biological evaluation was conducted by LACO's Senior Environmental Scientist. A copy of LACO's report, *Technical Memorandum: Preliminary Biological Evaluation,* dated July 23, 2013, is located in Appendix 13.

The field survey associated with this evaluation was conducted on May 9, 2013, along 2.2 miles of the 4.62-mile PAR. The survey took place along the shoulders of the PAR, with the exception of New Navy Base Road, and extended approximately 15 feet from the edge of pavement. For the road segments that are proposed new construction, the survey took place along the proposed footprint, with a 20-foot buffer on either side. The field survey did not include New Navy Base Road because any enhancement of this portion of the PAR is not expected to impact the vegetated shoulders or beyond.

Dark eyed gilia (photo courtesy Friends of the Dunes)

While the majority of the plant species encountered were ruderal (weedy) herbaceous species, a few areas contained willow hollow habitats, seasonal freshwater wetlands, beach grass habitats and, while relatively scarce, native dune mat habitats. Of particular note is the presence of dark-eyed gilia (*Gilia millefoliata*) in the proposed footprint along the

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western third of the South Spur (Segment 7). Dark-eyed gilia is listed in the California Native Plant Society's List 1B.2 (rare, threatened, or endangered in California and elsewhere; fairly endangered in California). Although the species is not on the state or federal threatened or endangered list, it is considered a California Species of Special Concern, and would require special consideration prior to any proposed habitat disturbance in Segment 7 or other road segments where it may be observed. The presence of this and potentially other sensitive species should be taken into consideration during future road segment-specific design and environmental compliance tasks.

Dune mat habitats, willow hollow habitats, and seasonal freshwater wetland habitats encountered in the field survey would likely be considered ESHA by the County of Humboldt and the CCC, the latter of which has primary or appeal jurisdiction over the project area, imposing requirements for adequate setbacks or mitigations for project-related impacts. During the planning phase for segment-specific road construction, a seasonally-appropriate biological field survey will need to be conducted to identify sensitive species and habitats within the proposed construction footprint, and to identify mitigations that would avoid or minimize impacts to those resources.

Although not incorporated into this preliminary biological evaluation, the presence of osprey (*Pandion haliaetus*) was noted across the PAR. The osprey is a medium-sized bird-of-prey that nests on platforms of sticks at the top of large snags, dead-topped trees, on cliffs, or on human-made structures. During field visits to the project area, active osprey nests were observed atop power and light poles adjacent to the PAR. The osprey is listed as a California Species of Special Concern and California Department of Fish & Wildlife (DFW) Code Section 3503.5 establishes protections for osprey nest sites:

> *It is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto*. (DFW, 2013).

Active osprey nest on Segment 3

Per a phone consultation with Michael van Hattem, DFW Environmental Scientist, this protection applies to both active and inactive nests. During subsequent segment-specific planning phases, an inventory of osprey nests will be required. Should it be determined that the removal of an osprey nest (through the removal of a power pole or other man-made structure) be necessary for road segment construction, a plan for replacement of the nesting site will be required. The replacement nesting site would consist of a pole approximately equal in height to the one removed, with a platform on top providing a place for the osprey to build a new stick nest. The replacement pole should be located away from high-impact areas to reduce annoyance to nesting and fledging osprey. The nest removal and replacement can only take place before or after the osprey nesting season (approximately March through August, though this can vary by nest site). In addition, though the ospreys nesting on the Samoa Peninsula are quite acclimated to heavy industrial activity and noise, the construction phase of any route that is within the vicinity of an osprey nest should be timed to reduce or avoid annoyance during the nesting season (van Hattem, 2013).

3.6.4 Preliminary Hydraulic Analysis

To estimate the quantity and potential impacts of stormwater runoff before and after the proposed road improvements, LACO performed a preliminary hydraulic analysis for the PAR. A copy of LACO's report, *Technical Memorandum: Preliminary Hydraulic Analysis*, dated July 24, 2013, is located in Appendix 14.

This analysis estimates the amount of stormwater runoff from the project roadways before and after improvements, and estimates the detention volume required for the project to meet Humboldt County standards. While the size, location, and condition of existing drainage inlets, culverts, and outlets in the project area have not all been evaluated, it is anticipated that construction of the PAR will not significantly modify the existing drainage patterns, and will not result in significant changes in runoff flow rates.
The PAR follows portions of existing roads or impermeable surfaces and open or permeable surfaces. The existing paved width of the PAR varies from 0 to 30 feet. PAR roads will need to be constructed or improved to a 32-foot average paved width for future use. In total, construction of the PAR would add approximately 3 acres of impermeable surface.

The Humboldt County Department of Public Works, Land Use Division (County) has developed (though not yet adopted) standards which require that stormwater be retained within a new development such that peak runoff from the post-development 100-year frequency storm does not exceed peak runoff from the pre-development 2-year frequency storm. LACO calculated peak runoff from the PAR using the Rational Method, widely used for estimating the design storm peak runoff from areas less than 200 acres. This calculation can be written as follows:

$$Q = C * i * A$$

where:
Q: Peak rate of runoff in cubic feet per second
C: Coefficient of runoff
i: Average intensity of rainfall (inches per hour)
A: Drainage area (acres)

Based on this calculation, it was estimated that approximately 17,800 cubic feet (cu.ft.) of new detention volume would be needed to meet County standards. LACO recommends the construction of bioswales, a Low Impact Development (LID) technique to manage stormwater. This technique is preferred by the Regional Water Quality Control Board (RWQCB) and the California Department of Fish and Wildlife (DFW), over the more traditional, underground stormwater management techniques.

Based on the preliminary hydraulic analysis, LACO concludes that the resulting increase in stormwater runoff from the future construction of the PAR can be mitigated to County standards by the construction of bioswales. The proposed storm drain system for the project uses a combination of bioswales, control structures, and rock check dams to attenuate peak flows.

During final design of each road segment of the PAR, the existing drainage system (inlets, culverts, and outlets) should be evaluated and surveyed to determine whether repairs or replacements are required.

Example of a bioswale (photo courtesy Greenroofs.com)

3.6.5 Preliminary Historical and Archaeological Resource Review

As this Plan is limited to identifying a Preferred Alternative Route and establishing a prioritization for future segment-specific design, planning, and construction, the preliminary historical and archaeological resource review was limited to records research and consultation with local Tribal Historic Preservation Officers to assist in this process. Archaeological field surveys were not conducted at this stage of project development.

On April 8, 2013, LACO submitted a records search request to the Northwest Information Center (NWIC) at Sonoma State University, which is a part of the California Historical Resources Information System. The NWIC letter response identified five recorded archaeological sites within the Area of Potential Effect (APE), and determined that there is a "high possibility of identifying Native American archaeological resources and a high possibility of identifying historic-period archaeological resources in the APE" (see Appendix 15 for LACO's records search request letter and NWIC's response letter). Following receipt of the NWIC response letter, LACO sent an informal consultation request letter to each of the following Historic Preservation Officers:

- Wiyot Tribe THPO (Position vacant at the time of letter delivery. Subsequently, Tom Torma was hired as the Wiyot THPO)
- Janet P. Eidsness, THPO for the Blue Lake Rancheria Tribe of Indians
- Erika Collins, THPO for the Bear River Band of the Rohnerville Rancheria
- Carol Roland-Nawi, Ph. D, California State Historic Preservation Officer (SHPO)

A sample letter is included in Appendix 6.

A summary of the cultural resources consultations identified above was delivered to Tim Keefe, Caltrans District 1 Heritage Resources Coordinator, in a letter dated June 4, 2013. During the weeks following LACO's delivery of the THPO/SHPO letters, LACO received a meeting request from THPO for the Blue Lake Rancheria Tribe of Indians, Janet Eidsness.

LACO staff met with Ms. Eidsness, Ms. Collins, and Mr. Torma on June 26, 2013, to discuss current cultural resource knowledge for the project area and receive recommendations for appropriate site reconnaissance procedures prior to road segment enhancement construction activities. The THPOs identified known existing cultural sites identified by L. Loud in his 1918 publication, *Ethnogeography and Archaeology of the Wiyot Territory*, and discussed whether there was risk of disrupting the cultural sites as a result of construction and implementation of the PAR. It was agreed that, due to the predominance of Wiyot cultural sites along the Humboldt Bay waterfront of the Samoa Peninsula, the new spurs (segments 6 and 7) would prove the most likely locations for interaction with cultural resources sites.

The THPOs also explicitly requested local tribal involvement in the pre-planning stages for any cultural resources field surveys to be conducted as part of future stages of the project, leading to construction. They requested the opportunity to provide input with the cultural resources consultant conducting the future field surveys, to assist with determining the method of collection based on known cultural resources data and site conditions. Preparation of a work plan for inadvertent discovery during project construction was also discussed, with a recommendation that this work plan would be provided to construction contractors prior to construction of any road segment.

LACO staff followed up the June 26 meeting with a short letter, dated June 28, 2013, confirming the points and recommendations discussed. A copy of the letter and written THPO responses are included in Appendix 7.

4.0 OPPORTUNITIES AND CONSTRAINTS

4.1 Interaction with Railroad Alignment

Historic land uses in the project area often relied on rail for transport of goods and people. Following the reduction of lumber processing and other activities on the Samoa Peninsula, the rail system fell into disuse, and the remnant tracks are in varied stages of disrepair. According to North Coast Railroad Authority (NCRA), the owner of the main railroad on the Samoa Peninsula, the rail line is non-operational but not abandoned (McCorkle, 2013). A stated goal of the Plan is to preserve a potentially viable rail system in case rail transport becomes a feasible option in the future. For this reason, identification and acknowledgement of the existing rail infrastructure is key. The following sections identify interactions (crossings or encroachments) with the existing railroad right-of-way, currently owned in fee or under easement by NCRA. The type of control (fee title or easement) does not greatly affect the requirements for negotiation with NCRA and impact mitigation for railroad crossings or encroachments:

4.1.1 Segment 2: Bay Street - New Navy Base Road to Vance Ave

Railroad crossing on Segment 2

Segment 2 has two un-signaled railroad crossings near stations 7+00 and 9+00 (the latter at a skew). These crossings are within the 50-foot railroad rights-of-way. This section of rail connects the Fairhaven Business Park with the former LP Mill site, now owned by HBHRCD.

4.1.2 Segment 3: Vance Ave - Bay Street to Samoa Pulp Lane

Near station 29+00, the 50-foot railroad right-of-way overlaps with the western edge of the proposed right-of-way of Segment 3. This minor encroachment (a matter of five feet or less) continues to the intersection of Segment 3 and Segment 5.

4.1.3 Segment 4: Vance Ave - Samoa Pulp Lane to North Spur

Parallel railroad track adjacent to Segment 4

The 50-foot railroad right-of-way overlaps with the western edge of the proposed right-of-way of Segment 4 at the intersection of Segment 4 and Segment 5. This minor encroachment continues northward along the western edge of Segment 4, where the encroachment into the railroad right of way between station 55+00 and the railroad crossing at station 61+50 grows more pronounced as the railroad splits and forms two parallel tracks. The two parallel railroad tracks cross the road segment at a skew near station 61+50.

4.1.4 Segment 5: Samoa Pulp Lane - New Navy Base to Vance Ave

The 50-foot railroad right-of-way crosses Segment 5 at station 1+50. The crossing is un-signaled. The pavement covering the rails would need to be removed and a crossing control installed prior to railroad operation.

4.1.5 Segment 6: North Spur off Vance Avenue

Parallel railroad tracks within a 50-foot railroad right-of-way cross the proposed Segment 6 right-of-way near station 3+50.

4.1.6 Segment 7: South Spur off Vance Avenue

Private railroad tracks overlap the proposed Segment 7 right-of-way near station 15+00. This is a private spur track that connects with the NCRA mainline on Segment 4.

4.2 Interaction with Utility Alignments

Using PG&E maps and other property records (see Section 3.5.1), the major utility easement alignments have been located and mapped (see Appendix 9, 10% engineered design plan set). The summary in this section is preliminary in nature and does not identify all utility crossings or alignments within, or in the vicinity of, the road segments. A formal survey prior to advanced design or construction will be required. Utility encroachments by road segment, based on proposed roadway geometrics (see Section 5.5), are described below.

During future road construction phases an opportunity exists to connect a new looped water system for serving waterfront parcels to the Humboldt Bay Municipal Water District (HBMWD) main line which runs down roughly the center of the Samoa Peninsula. This looped system could run from the HBMWD main line crossing on Bay Street (Segment 2) eastward, then northward along Vance Avenue (Segments 3 &4), to reconnect with the HBMWD main line on Samoa Pulp Lane (Segment 5). A distribution line could also extend northward along Segment 4 to a stub-out on the North Spur (Segment 6) to support future waterfront development. Another connection along the South Spur Alignment (Segment 7) would stub out at the end of Segment 7 to support waterfront development near Redwood Marine Berth 2. As both domestic and industrial (non-treated) HBMWD water lines run in close proximity to each other down the Samoa Peninsula, either or both water supply lines could be run along the road segment alignments during future road construction phases to support future development.

The Samoa Peninsula does not currently contain a municipal sewer system, nor is one supported by current demand or projected development. However, future road design and construction phases could include an evaluation of sewer collection and pipeline system integration into the future road segment alignments.

During the construction of each road segment it may be feasible to replace the overhead electrical utility lines with underground conduits. A roadbed utility easement could potentially include electrical; gas, and water lines; fiber-optic cable; and other utilities, as needed. Efficient application of utility upgrades within the project area will require close coordination with future developments and the potential resurrection of the railroad.

4.2.1 Segment 2: Bay Street - New Navy Base Road to Vance Ave

Segment 2 contains an existing water line crossing within a 30-foot easement granted to the Humboldt Bay Municipal Water District. The waterline intersects with Segment 2 near station 4+95, and follows the roadway westerly for approximately 380 feet, where it crosses the remainder of the roadway and continues south. A row of existing joint utility poles are located within the road right-of-way. Based on advanced road segment design, these utility poles may need to be realigned to accommodate construction of Segment 2 to AASHTO standards.

4.2.2 Segment 3: Vance Ave - Bay Street to Samoa Pulp Lane

A 20-foot-wide PG&E gas line easement is located on the western side of Segment 3, with evidence of a gas line crossing near station 5+00. An 80-foot PG&E power line easement crosses Segment 3 at station 6+00; the eastern boundary of the easement intersects with the road segment at station 23+00. A line of joint utility poles is located directly adjacent to the existing paved roadway on both the western and eastern sides of Segment 3. This road segment is highly constrained by the existing utility poles and construction of this road segment to AASHTO standards will require relocation of some or all of the existing utility poles.

Utility poles lining both sides of Segment 3

4.2.3 Segment 4: Vance Ave - Samoa Pulp Lane to North Spur

A number of joint utility poles are located along this road segment. Widening the paved roadway to AASHTO standards will likely require relocation or removal of some of these utility poles.

4.2.4 Segment 5: Samoa Pulp Lane - New Navy Base to Vance Ave

A 50-foot HBMWD water line easement crosses Segment 5. This crossing is not expected to significantly restrict or impact development of Segment 5 to AASHTO standards.

4.2.5 Segment 6: North Spur off Vance Avenue

There are a number of joint utility poles in the vicinity of Segment 6. As this is a conceptual-level design, the alignment of Segment 6 can likely be modified to circumvent some or all of the existing poles and utility lines, thereby avoiding the need to relocate or remove existing poles.

4.2.6 Segment 7: South Spur off Vance Avenue

A utility line easement, granted to PG&E, is located on the south side of the proposed Segment 7 right-of-way. There appears to be ample room to accommodate the proposed road segment without impacting the existing overhead utility line. Near station 14+00, a pair of outfall or intake pipes cross Segment 7. These pipes do not appear to be working at this time (one has a large tear in the pipe lining), and may be able to be removed to avoid conflict with the proposed road segment.

4.3 Topographic and Physical Limitations

LACO Associates reviewed existing available topographic data, NOAA Coastal LiDAR data, site photos, and aerial imagery to identify areas where topographic diversity or existing non-utility infrastructure may pose a constraint to construction of road segments to their proposed dimensions.

4.3.1 Segment 2: Bay Street - New Navy Base Road to Vance Ave

The southern edge of the road segment has a significant willow hollow located near station 15+00, and a small hill that encroaches into the right-of-way between station 1+50 and 4+50.

Willow hollow on south side of Segment 2

4.3.2 Segment 3: Vance Ave - Bay Street to Samoa Pulp Lane

A gate is located at the southern end of Segment 3, controlled by CRC. From station 4+50 to 7+00, a willow hollow is located on the western side of the road segment. A minor rise in elevation exists along the eastern side of the road segment up to the proposed intersection with Segment 7 (station 15+00), which may require additional excavation to accommodate widening of the paved roadway. Past station 15+00, the rise on the eastern side of the roadway is more pronounced; this may interfere with road widening. In addition, a more pronounced downslope begins on the western side of the roadway at this same location, which will likely require importation of engineered fill to support the widened roadway. These pronounced slopes taper off at approximately station 37+00, where the shoulders on each side of the existing paved road are relatively flat.

4.3.3 Segment 4: Vance Ave - Samoa Pulp Lane to North Spur

The shoulders along Segment 4 are relatively flat and do not pose any topographic constraints to road widening. A small outbuilding is located next to the joint utility pole near station 60+50; this structure may not currently be in use.

4.3.4 Segment 5: Samoa Pulp Lane - New Navy Base to Vance Ave

The road shoulders on both sides of Segment 5 drop off into depressions immediately outside the existing curbs. Widening the paved roadway will likely require importation of engineered fill. A fence meets the edge of the paved road on both sides of Segment 5 near station 1+80, and a former guard house and associated automated gate infrastructure is located on the north side of the road.

4.3.5 Segment 6: North Spur off Vance Avenue

Between stations 3+50 and 5+00, the proposed footprint for Segment 6 drops 10 feet. The road segment crosses old foundations from abandoned and torn down buildings from previous uses of the property. The remainder of the road segment footprint crosses a paved landscape from previous use of the property as a log yard. Remnants of structure foundations and old infrastructure dot the area.

4.3.6 Segment 7: South Spur off Vance Avenue

Following a slight incline from Segment 3, the majority of Segment 7 is relatively flat. The road segment crosses a sandy substrate made up of dredge spoils and native dune mat. A manmade berm, on which a fence has been installed, is located on the north side of the road segment. At approximately station 13+50, Segment 7 crosses this berm to meet up with the existing paved waterfront road.

Segment 7, facing west (note berm and fence on right side of photo)

4.4 Functional Classification, National Highway System Designation, and Road Ownership

Roadway functional classification, National Highway System designation, and road ownership all affect eligibility for state and federal road construction and rehabilitation funding. This section provides an explanation of each of these designations, the process to change the respective designations, and the current designations for roads on the Samoa Peninsula that are within or are connected to the PAR.

4.4.1 Functional Classification

Streets and highways are grouped into functional classifications, or systems, according to the character of service they are intended to provide. Basic to this process is the recognition that individual roads and streets do not serve travel independently in any major way. Rather, most travel involves movement through a network of roads that vary in their ability to move vehicles (mobility) and their ability to access individual properties (land access). Functional classification defines the nature of this channelization process by defining the part that any particular road or street should play in serving the flow of trips through a highway network.

Following are the functional classification categories, beginning with those that provide the greatest mobility and the lowest land access (Interstate) to those that provide the lowest mobility and the greatest land access (Local):

- Interstate
- Other Freeways or Expressways
- Other Principal Arterial
- Minor Arterial
- Major Collector
- Minor Collector
- Local

Functional classification is used in determining federal and state funding to maintain roads. Typically, having a functional classification of Major Collector or higher increases eligibility for Federal Aid secondary highway funding (Buck, 2013). A roadway must be under public control (fee title or easement) in order to receive a functional classification.

The process to request a change in functional classification requires the following steps:

1. Prepare a Functional Classification Change Request Form and a marked-up California Road System map showing the proposed changes.
2. The local agency responsible for the road must adopt a resolution in support of the proposed change and prepare a statement of justification.
3. The change request form, map, and resolution are forwarded to the Regional Planning Agency (in this case, the Humboldt County Association of Governments [HCAOG]), who will prepare a concurrence letter.
4. The entire package is sent to the Caltrans District Coordinator for forwarding to the Federal Highway Administration (FHWA) for approval.

Appendix 5 includes a flowchart of the functional classification designation process.

4.4.2 National Highway System Designation

The National Highway System (NHS) consists of roadways important to the nation's economy, defense, and mobility. The NHS includes the following subsystems of roadways (note that a specific highway route may be on more than one subsystem):

- Interstate: The Interstate System of highways retains its separate identity within the NHS.
- Other Principal Arterials: These are highways in rural and urban areas which provide access between an arterial and a major port, airport, public transportation facility, or other intermodal transportation facility.
- Strategic Highway Network: This is a network of highways which are important to the United States' strategic defense policy and which provide defense access, continuity, and emergency capabilities for defense purposes.
- Major Strategic Highway Network Connectors: These are highways which provide access between major military installations and highways which are part of the Strategic Highway Network.
- Intermodal Connectors: These highways provide access between major intermodal facilities and the other four subsystems making up the National Highway System.

Roadways included in the NHS are subject to design and maintenance standards established by the American Association of State Highway and Transportation Officials (AASHTO), which may be more demanding, and therefore more expensive, than standards required by the County or Caltrans. In addition to other Federal-aid transportation funds, NHS roads are also eligible, on a competitive basis, for the National Highway Performance Program, a source of funds not available for non-NHS roads.

US Highway 101 in Eureka is part of the NHS

The process to obtain NHS designation requires a statement of justification and a request for modification, submitted to Caltrans for concurrence, and then forwarded to FHWA for approval. The FHWA provides the following guidance criteria for ports served by roads being considered for inclusion in the NHS.

1. Terminals that handle more than 50,000 TEUs (a volumetric measure of containerized cargo which stands for Twenty-foot Equivalent Units) per year, or other units measured that would convert to more than 100 trucks per day in each direction. Trucks are defined as large single-unit trucks or combination vehicles handling freight.
2. Bulk commodity terminals that handle more than 500,000 tons per year by highway or 100 trucks per day in each direction on the principal connecting route. If no individual terminal handles this amount of freight, but a cluster of terminals in close proximity to each other does, then the cluster of terminals could be interpreted as meeting the criteria. In such cases, the connecting route might terminate at a point where the traffic to several terminals begins to separate.
3. Passenger terminals that handle more than 250,000 passengers per year or at least 1,000 passengers per day for at least 90 days during the year.

In addition to the above guidance criteria, new segments to the NHS must be contiguous to the existing NHS.

4.4.3 Road Ownership

State and federal transportation funding for construction or rehabilitation is typically limited to publicly-controlled roads. Roads within the PAR are under various ownerships: State Route 255 is owned and maintained by the State of California; New Navy Base Road, Bay Street, and Samoa Pulp Lane are owned and maintained by the County; and Vance Avenue is primarily privately owned and maintained. To establish eligibility for public funding for road construction, enhancement, or rehabilitation, the entire PAR must be under public control.

Humboldt County has adopted a policy under which they will only accept additional roads into their maintained roadway system if the roadway provides through access for the benefit of the public, or if a reliable source of maintenance funding is established for the road. In either case, the roadway would first have to be constructed or improved to Humboldt County Standards. Humboldt County Public Works Director, Tom Mattson, indicated that his office would likely not recommend the County accept any new roads on the Samoa Peninsula into their system without a secure source of maintenance funding (Mattson, 2013). Possible sources of funding for road maintenance could include a maintenance assessment district, a freight fee, or a harbor port fee.

As an alternative, HBHRCD has the administrative authority from Caltrans, as a local agency, to receive state and federal transportation funds for road construction and rehabilitation directly from state or federal programs, rather than through the County of Humboldt. HBHRCD's control, construction, and maintenance of the road segments not already owned by the County (including Vance Avenue, North Spur, and South Spur) is authorized in Section 19 of Article 2 of HBHRCD's enabling charter which states the following:

> *The district shall improve the Humboldt Bay Harbor for navigation and commerce through maintenance and construction of channels, shipways, berths, anchorage places, turning basins, breakwaters, bulkheads, wharves, processing plants, warehouses, roads, spur tracks or beltline railways, and any other work that is deemed necessary that would not otherwise be accomplished by other public or private agencies*. (State of California, 1970)

4.4.4 Current Status of Road Segments

Table 3 lists the current ownership, functional classification, and NHS status of the various roads that provide access to industrial waterfront parcels on the Samoa Peninsula.

Table 3. Current Ownership, Functional Classification, and NHS Status of Samoa Peninsula Roads.

Name	Ownership	Functional Classification	National Highway System
Highway 255	State of California	Minor Arterial	No. Connects to U.S. Highway 101, which is part of the NHS.
New Navy Base Road	Humboldt County	Major Collector	No
Samoa Pulp Lane	Humboldt County	Local	No
Cookhouse Road	Humboldt County	Local	No
Bay Street from New Navy Base Road to Vance Avenue	Humboldt County	Local	No
Vance Avenue South of Cookhouse Road	Private, various parties, with private easements	Not yet classified	No
North Spur off Vance Avenue	Private – California Redwood Company	Not applicable; not yet constructed	No
South Spur off Vance Avenue	HBHRCD	Not applicable; not yet constructed	No

As indicated in Section 4.4.3, to be eligible for federal or state transportation funds, a road must be owned either in fee or under easement, and maintained, by a public agency. To meet this condition, a public agency would have to acquire control of currently privately-owned Vance Avenue and the north and south spurs off Vance Avenue. Unlimited public access is not necessarily required; adjacent to a port facility, for example, public access may be restricted for security reasons. In fact, security at international ports is required.

Vance Avenue (Segments 3 & 4) is privately-owned

To become eligible for the greatest number of transportation funding sources, the roadways in the PAR should be functionally classified as Major Collectors, at a minimum, and should be added to the NHS. Change of the functional classification of County-owned roads will require the County's approval and HCAOG's concurrence. Roads that are currently private would first have to be acquired by a public agency (either Humboldt County or HBHRCD), then undergo the functional classification designation process.

None of the roads on the Samoa Peninsula, including SR 255, are currently in the NHS. In order to add the roads to the NHS, both Humboldt County and Caltrans would have to approve the change to the roads under their respective ownerships. NHS designation for Vance Avenue, North Spur, and South Spur could be requested prior to or following construction of the roadways. However, if the NHS designation request for the North Spur and South Spur is made prior to their construction, they would not be included in the NHS network until road construction is complete. In addition, although it is not in the project area, SR 255 would have to be added to the NHS in order to provide a contiguous connection to the existing NHS (U.S. Highway 101 in Eureka).

5.0 PREFERRED ALTERNATIVE ROUTE PROPOSED CONDITIONS

In this section we discuss the anticipated future build-out traffic demand and identify the proposed roadway geometrics that will accommodate traffic levels and meet applicable standards. We also evaluate the potential for a railroad loop track off of the existing main line to complement a potential future reestablishment of rail-based freight transport; this railroad loop track is a conceptual-level layout for the purposes of this Plan. The railroad loop track would connect the main line with the Humboldt Bay waterfront parcels within the project area, providing a link between shipping terminals and rail transport facilities.

5.1 Volume of Roadway Traffic

The PAR study area comprises approximately 580 acres, and includes approximately 35 Assessor's Parcels across eight ownerships.

The volume of traffic (in vehicle trips) generated by the existing land uses in the vicinity of the PAR were calculated using Trip Generation, 7th Edition, Institute of Transportation Engineers (ITE), 2003. This publication is a standard reference used by jurisdictions throughout the country, and is based on actual trip generation studies performed at numerous locations in areas of varied population. A vehicle trip is defined as a single or one-direction vehicle movement with either the origin or the destination inside the study area.

Trip generation projections used for determining transportation impacts resulting from the project are based on land use designations from the currently adopted Humboldt County General Plan (1984). The County is currently updating its General Plan, but no changes to General Plan land use designations for the parcels within the study area are proposed as part of the update (County General Plan Update WebGIS as of June 4, 2013). The land use designations for the study area and vicinity are depicted in Figure 14. For the purposes of the vehicle trip projections, it was assumed that the Industrial General (MG) and Industrial/Coastal-Dependent (MC) General Plan land use designations are best represented by the "General Light Industrial" land use (ITE LU #110); existing loading/unloading facilities are best represented by "Waterport/Marine Terminal" (ITE LU #010); and existing residential single-family units are best represented by the "Single-Family Detached Housing" land use (ITE LU #210).

Due to numerous site constraints, including sensitive biological habitats, culturally-significant areas, and regulatory setbacks, the calculated area of each land use type was reduced to reflect a reduction in build-out projections for the Samoa Peninsula. These constraints were identified based on LACO's familiarity with the built and natural environments and land ownership patterns on the Samoa Peninsula, and recent determinations regarding development in the coastal zone. LACO's Senior Environmental Scientist, Gary Lester, reviewed the following documents for location of sensitive biological areas on the Samoa Peninsula:

- Duebendorfer, Tom. 1992. *Vegetation Classification, Rare Plant Analysis, Impacts Restoration, and Habitat Management Strategies*. Humboldt County Planning Department.
- US Fish & Wildlife Service. Accessed 2013. National Wetlands Inventory. http://www.fws.gov/wetlands/wetlands-mapper.html
- Humboldt County GIS. Accessed 2013. Queried for Natural Resources and Hazards. http://gis.co.humboldt.ca.us/Freeance/Client/PublicAccess1/index.html?appconfig=podgis4

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The sensitive biological areas identified through the document review were hand-drawn onto a GIS map. To reflect standard regulatory protections on such habitats (which included willow hollows, freshwater marshes, and brackish marshes), a 100-foot buffer was placed around each sensitive biological area polygon. The area of each buffered sensitive biological area polygon was then subtracted from the base General Plan land use layer.

The area comprising the City of Eureka's Samoa Field Airport (approximately 288 acres near the southern end of the Samoa Peninsula) was also removed from consideration in trip generation calculations. While the airport property is designated as Industrial/Coastal Dependent, LACO does not feel that build-out of the airport property for such uses is likely within the life of the project (approximately 20 years), and was therefore removed from inclusion in vehicle trip projections for areas designated Industrial/Coastal Dependent land use.

To determine the trip generation figures for proposed roads, the study area was divided into four zones. Land use, acreage, and trip generation information for each zone is shown in Table 4. It is assumed that vehicular trips generated from Zone 1 will use existing Cookhouse Road; vehicular trips from Zone 2 will use existing Samoa Pulp Lane; vehicular trips from Zone 3 will use existing Bay Street; and vehicular trips from Zone 4 will use the existing Simpson Private Road, Lincoln Avenue, and other internal private roads to access New Navy Base Road. The vehicular trips from the Samoa Town Master Plan (STMP) project area are not shown in Table 4; however, for Level of Service (LOS) analysis at the project intersections, STMP project trips were included. LOS is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, LOS A represents free flow conditions and LOS F represents forced flow or breakdown conditions. The LOS designation is measured by the level of approach or control delay for vehicles at the intersection.

Following removal of the Samoa Field Airport, Samoa Town Master Plan, and sensitive biological areas from the available land base, trip generation and distribution were calculated for three scenarios:

- Scenario One assumes that 100 percent of the unused Industrial General (MG) and Industrial/Coastal-Dependent (MC) land use area will be developed in the next 20 years
- Scenario Two assumes that only 50 percent of the unused Industrial General (MG) and Industrial/Coastal-Dependent (MC) land use area will be developed in the next 20 years
- Scenario Three assumes that only 10 percent of the unused Industrial General (MG) and Industrial/Coastal-Dependent (MC) land use area will be developed in the next 20 years

These figures are higher than the current County growth rate (<1% per year) and anticipated traffic growth rates in the City of Eureka (1.4% per year). After consultation with HBHRCD and the project team, it was decided to use Scenario Three in calculations for LOS and delays at the project intersections.

A traffic impact analysis for Scenario Three is included in the memorandum prepared by Whitlock & Weinberger Transportation (W-Trans); the memorandum is included as Appendix 16. The analysis included traffic evaluation and assessment of the five key intersections listed below:

- New Navy Base Road/Samoa Pulp Lane
- New Navy Base Road/Cookhouse Road
- New Navy Base Road/SR 255
- SR 255/4th Street (City of Eureka)
- SR255/5th Street (City of Eureka)

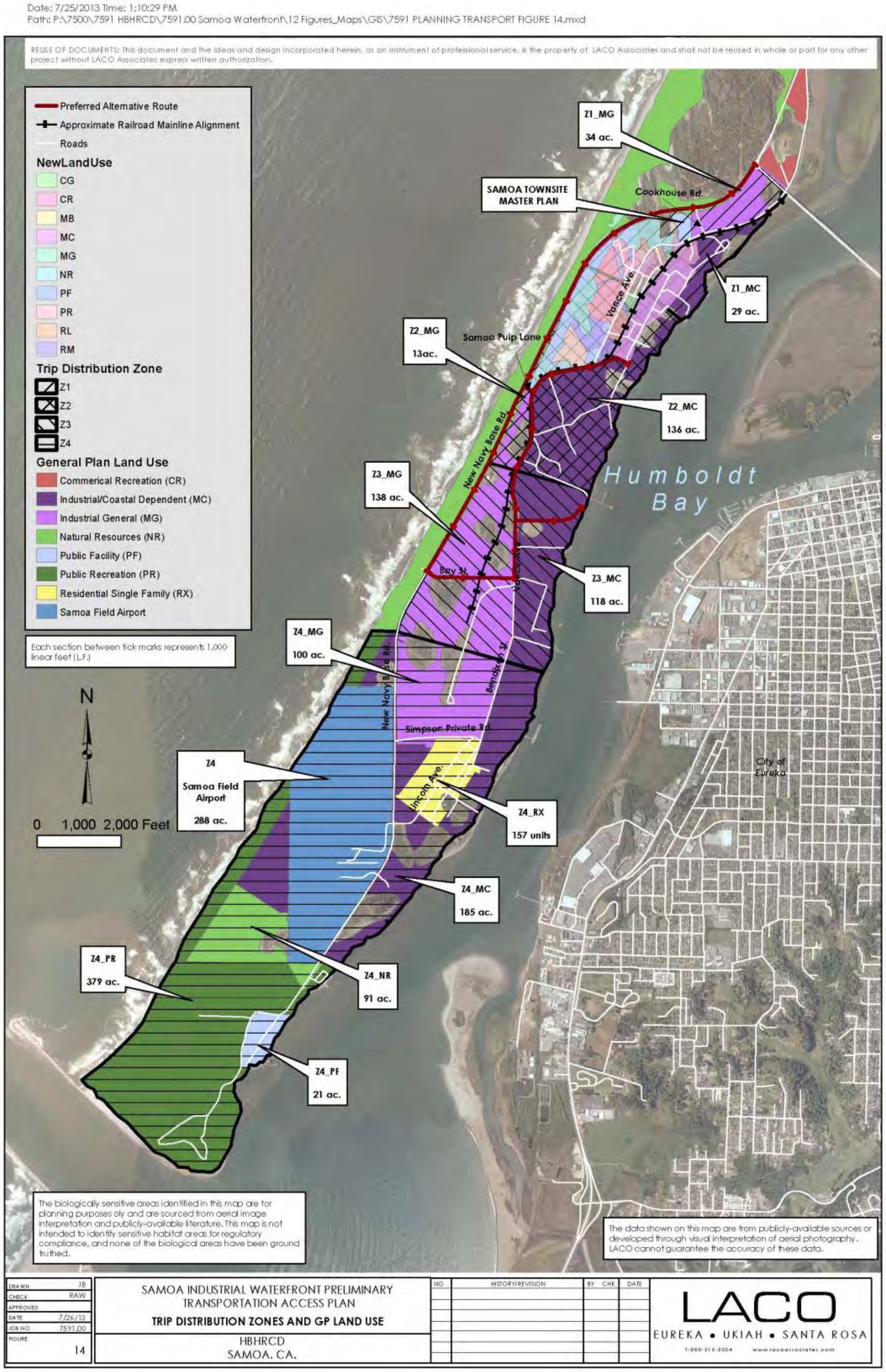

Figure 14. Trip Distribution Zones and General Plan Land Use Designations Map

Table 4. Samoa Peninsula Trip Generation

		100% Development									50% Development									10% Development								
Land Use	**Area/units/Berths**	**Project Trips (weekday)**		**Peak Hour Trips**						**Project Trips (weekday)**		**Peak Hour Trips**						**Project Trips (weekday)**		**Peak Hour Trips**					
				AM			**PM**					**AM**			**PM**					**AM**			**PM**		
					In	Out		In	Out			Total	In	Out		In	Out				In	Out		In	PM
Zone 1																									
Industrial/Coastal-Dependent (MC) (acre)	29	51.8 per acre	1,502	231	196	35	254	76	178	51.8 per acre	751	115	98	17	127	38	89	51.8 per acre	150	23	20	3	25	8	18
Industrial General (MG) (acre)	34	51.8 per acre	1,761	271	230	41	298	89	209	51.8 per acre	881	135	115	20	149	45	104	51.8 per acre	176	27	23	4	30	9	21
Existing loading/unloading Facility (berth)	1	171.52 per berth	172	34	17	17	34	17	17	171.52 per berth	86	18	9	9	18	9	9	171.52 per berth	17	4	2	2	4	2	2
Zone 2																									
Industrial/Coastal-Dependent (MC) (acre)	136	51.8 per acre	7,045	1,083	920	163	1193	358	835	51.8 per acre	3,522	542	460	82	596	179	417	51.8 per acre	704	108	92	16	119	36	83
Existing loading/unloading Facility (berth)	2	171.52 per berth	343	69	35	34	69	34	35	171.52 per berth	172	35	18	17	35	17	18	171.52 per berth	34	7	4	3	7	3	4
Industrial General (MG) (acre)	13	51.8 per acre	673	103	88	16	114	34	80	51.8 per acre	337	52	44	8	57	17	40	51.8 per acre	67	11	9	2	11	3	8
Zone 3																									
Industrial/Coastal-Dependent (MC) (acre)	118	51.8 per acre	6,112	939	798	141	1035	310	724	51.8 per acre	3,056	469	399	70	517	155	362	51.8 per acre	611	94	80	14	103	31	72
Existing loading/unloading Facility (berth)	2	171.52 per berth	343	69	35	34	69	34	35	171.52 per berth	172	35	18	17	35	17	18	171.52 per berth	34	7	4	3	7	3	4
Industrial General (MG) (acre)	138	51.8 per acre	7,148	1,098	934	165	1210	363	847	51.8 per acre	3,574	549	467	82	606	182	424	51.8 per acre	715	109	93	16	121	36	85
Zone 4																									
Industrial/Coastal-Dependent (MC) (acre)	185	51.8 per acre	9,583	1,473	1,252	221	1622	484	1,138	51.8 per acre	4,792	736	626	110	811	242	569	51.8 per acre	958	147	125	22	162	48	114
Industrial General (MG) (acre)	100	51.8 per acre	5,180	796	677	119	877	263	614	51.8 per acre	2,590	398	338	60	439	132	307	51.8 per acre	518	80	68	12	87	26	61
Residential Single Family (RX) (unit)	157	9.57 per unit	1,502	121	32	89	160	102	58	9.57 per unit	751	60	16	44	80	51	29	9.57 per unit	150	12	3	9	16	10	6
Existing loading/unloading Facility (berth)	1	171.52 per berth	172	34	17	17	34	17	17	171.52 per berth	86	18	9	9	18	9	9	171.52 per berth	17	4	2	2	4	2	2
Natural Resources (NR) (acre)	91		0*						0*		0*						0*		0*						0*
Public Recreation (PR) (acre)	379		0*						0*		0*						0*		0*						0*
Samoa Field Airport (acre)	288		0*						0*		0*						0*		0*						0*
Public Facility (PF) (acre)	21		0*						0*		0*						0*		0*						0*

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These five existing intersections were identified as locations which may be impacted by development of the Samoa industrial waterfront area.

The analysis concluded that all of the study intersections are currently operating acceptably at LOS C or better. However, under future conditions with development of the Samoa Town Master Plan and the industrial waterfront area, some of the intersections are expected to operate with unacceptable conditions:

- New Navy Base Road/Cookhouse Drive is expected to deteriorate to LOS F under PM peak hour conditions.
- SR 255/New Navy Base Road is expected to deteriorate to LOS F under both AM and PM peak hour conditions.
- SR 255/Fourth Street is expected to deteriorate to LOS F under PM peak hour conditions

Due to the expected unacceptable conditions at three of the study intersections, the following mitigation measures would likely be required to allow for acceptable operations:

- New Navy Base Road/Cookhouse Drive - A traffic signal or roundabout should be installed. This mitigation would not be needed until approximately 50 to 75 percent of the anticipated combined development in the STMP and industrial waterfront areas is completed.
  SR 255/New Navy Base Road – A traffic signal or roundabout should be installed. This mitigation would not be needed until approximately 25 percent of the anticipated combined development in the STMP and industrial waterfront areas is completed.
- SR 255/Fourth Street – The southbound approach should be restriped to include one right-turn lane and one combined through/right-turn lane. The appropriate pavement markers to guide the new double right turn lane onto Highway 101 South should be installed. This mitigation would not be needed until approximately 50 percent of the anticipated combined development in the STMP and industrial waterfront areas is completed.

In support of the above recommendations the W-Trans memorandum, providing a detailed analysis, methodology, results, conclusion, assumptions, and mitigation measures, is presented in Appendix 16 of the Plan.

5.2 Vehicle Types

Table 5 shows types and characteristics of vehicles that will be using the proposed PAR. In addition, various construction vehicles (e.g. excavators, cranes) and loading/unloading vehicles will use these roads to access the port area.

5.3 Functional Classification and National Highway System

To be eligible for the greatest number of transportation funding sources, we recommend that all segments of the PAR be functionally classified as Major Collector, at a minimum, and that all segments be added to the NHS. Since roadways proposed for NHS designation must be contiguous to the existing NHS system, SR 255, between New Navy Base Road and US Highway 101 (existing NHS) must be included in this proposed designation.

Table 5. Vehicle Types and Characteristics

Vehicle type	Motor Cycle	Passenger Car	Single Unit Truck	Inter-City Bus	Transit Bus	School Bus	Semi Trailer	Inter State Semi trailer	"Double Bottom" Semi-trailer	Motor Home	Car and Boat Trailer	Motor Home and Boat Trailer
Symbol	NA	P	SU	BUS-45	CITY-BUS	S-BUS-40	WB-40	WB-62	WB-67D	MH	P/B	MH/B
Minimum Design Turning Radius (ft)	NA	24	42	45	42	39.4	40	45	45	40	24	18
Center -line Turning Radius (ft)	NA	21	38	40.8	37.8	35.4	36	41	41	36	21	14
Minimum Inside Radius (ft)	NA	14.4	28.3	25.5	24.5	25.4	19.3	7.9	19.3	25.9	8	10.5
Length (ft)	NA	19	30	45	40	40	45.5	68.5	73.3	30	42	53
Width (ft)	NA	7	8	8.5	8.5	8	8	8.5	8.5	8	8	8
Height (ft)	NA	4.25	11-13.5	12	10.5	10.5	13.5	13.5	13.5	12	NA	12

5.3.1 Functional Classification

The general process for changing a road's functional classification is outlined in Section 4.4.1. Specifically, changing the functional classification of Bay Street and Samoa Pulp Lane from Local to Major Collector will require approval from Humboldt County. A reclassification request for Bay Street has been initiated, including preparation of the Functional Classification Change Request Form and a marked-up California Road System map. These items have been submitted to the County for consideration. As of the date of this Plan, the County has not yet acted on this request.

Upon acquisition of Vance Avenue, North Spur, and South Spur (currently private roads) by a public agency, either through fee title or easement, a request for change of the functional classifications of these roads to Major Collector can be initiated.

5.3.2 National Highway System

The addition of all PAR segments to the NHS will involve the coordination, participation, and approval of Caltrans, Humboldt County, HBHRCD, and HCAOG.

The first step toward NHS designation was to gain inclusion of all segments of the PAR in the Regional Transportation Plan (RTP), updated every three to five years by HCAOG. HBHRCD made a request that all PAR segments be included in the 2013 RTP, along with a request that the segments would ultimately be added to the NHS. LACO worked with Planwest Partners to prepare the required documentation. HCAOG confirmed that the PAR was included in the 2013 RTP update.

The next step involves securing County approval to add New Navy Base Road, Bay Street, and Samoa Pulp Lane to the NHS. As outlined in Section 4.4.2, this will require the preparation of a statement of justification and compliance with the NHS guidance criteria, and eventual submittal to Caltrans for concurrence and forwarding to FHWA for approval.

To satisfy the requirement that there be a contiguous connection to the existing NHS, (in this case between the PAR and U.S. Highway 101) SR 255 will also need to be designated as part of the NHS. Caltrans approval of the request to modify the status of SR 255 (from New Navy Base Road to Highway 101 in Eureka) is necessary prior to the request being forwarded to FHWA for consideration. Caltrans is scheduled in 2013/14 to update their Highway 255 Corridor Report. LACO has requested, on behalf of HBHRCD, that Caltrans consider adding this segment of the highway to the NHS.

Finally, after the private road segment rights-of-way (Vance Avenue, and the north and south spurs off Vance Avenue) are acquired, either in fee or in easement, by a public agency (likely HBHRCD), the application to add those segments to the NHS can be made. If NHS designation is obtained prior to construction, the roads must be constructed to AASHTO standards. If, however, the roads are constructed first to a lesser standard, they could potentially still be added to the NHS if sufficient right-of-way has been acquired to allow for improvements to meet AASHTO standards in the future.

5.4 Roadway Ownership

Two main options exist for future ownership and maintenance of PAR segments currently under private ownership. Both require acquisition by a public agency in order to be eligible for federal and state transportation funds. Constructing adequate roads with local or private funds is likely unfeasible. Figure 12 shows current roadway ownership for the PAR.

As stated in Section 4.4.3, three PAR segments are currently owned and maintained by Humboldt County: New Navy Base Road, Bay Street, and Samoa Pulp Lane. We recommend that these segments be retained by the County, with a change in functional classification and inclusion in the NHS, as stated above. With the changes noted, these segments will become more eligible for transportation funding. Specifically, inclusion in the NHS will make these segments eligible for funding from the National Highway Performance Program. However, it should be noted that such inclusion may require additional reporting to FHWA, and possibly additional maintenance or improvements in the future.

HBHRCD has the authority to acquire, and has expressed an interest in, either fee title ownership or easements rights for the PAR segments not currently under County or HBHRCD ownership: portions of Vance Avenue, and the North Spur off Vance Avenue. Vance Avenue, a former County road, is currently owned by Freshwater Tissue, California Redwood Company, Pacific Gas & Electric Company, and HBHRCD. There are several easements for public utilities, and access or ingress/egress in favor of other parties, on part or all of Vance Avenue (see Section 4.2). A minimum 48-foot-wide right-of-way is required along the proposed alignment. This width will allow for construction of the Major Collector road and shoulder to minimum AASHTO standards. To accommodate drainage facilities (e.g., bioswales), future utilities, fencing, and possibly landscaping, a 60-foot-wide right-of-way is recommended.

The North Spur off Vance Avenue is located on California Redwood Company property, and is not currently improved as a roadway. Parts of the segment cross concrete or asphalt log deck, or packed gravel surfaces. As with Vance Avenue, a minimum 48-foot-wide right-of-way is required, with a recommended width of 60 feet to accommodate drainage and utilities.

The South Spur off Vance Avenue is located along the southern property line of the former LP pulp mill property, currently owned by HBHRCD. This proposed road alignment has not been improved for road purposes. As noted above, a minimum 48-foot-wide right-of-way is required, with a recommended width of 60 feet to accommodate drainage and utilities.

In addition to the right-of-way and easement recommendations noted above, portions of the roadway are adjacent to steep banks, and in those locations additional temporary or permanent right-of-way width may be needed to accommodate constructed slopes of the improved roads. These additional slope requirements will be determined after a more detailed survey is completed and further design work is performed.

Being mostly private property, most of Vance Avenue is restricted or gated, and patrolled by security personnel. During final design, security of private property and port facilities will need to be addressed for each road segment. Fencing may be needed along the edge of the right-of-way, and secure gates may be needed at some locations to limit access to authorized personnel.

5.5 Roadway and Intersections Geometrics and Improvements

The proposed road geometry for Segments 2 through 7 of the PAR is presented below in Table 6, and a typical cross-section of the road is shown on Figure 15. Segment 1, New Navy Base Road, is currently 36.2 feet wide, on average, and has adequate capacity for the projected traffic increases.

Table 6. Proposed Road Geometry for Segments 2-7 of the Preferred Alternative Route

Road Design/Geometry Element	Proposed Geometry for Segments 2-7 (Major Collector)
Traffic Volume (veh/ day)*	4,119
Design Speed (mph) **	35
Total Length (ft)	11,550
Sight Distance	Per AASHTO
Cross Slope (%)	2%- 5%
Medians	none
Sidewalk	none
Parking	none
Super Elevation	Per AASHTO
Number of Lanes***	1 in each direction
Minimum Paved Width of the Road (ft)	24
Shoulder (ft)	8
Grades	Match existing
ROW (ft)	60
Railroad-Highway Grade Crossing	MUTCD and Rails Authority
Provision for Utility	AASHTO Chapter (10)
Lighting	AASHTO Chapter (11)

* The design traffic should be estimated for at least 10 and preferably 20 years from the anticipated completion of construction

** Posted speed limit on Bay Street

** * Based on desired LOS

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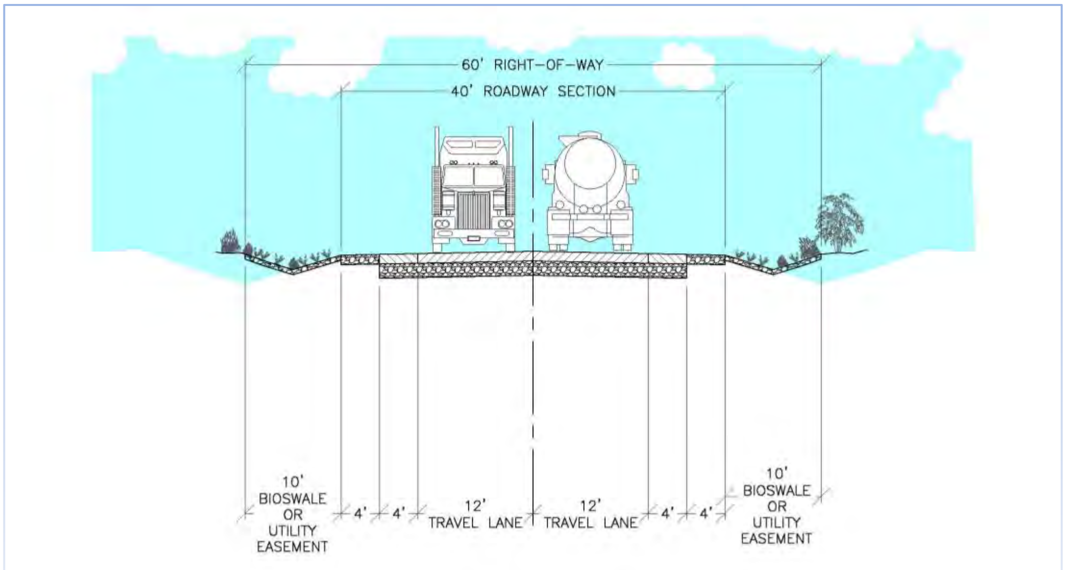

Figure 15. Typical Cross Section of Proposed Roadway

The following intersection geometrics and improvements are based on the existing intersection conditions as discussed in Section 3.4, and the projected traffic volumes as identified in Section 5.1:

- Intersection No. 1: New Navy Base Road and Bay Street. Based on the existing geometry of the intersection it is anticipated that this intersection can accommodate future project traffic without major modifications.

- Intersection 2: Bay Street and Vance Ave. Based on the existing intersection geometry and projected use, it appears this intersection can accommodate the projected project traffic with minor modifications (see Section 6.0 for proposed improvements and costs).

- Intersection No. 3: Vance Avenue and South Spur. This new intersection should be designed per current AASHTO standards.

- Intersection No. 4: Vance Ave and Private Driveway. This intersection should be designed with a stop control at the private driveway and free flow at Vance Avenue. Intersection improvements should be designed per current AASHTO standards.

- Intersection No. 5: Samoa Pulp Lane and Vance Ave. Based on the existing intersection geometry and existing use it appears this intersection can accommodate the projected project traffic with minor modifications.

- Intersection No. 6: New Navy Base Road and Samoa Pulp Lane. Based on the existing geometry of the intersection it is anticipated that it can accommodate the projected project traffic without major modifications.

- Intersection No. 7: Vance Ave and Former Arcata Community Recycling Center Driveway. This intersection should be designed with a stop control at private driveway/roads and free flow at

Vance Avenue. Intersection improvements are proposed be designed per current AASHTO standards.

- Intersection No. 8: Vance Ave and North Spur. Currently this intersection does not exist and is proposed to be a three-way intersection with a stop control at North Spur and free flow at Vance Avenue. This new intersection should be designed per current AASHTO standards.

5.6 Conceptual Rail Layout and Cargo Volume

According to the BST rail study (Appendix 1), the estimate of required rail volumes to meet financial feasibility thresholds for a rail system on the Samoa Peninsula connecting with a North-South line or an East-West line, would likely range from 26.2 to 100 million metric tons of cargo each year. This translates into a range of 7.2 to 27.4 trains per day to carry that volume of cargo. Although repair of the existing North-South rail line or construction of a new East-West rail line to Humboldt County is considered a high-cost and high-risk endeavor, per the BST rail study, the lack of rail connectivity to either the San Francisco Bay area or the central valley is considered by the HBHRCD to be one of the primary constraints to efficient use of Samoa Peninsula properties.

The authors of the BST rail study state that dry bulk cargoes such as grain, coal, ores, and minerals are increasingly being moved in shuttle trains with as many as 100 to 125 cars per train. New facilities to handle these trains typically require rail trackage sufficient to hold several complete trains at once, as well as unloading equipment that can send a train back out in less than one day. The unloading equipment would need to be sited adjacent to an existing dock facility that could handle the infrastructure necessary for bulk cargo loading and unloading. A loop track, or a series of linear tracks (ladder tracks), would likely be required of a cargo terminal. In addition to a loop track (or ladder track), a new cargo terminal designed to primarily handle bulk cargoes would need to be constructed on the Samoa Peninsula.

The BST study does not include the conceptual design or layout of a cargo terminal to address the estimated train volumes, shipping facilities, or bulk cargo holding facilities. While the siting of this conceptual cargo terminal is too speculative at this time to address potential environmental concerns or other impacts, a conceptual-level rail loop layout was prepared by LACO, in consultation with Burgel Rail Group, to (1) show how Samoa Peninsula could potentially accommodate a loop track that meets modern rail turn radius standards, (2) identify the parcels most likely to need rail access, and (3) identify the potential rail crossings and needed infrastructure should the rail be reestablished in the future. The conceptual level rail loop map is located in Figure 16. The loop track shown is conceptual only, and many additional factors outside the scope of this study would have to be considered before a final alignment is determined. At a later date, if the reestablishment of an East-West or North-South connection is deemed economically and logistically feasible, an evaluation of these infrastructure needs will be a necessary component to advancing site design. A preliminary cost estimate for the loop track and switching/storage track, based on the conceptual layout in Figure 16, is provided in Section 6.0.

In addition to railroad construction costs, development of rail facilities and a cargo terminal will require the investment of a significant land area. The recently-completed export grain terminal in Longview, Washington, for example, occupies a roughly 35-acre site. The Port of Portland's Terminal 5 grain export facility occupies a 40-acre site, although the adjacent Terminal 5 bulk cargo facility (which handles soda ash) occupies only 7 acres. Existing parcels large enough to accommodate a new export grain terminal in

Date: 11/21/2013 Time: 12:17:09 PM
Path: P:\7500\7591 HBHRCD\7591.00 Samoa Waterfront\12 Figures_Maps\GIS\7591 PLANNING TRANSPORT FIGURE 16.mxd

Figure 16. Conceptual Railroad Loop Track Map

the project area include the HBHRCD waterfront parcel south of Redwood Marine Berth 1; the two parcels owned by Samoa Properties north of the former LP Pulp Mill (approximately 55 acres total); and the former LP Pulp Mill parcel (APN 401-112-21, approximately 69 acres, not including the adjacent chip storage area). It is likely that some rearranging of lot lines and repurposing of parcels would be necessary or beneficial to most efficiently develop a modern bulk cargo terminal on the Samoa Peninsula with the capacity to handle the volumes identified in BST rail study to meet financial feasibility thresholds.

6.0 PRELIMINARY COST ESTIMATES

6.1 Preferred Alternative Route

A preliminary cost estimate for the construction of the roadway PAR is presented in Table 7. Preliminary cost estimates are based on the 10% design plans (Appendix 9).

The total shown in Table 7 includes both construction and non-construction cost items. The construction cost items include mobilization, traffic control, grading, street signs, striping, lighting, erosion and sediment control, demolition, power pole relocation, drainage structure, bioswale, paving, and joint trench for future utilities. The non-construction costs include preparing environmental documents, final plans, specifications and cost estimates; construction management and engineering; construction staking; street monuments; and record drawings. Also included in non-construction costs is land acquisition for Segments 3, 4, and 6 (currently privately owned) based on land values generated in a recent appraisal conducted for HBHRCD.

The cost of installing signals at the intersections of New Navy Base Road and Cookhouse Drive, and New Navy Base Road and SR 255, are included in the Segment 1 cost estimate as recommended in the traffic and constraint analysis sections. However, these signals don't need to be installed until advanced stages of the anticipated combined development in the STMP and industrial waterfront area is completed.

Table 7. Preliminary Cost Estimate for the Preferred Alternative Route

Segment Number	Road Name	Cost
1	New Navy Base Road - Bay Street to SR 255	$1,929,000
2	Bay Street - New Navy Base Road to Vance Ave	$978,000
3	Vance Ave - Bay Street to Samoa Pulp Lane	$2,336,000
4	Vance Ave - Samoa Pulp Lane	$1,094,000
5	Samoa Pulp Lane - New Navy Base Road to Vance Ave	$239,000
6	North Spur off Vance Ave	$746,000
7	South Spur off Vance Ave	$1,033,000
Total		**$8,355,000**

As these cost estimates are preliminary and no detailed field investigation or field topography survey was conducted, a 30 percent contingency has been applied to both construction and non-construction cost estimates. Segment-specific cost estimates are included in Appendix 17.

6.2 Railroad Loop Track and Switching/Storage Yard

Preliminary cost estimates to develop a railroad loop track and switching/storage yard on the Samoa Peninsula were estimated based on costs provided in the BST rail study and discussions with Bill Burgel of Burgel Rail Group, a contributing consultant to that analysis. The layout and alignment of a switching/storage yard and loop track is purely conceptual at this time. The ultimate design will depend on several factors, including the estimated amount of storage required by a railroad operator, the location of existing and planned docks and loading/unloading facilities, and the volume of cargo anticipated. The final cost would also depend on the type of signals used for train control and at-grade road crossings. According to Mr. Burgel, at-grade road crossings without full signals can cost roughly $300,000 each, and full signals for train control, if needed, can cost up to $1M per mile of track.

For order-of-magnitude estimating purposes, LACO has assumed that storage for two train sets (120 cars each) would be needed. This would result in 16,000 feet of track for storage alone, although some of the storage track could also be used for loading/unloading. The loop track, as shown in the conceptual layout in Figure 16, would require approximately 15,000 feet of new track. The total track needed would therefore be roughly 31,000 feet (5.9 miles).

Due to the small proposed yard area and anticipated low train speeds in the area, LACO has assumed that train control signals and at-grade road crossing signals will be minimal. We have also assumed that the area will not need to operate as a quiet zone, which requires more extensive at-grade road crossing controls.

According to the BST rail study, the estimated cost of grading for the new track is $1.5M per mile for relatively flat areas, including culverts and railroad sub-grade. The cost to construct new track on a graded railroad sub-grade is estimated to be $1.0M per mile. The total cost to grade and construct new railroad on relatively flat areas is therefore roughly $2.5M per mile.

The total order-of-magnitude cost to construct 31,000 feet (5.9 miles) of new railroad loop track and storage track will be approximately $15M. This figure does not include any additional sidings, signals, loading/unloading facilities, or other improvements not specifically stated above. In addition, the loop track does not lie entirely on HBHRCD property; costs for fee simple or easement acquisition were not factored into this estimate.

7.0 PERMITTING/CEQA/NEPA REQUIREMENTS

7.1 Federal, State, and Local Permits

Federal, state, and local permits will be required prior to construction of the road segments that make up the PAR. Below is a description of each permit that may be required (some of which are contingent upon findings from segment-specific field surveys), followed by a matrix of the permitting agencies and applicable contacts (Table 8). Construction of a loop track and cargo terminal, in the case of future reestablishment of rail-based cargo transport, will likely require the same suite of permits, but their application will be further determined through future rail project-specific site surveys.

7.1.1 U.S. Army Corps of Engineers Section 404 Permit

Under Section 404(e) of the Clean Water Act (CWA), the U.S. Army Corps of Engineers (USACE) has permit jurisdiction over projects that involve the dredge or fill of navigable waters of the United States, including associated wetlands. If the construction or enhancement of a road segment will result in impacts to a jurisdictional wetland, a USACE Section 404 Permit will be required. A jurisdictional wetland exhibits three key wetland characteristics:

1. Wetland hydrology: permanent or periodic inundation or saturation of the soil to the surface at some time during the growing season of the prevalent vegetation.
2. Predominance of hydrophytic vegetation: plants adapted to anaerobic conditions resulting from a prolonged inundation with water.
3. Hydric soils: soils that become saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth of hydrophytic vegetation.

Willow hollows such as this one may be jurisdictional wetlands

Based on the nature of the project-causing jurisdictional wetland impacts, Section 404 compliance may be met through either an Individual Permit or a Nationwide Permit.

A Nationwide Permit (NWP) is a general permit that authorizes one of 52 activity categories, resulting in a reduced permitting burden for the project proponent. If the project meets the criteria for one of the 52 NWP categories, USACE will issue the NWP, which is applicable for five years. Each NWP has a statutory authority, specific limits, and certain additional requirements or considerations that must be met by the applicant.

While avoidance of impacts to jurisdictional wetlands is the primary goal in project design, where dredge or fill impacts may be unavoidable, a NWP No. 14 (Linear Transportation Projects) may be applicable. A NWP 14 is limited to ½ acre of fill or dredge in non-tidal waters, and a Pre-Construction Notification is required if the project consists of greater than 0.1 acre.

7.1.2 North Coast Regional Water Quality Control Board Section 401 Water Quality Certification or Waste Discharges Requirements

Section 401 of the CWA grants each state the right to ensure that the state's interests are protected on any federally-permitted activity occurring in or adjacent to waters of the state, including wetlands. In the State of California, Regional Water Quality Control Boards have the mandate to protect waters of the State. The North Coast Regional Water Quality Control Board (NCRWQCB) regulates activities in Humboldt County. When a federal project permitted under a USACE Section 404 Permit has the potential to impact waters of the state, the NCRWQCB will issue a Water Quality Certification determination.

If the project does not fall under federal jurisdiction, but the potential to impact waters of the state remains, NCRWQCB has the authority to issue a "General Waste Discharges Permit for Waters Determined to be

Non-jurisdictional." This general permit covers dredge and fill activities in waters of the state where the following conditions are met:

- No more than 0.2 acres of wetland area
- Less than 50 yards of dredging
- Not subject to Section 404 or Section 10
- No rare, threatened, or endangered species
- No adverse impacts to beneficial uses of waters of the state

Projects that meet these conditions individually but not in aggregate are not eligible for a General Waste Discharges Permit. A project that impacts non-jurisdictional Waters of the state that is not eligible for a General Waste Discharges Permit must receive an Individual Waste Discharge Requirements permit. This is a discretionary permit that is reviewed by the NCRWQCB Board.

7.1.3 County of Humboldt/California Coastal Commission Coastal Development Permit

The Coastal Act of 1976 established detailed policies for land use within the Coastal Zone Boundary, and charged local governments with the responsibility for incorporating these policies into their planning and zoning regulations (County of Humboldt, 2013).

The California coastal zone in Humboldt County is roughly separated into three jurisdictional categories:

1. State jurisdiction, through the California Coastal Commission (CCC)
2. County jurisdiction, with State-appeal jurisdiction
3. County jurisdiction, with no State-appeal jurisdiction.

The purpose of a Coastal Development Permit (CDP) is to allow staff to review a project to ensure that it will not cause serious health, safety, or welfare problems, or have adverse impact on the coastal resources, such as scenic bluffs, dunes, coastal wetlands, and native plant and animal species (County of Humboldt, 2013). Since the entirety of PAR Segments 1 through 6, and a majority of Segment 7, lie within the County CDP jurisdiction, a County of Humboldt CDP will be required. The County CDP application consists of an application form and a plot plan prepared in accordance with the County's "Plot Plan and Tentative Map Checklist." Following submittal of the CDP application packet, County staff has 30 days to determine the completeness of the submittal, and may request additional information if necessary. Once the application is accepted and fees are paid, a County Planning Commission hearing for the CDP application is scheduled to discuss the application and issue a decision.

The CCC retains appeal authority over the County CDP jurisdiction over the entire PAR. An appeal of a CDP decision by the County Planning Commission may be made by the project applicant, an "aggrieved person", or two members of the CCC. The grounds for an appeal of a project approval or denial are limited to an allegation that the development does not (or does, in the case of a denial) conform to the standards set forth in the local coastal program of the public access policies set forth in the Coastal Act (CCC, 2013).

Table 8. Agency Permitting Contacts

Permit	**Agency**	**Contact**	**Nexus**
Army Corps 404 Permit	U.S. Army Corps of Engineers	Carole Heidseik Northern Field Office 601 Startare Drive Eureka, California 95501	Dredging or filling in jurisdictional wetlands (Waters of the U.S.)
Section 401 Water Quality Certification or Waste Discharge Requirements	North Coast Regional Water Quality Control Board	Mona Dougherty Core Regulatory 5550 Skylane Blvd., Suite A Santa Rosa, California 95403-1072	Impacts to waters of the State, including wetlands
Construction General Permit and Storwater Pollution Prevention Plan	North Coast Regional Water Quality Control Board	Paul Kieran Water Resources Engineer 5550 Skylane Blvd., Suite A Santa Rosa, California 95403-1072	Projects where ground disturbance exceeds one acre
Coastal Development Permit	County of Humboldt	Michael Wheeler, Senior Planner Humboldt County Planning & Building Dept. 3015 H Street Eureka, California 95501	Development within County coastal zone jurisiction
Special Permit			Impacts or encroachments into County-designated ESHAs or their designated buffers
Coastal Development Permit	California Coastal Commission	Melissa Kraemer, Coastal Planner North Coast District Office 1385 8th Street, Suite 130 Arcata, California 95521	Development within State coastal zone jurisdiction
Encroachment Permit	County of Humboldt	Glen Anderson Public Works Department County of Humboldt 3033 H Street, Room 17 Eureka, California 95501	Encroachment into County-owned roadways
Grading Permit	County of Humboldt	Todd Sobolik Building Inspections Division County of Humboldt 3033 H Street, Room 17 Eureka, California 95501	Site grading for road construction

As approximately 250 linear feet of Segment 7 lies within the state CDP jurisdiction, a CCC CDP will be required for the construction of Segment 7. A complete CCC CDP application consists of the following elements:

- Proof of applicant's interest in the property
- Assessor's parcel maps with specified details
- Stamped envelopes addressed to neighboring property owners and interested parties
- Vicinity map
- Two sets of project plans (at least 30% design level) and two sets of other applicable plans
- Copies of any environmental documents (CEQA/NEPA compliance, see Section 7.2-7.4)
- Verification of all other permits, permission, or approvals applied for or granted by public agencies
- Copy of geology or soils report
- Local (County) approval of the project secured prior to CCC consideration of the CDP
- Posting of the Notice of Pending Permit
- Filing fee (fee amount based on cost of project)
- Completed and signed permit application form

As an alternative, since Segment 7 is located in both the County and CCC CDP jurisdictions, a consolidated CDP permit may be sought by HBHRCD. This process begins with a phone-based consultation with the Humboldt County Planning Department and CCC staff regarding a CDP consolidation. Following the phone consultation, a CDP consolidation confirmation letter, addressed to the Director of the Humboldt County Planning and Building Department, is prepared. This letter states that, because the site is located within both the County and state jurisdictional coastal zone, the CDP should be consolidated and processed by the CCC. If the Director approves the consolidation, a consolidation request is then submitted to the Executive Director of the CCC. If the consolidated approach is approved by both the County and CCC, a standard CCC CDP application is prepared. The consolidated CDP process can often reduce the number of discretionary approvals and reduce the permitting timeline by 4 to 6 months.

7.1.4 State Water Resources Control Board Construction General Permit and Stormwater Pollution Prevention Plan

BMPs such as silt fences are identified in the SWPPP

Under State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) Order No 2009-0009-DWQ (as amended), construction projects that disturb one or more acres of soil are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, or CGP), and are required to prepare and implement a Stormwater Pollution Prevention Plan (SWPPP). A SWPPP is a document that recognizes potential stormwater and non-stormwater impacts associated with a construction project, and identifies Best Management Practices (BMPs) to prevent discharge of sediments and nonvisible pollutants to Waters of the State and Waters of the United States.

A SWPPP must be prepared by a Qualified SWPPP Developer (QSD). The following excerpt is from the SWRCB Storm Water Program webpage:

> *The SWPPP should contain a site map(s) which shows the construction site perimeter, existing and proposed buildings, lots, roadways, storm water collection and discharge points, general topography both before and after construction, and drainage patterns across the project. The SWPPP must list Best Management Practices (BMPs) the discharger will use to protect storm water runoff and the placement of those BMPs. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment* (SWRCB, 2013).

Prior to any groundbreaking activities, a Notice of Intent (NOI) must be filed with the SWRCB through the Storm Water Multiple Application and Report Tracking System (SMARTS), which is an online system that has been developed to provide an online tool to assist dischargers in submitting their Notices and Reports, viewing or printing Receipt Letters, monitoring the status of submitted documents, and viewing their application and renewal fee statements.

The CGP annual permit fee is calculated based on the acreage of the project. The annual fee must be paid to maintain the CGP through the duration of the project. Once the project has been completed, a Notice of Termination (NOT) must be submitted to SWRCB through SMARTS.

7.1.5 County of Humboldt Special Permit

In cases where the construction of a road segment will impact County-designated ESHAs, or construction will take place within areas with County-required ESHA setbacks (e.g., road construction planned within 200 feet of Humboldt Bay waterfront, as in the case of Segment 7), a County-issued Special Permit will be required. The application and discretionary review for this permit can take place concurrently with the County's review and consideration of the County Coastal Development Permit (CDP). The requirements for the application are the same as those for the County CDP application, and mitigations for the Special Permit can be rolled into the conditions of approval for the County CDP (see Section 7.1.3).

7.1.6 County of Humboldt Encroachment Permit

Encroachment permits are issued by the County of Humboldt Department of Public Works for work and activities conducted within the right of way of the County Maintained Road System. Prior to work conducted on Segment 3 (Vance Avenue between Bay Street and Samoa Pulp Lane) and Segment 4 (Vance Avenue between Samoa Pulp Lane and the North Spur), a County Encroachment Permit will be required, as these roadways encroach into County-maintained rights-of-way.

7.1.7 County of Humboldt Grading Permit

Per County of Humboldt Grading Ordinance (Title III, Division 3, Section 331-12 [D]), most site grading requires a grading permit from the County Building Inspection Division. Grading in excess of 5,000 cubic yards, or where special conditions or unusual hazards exist, require the preparation of an Engineered Grading Application. Given the site conditions and nature of the project, an Engineered Grading Application will likely be required for each of the road segments.

An Engineered Grading Application consists of the following items:

1. Information covering construction and engineering requirements
2. Scale plan set, including the following information:
    a. General vicinity of the project site
    b. Property limits and accurate contours and drainage
    c. Limiting dimensions, elevations, or finish contours
    d. Detailed plans of all drainage devices, walls, cribbing, dams, or other protective devices proposed as part of the project
    e. Location of buildings and structures within 15 feet of the property
    f. Recommendations from soils engineering report and engineering geology reports
3. Soils Engineering Report
4. Engineering Geology Report
5. Liquefaction Study
6. Method and standard for compaction
7. Description of erosion control methods
8. Excess soil stockpile locations or disposal plans

7.1.8 California Department of Fish & Wildlife Jurisdiction

CDFW has trustee agency status over wetlands in the State of California, and is responsible for enforcing the State's "no net loss" of wetlands policy. CDFW defines wetlands as "lands which may be covered periodically or permanently with shallow water and which include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, fens, and vernal pools" (CA PRC Section 2785[g]). CDFW's definition of wetlands is based on a one-parameter characterization (hydrophytic vegetation, hydric soils, or wetland hydrology) when wildlife is present and using the wetland.

In cases where a project may impact lakes, rivers, or streams, or associated wetlands, within the State of California, the California Department of Fish & Wildlife (CDFW) requires a Section 1600 Lake or Streambed Alteration Agreement (1600 permit) to be issued. Future road segment construction will not impact any lakes, rivers, or streams, or associated wetlands, within the project area, and therefore will not require such an agreement. While a 1600 permit will not be required for impacts to the dune hollows and other isolated wetlands along the PAR, as these wetlands are not associated with rivers, streams, or lakes, impacts to any wetlands will require oversight by CDFW and must include consideration of alternative alignments or mitigation of unavoidable impacts.

7.2 California Environmental Quality Act

The California Environmental Quality Act (CEQA) was passed by the California State Legislature in 1970, and is a statute that requires state and local agencies to identify potentially significant environmental impacts of their proposed actions and to avoid or mitigate those impacts, if feasible. According to the California Environmental Resources Evaluation System (CERES) website, CEQA applies to certain activities of state and local public agencies, per the following guidelines:

> *A public [state or local] agency must comply with CEQA when it undertakes an activity defined by CEQA as a "project." A project is an activity undertaken by a public agency or a private activity which must receive some discretionary approval (meaning that the agency has the authority to deny the requested permit or approval) from a government*

agency which may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment (CERES, 2013).

As this Plan does not involve any discretionary approval from a public agency, and will not cause either a direct or reasonably foreseeable indirect change in the environment, it has been determined that the preparation of this Plan does not constitute a "project" for the purposes of CEQA.

The goal of this Plan is to identify a PAR that will connect the Humboldt Bay/Samoa Peninsula waterfront to inland transportation systems (i.e. highways). Following identification of the PAR and prioritization of the seven constituent road segments, subsequent phases will involve segment-specific field surveys and special studies as necessary, and CEQA analysis of the potential impacts of future construction. These studies will identify characteristics and resources along a segment's proposed footprint, evaluate potential impacts from the construction of the road segment, and identify mitigations that may avoid or reduce those impacts to a less-than-significant level. These studies will evaluate characteristics such as biological resources, cultural and historic resources, geology, hydrology, and noise.

The CEQA analysis for each road segment (each segment will be treated as a separate and stand-alone project) and any future rail infrastructure will include the preparation of an Initial Study (IS). The IS consists of informed responses to 88 standard questions pertaining to the environmental categories listed in the IS checklist. Responses indicate the potential level of environmental impact of the project. The CEQA analysis includes summarization of the project site setting, findings, identification of mitigation measures (if any, partially based on the findings from the special studies), and recommendations, for incorporation into the IS. HBHRCD will act as Lead Agency and will use the information provided in the IS to prepare the environmental document to be adopted by the HBHRCD Board of Commissioners and submitted to the State Clearinghouse. In cases where there is no anticipated significant impacts, or identified mitigations would reduce the project impacts to a less-than-significant level, a Negative Declaration (or Mitigated Negative Declaration) is typically the environmental document adopted by the Lead Agency.

If it is determined by the Lead Agency that the impacts from the project are significant and unavoidable, then an Environmental Impact Report (EIR) would need to be prepared. According to the American Council of Engineering Companies 2010 CEQA Guidelines, an EIR is an informational document that aids in public agency decision making by providing "public agencies and the public in general with detailed information about the effect which a proposed project is likely to have on the environment; to list ways in which the significant effects of each project might be minimized; and to indicate alternatives to such a project" (ACEC, 2010). Similar to the IS, the Draft EIR is circulated by the Lead Agency (HBHRCD) for public and agency review and comment. Following the circulation period, written responses to comments are prepared and the Final EIR is adopted through the filing of the Notice of Determination with the County Clerk. Please refer to Appendix 18 for a flow chart of the CEQA process.

7.3 National Environmental Policy Act

In 1969, Congress passed the National Environmental Policy Act (NEPA) in response to growing concern about the connection between the condition of the environment and human activity. NEPA established procedural requirements that apply to a Federal agency's decisions for actions, including financing, assisting, conducting, or approving projects or programs; agency rules, regulations, plans, policies, or procedures; and legislative proposals. As this Plan has been funded by a federal grant (TEA-21

Demonstration Program, administered by the Federal Highways Administration, see Section 1.1), it is subject to NEPA review.

Through a Memorandum of Understanding (MOU) dated October 1, 2012, the California Department of Transportation (Caltrans) has assumed FHWA's administration responsibilities under NEPA, as well as FHWA's consultation and coordination responsibilities under other Federal environmental laws, for most highway projects in California (Caltrans, 2013). Based on preliminary consultation with Caltrans District 1 Local Assistance staff, the preparation of this Plan qualifies for a Categorical Exclusion (CE) per 23 CFR 771.117(c)(1) (activities which do not involve or lead directly to construction, such as planning and research activities). LACO prepared a Preliminary Environmental Screening for Non-Infrastructure Projects (PES[NI]), which was reviewed and approved by Caltrans Local Assistance on June 10, 2013. Signed copies of the PES(NI) and Categorical Exclusion are located in Appendix 19.

New roadway construction is not eligible for a CE under 23 USC 326, nor does this project type appear in Appendix A of the CE MOU between FHWA and Caltrans, effective June 7, 2013. Some of the auxiliary activities that would likely take place during the construction of the PAR road segments are eligible for CEs (e.g., construction of bioswales, per Appendix A to the CE MOU; and installation of fencing, signs, pavement markings,…traffic signals, and railroad warning devices, per 23 CFR 771.117[c][8]). Widening or otherwise rehabilitating existing roadways to accommodate AASHTO standards may in some cases meet the CE eligibility requirement in 23 CFR 771.117(d)(1): "Modernization of a highway by resurfacing, restoration, rehabilitation, reconstruction, adding shoulders, or adding auxiliary lanes (e.g., parking weaving, turning, climbing). In certain cases, technical studies will be required to determine CE eligibility. The project may still qualify as a CE under 23 USC 327 as long as it is proven that the project will not have a significant impact on the human environment. Per 23 CFR 771.117 (c)(18), track and railbed maintenance and improvement projects carried out within the existing right-of-way are eligible for a CE; construction of new track and railbed does not appear to be eligible.

Projects that do not qualify for CE would be subject to NEPA review through the preparation of an Environmental Assessment (EA). An EA is prepared by the Lead Agency (in this case, Caltrans) to determine whether an action constitutes a major federal action affecting the quality of the human environment. This is first accomplished through the Lead Agency's identification of issues that may be impacted by the proposed project. Technical studies may be needed to evaluate characteristics such as biological resources, cultural and historic resources, and demographic and socioeconomic data. The EA document includes the following elements:

- Statement of purpose and need for the action
- Alternatives, including the proposed alternative and the "no action" alternative
- Description of the affected environment
- Environmental consequences for each alternative

Based on the EA, a determination of whether the project will result in a significant impact is made by the Lead Agency. Once a draft EA (DEA) is prepared, a Notice of Availability (NOA) is sent to the State Clearinghouse, announcing the availability of the DEA for public review and comment. The DEA is available for public review and comment for a 30-day period, after which the Lead Agency considers and responds to all substantive comments and prepares a final EA. If the Lead Agency determines that a significant impact will not result from the project, a Finding of No Significant Impact (FONSI) is published for public review and comment. If the Lead Agency determines that a significant impact may result from the project, preparation of an Environmental Impact Statement (EIS) will be required.

An EIS is a major undertaking; only approximately 500 EIS's are prepared by all federal agencies combined, per year. If the Lead Agency determines that an EIS is necessary for the project, a Notice of Intent (NOI) is published in the Federal Register. Project scoping is then performed to identify the issues to be addressed in the EIS and to identify the need for additional special studies, if any. The EIS contains elements similar to those in an Environmental Assessment, but the alternatives analysis is greatly expanded. Once a draft EIS (DEIS) is prepared, a Notice of Availability (NOA) is published in the Federal Register, announcing the availability of the DEIS for public review and comment. The DEIS is available for public review and comment for a 45-day period, after which the Lead Agency considers and responds to all substantive comments and prepares a final EIS (FEIS). A NOA is published in the Federal Register and the FEIR is made available for public review for 30 days, after which a Record of Decision (ROD) is published in the Federal Register. The ROD explains the agency's decision, describes the alternatives considered, and discusses mitigations adopted to reduce project impacts. Please refer to Appendix 20 for a flow chart of the NEPA process.

7.4 Joint NEPA/CEQA Document

Due to anticipated funding and discretionary approvals at both state and federal levels, future permitting and construction of each road segment will likely be subject to both CEQA and NEPA analysis. Per Chapter 37 of the Caltrans Standard Environmental Reference (SER) (Caltrans, 2012), a procedure is in place to prepare joint CEQA/NEPA documents in order to avoid redundancy; maximize local, state, and federal consultation; and reduce public circulation timeframes. As the NEPA Lead Agency for FHWA (see Section 7.3), Caltrans would serve as the federal Lead Agency for the joint document, while HBHRCD would serve as the state Lead Agency.

There are many similarities between CEQA and NEPA requirements that lend to a relatively compatible environmental review process, including preparation of environmental documents that include project description, identification of permits needed, analysis of impacts, and circulation for public review and comment. However, there are some distinct differences between CEQA and NEPA that must be well-understood to appropriately handle issues of "significance" and various levels of coordination and public outreach. The Caltrans SER provides the following comparison between NEPA and CEQA on the issue of "significance":

> *One of the primary differences between NEPA and CEQA is the way significance is determined and later discussed in environmental documents. Under NEPA, significance is used to determine whether an EIS, or some lower level of documentation, will be required. NEPA requires that an EIS is prepared when the proposed federal action (project) as a whole has the potential to "significantly affect the quality of the human environment." The determination of significance is based on context and intensity. Some impacts determined to be significant under CEQA may not be of sufficient magnitude to be determined significant under NEPA. Under NEPA, once a decision to do an EIS is made, it is the magnitude of the impact that is evaluated and no judgment of its significance is deemed important for the text. NEPA does not require that a determination of significant impacts be stated in the environmental documents.*
>
> *CEQA, on the other hand, does require the Department to identify each "significant effect on the environment" resulting from the project and ways to mitigate each significant effect. A significant*

effect on any environmental resource triggers the preparation of an EIR. Each and every significant effect on the environment must be disclosed in the EIR and mitigated, if feasible. In addition, the CEQA Guidelines list a number of mandatory findings of significance, which also require the preparation of an EIR. There are no types of actions under NEPA that parallel the findings of mandatory significance in CEQA (Caltrans, 2012).

As discussed in Sections 7.2 and 7.3, the joint environmental document ultimately prepared for CEQA and NEPA compliance depends on the level of significance of the impacts and overall project. For whichever combination is required to meet both environmental review processes (e.g. preparation of a joint IS/EA), the requirements for both documents will have to be met in the joint document. For example, while an IS does not require discussion of alternatives in the project description or analysis, an EA does, so the joint document will have to include alternatives analysis. Table 9 below, taken from Chapter 37 of the Caltrans SER, identifies the required contents by environmental document type.

For future road segment-specific and rail-specific environmental compliance processes, the joint CEQA/NEPA document will be prepared for use in both the CEQA and NEPA review and document adoption processes (as described in Sections 7.2 and 7.3). Depending on the respective Lead Agencies' significance determinations, the combined document may take on one of a number of combinations, including (from lowest impact to highest impact):

- Joint Categorical Exemption and Categorical Exclusion
- Joint Initial Study/Negative Declaration (or Mitigated Negative Declaration) and Environmental Assessment/Finding of No Significant Impact
- Joint Environmental Impact Report/Notice of Determination and Environmental Assessment/Finding of No Significant Impact
- Joint Environmental Impact Report/Notice of Determination and Environmental Impact Statement/Record of Decision

The joint document used for each road segment or rail project may differ, as the anticipated level of construction and ground-disturbance activity, physical and regulatory constraints, and other considerations vary greatly between the segments (see Section 8.0).

Table 9. Required Contents by Environmental Document Type

Content	IS*	EA*	EIR*	EIS*
Title Sheet	X	X	X	X
Draft Negative Declaration or Draft Mitigated Negative Declaration (if not preparing EIR)	X			
Summary			X	X
Table of Contents			X	X
Purpose and Need		X	X	X
Project Description	X	X	X	X
Areas of Known Controversy				X
Permits and Approvals Needed	X	X	X	X
Alternatives Discussion		X	X	X
No Build/No Action		X	X	X
Discuss More Than 1 Build Alternative			X	X
Identify Environmentally Superior Alternative			X	
Environmental Setting/Affected Environment	X	X	X	X
Environmental Effects/Impacts**	X	X	X	X
Short Term Uses of Environment and Long Term Productivity				X
Irreversible and Irretrievable Commitment of Resources			X	X
Consistency with Plans	X		X	
Growth Inducing Effects	X	X	X	X
Cumulative Effects	X	X	X	X
Mitigation Measures	X	X	X	X
List of Preparers	X			X
Distribution List				X
Comments and Coordination (including concurrence letters, etc. from resource agencies)		X		X
Section 4(f) Evaluation (if using protected resources, such as Wildlife Refuges)		X		X
Index			X	X

(Source: Caltrans, 2012; http://www.dot.ca.gov/ser/vol1/sec6/ch37joint/chap37.htm)

8.0 SUMMARY AND COMPARISON OF ROUTE SEGMENTS

This section provides a detailed description of each PAR roadway segment. As each segment has its own opportunities and constraints, it is important to fully characterize each segment individually. For ease of reference, a Road Segment Summary Table (Table 10) is located at the end of this section. As the consideration of a railroad loop track and associated infrastructure has not reached an appropriate stage for detailed evaluation, this section does not include a discussion of projected railroad conditions.

8.1 Segment 1: New Navy Base Road – Bay Street to SR 255

Segment 1, facing north

Segment 1 comprises New Navy Base Road from its intersection with SR 255 at the northern end, to its intersection with Bay Street (Segment 2) at the southern end, totaling 13,176 feet in length. New Navy Base Road is owned and maintained by the County of Humboldt, and has a functional classification of Major Collector. The roadway serves as the sole land-based ingress and egress for residential, commercial, and industrial land uses on the Samoa Peninsula. At the road segment's northern end, vehicles enter and exit via two routes: State Route (SR) 255 south from, and north to, Manila/Arcata; and SR 255 west from, and east to, three bridges connecting the peninsula to Woodley Island and the City of Eureka. Along the road segment's length varied biological communities are found, including native dune mat, ruderal, lupine scrub, and coastal forests. The western edge of the roadway contains multiple turnouts that provide beach and ocean access. The right-of-way width along Segment 1 is 200 feet, and the average paved roadway width is 36.2 feet. Based on a minimum paved roadway width requirement of 24 feet, with 8-foot shoulders (paved or unpaved) on each side, this segment meets AASHTO standards for a roadway with a design volume of 2000+ trips per day. The current paved and right-of-way widths, as well as the intersection conditions at Bay Street and Samoa Pulp Lane, meet AASHTO standards for the vehicle types and level of traffic anticipated at design build-out for the PAR. However, as determined in the memo prepared by W-Trans dated July 19, 2013, traffic signals or roundabouts are recommended on New Navy Base Road at SR 255 and Cookhouse Road, to mitigate substandard LOS due to build-out of the Samoa Town Master Plan and industrial areas on the PAR. The preliminary cost estimate for Segment 1 is $1,929,000. See Sections 3.1 and 3.4 for data on the roadway dimensions and intersection conditions.

One of the requirements for a roadway to be added to the NHS is a contiguous connection to the existing NHS. As such, it is critical that NHS designation for Segment 1(along with NHS designation for SR 255) be pursued as part of establishing contiguity and qualifying other PAR segments for NHS designation. NHS designation will open up more possibilities for funding of roadway construction and improvements.

Segment 2, facing west

8.2 Segment 2: Bay Street – New Navy Base Road to Vance Avenue

Segment 2 comprises Bay Street from its intersection with New Navy Base Road to its intersection with Vance Avenue (Segment 3), totaling 2,103 feet in length. Bay Street is owned and maintained by the County of Humboldt, and has a functional classification designation of Local Road. The roadway has an average paved width of 30.3 feet and a proposed paved width of 32 feet, resulting in a proposed average increase of 1.7 feet for the road segment. The road is within a 65-foot public right-of-way.

Bay Street is bordered on the north by property owned by DG Fairhaven Power Co., LLC, and on the south by property owned by Sequoia Investments X, LLC. Pacific Gas & Electric owns a 25-foot utility easement along the northern edge of the right-of-way; this easement contains additional utility easements. An overhead power line runs along the northern edge of the right-of-way from the DG Fairhaven Power Co. facility to Vance Avenue. A 6-inch PVC water line runs nearly the entire length of Bay Street near its northern edge. Segment 2 has two un-signaled railroad crossings near stations 7+00 and 9+00 (the latter at a skew). These crossings are within the 50-foot railroad rights-of-way. A 30-foot Humboldt Bay Municipal Water District (HBMWD) easement and associated 18-inch techite pipeline meets the road near station 5+00, and then follows the road west for approximately 380 feet where it then crosses the road and continues south.

The northern roadway edge is relatively flat, and is comprised of a mixture of ruderal, beach grass habitat, and dune mat habitat. The southern edge of the roadway has more topographic variety, with a significant willow hollow located near station 15+00, and a small hill that encroaches into the right-of-way between station 1+50 and 4+50. The remainder of the southern edge of the roadway is predominantly ruderal, with interspersed beach grass habitat toward the eastern and western ends of the road segment. The substrate beneath the proposed right-of-way is predominantly loose silty sands and loose poorly-graded fine sands. There are no known cultural or historic resources associated with this road segment.

We recommend that this segment of Bay Street be upgraded to Major Collector functional classification, and that it be added to the National Highway System. The preliminary cost estimate for Segment 2 is $978,000.

8.3 Segment 3: Vance Avenue – Bay Street to Samoa Pulp Lane

Segment 3, which comprises Vance Avenue from its intersection with Bay Street to its intersection with Samoa Pulp Lane, totals 4,612 feet in length. Vance Avenue is a former county road that was abandoned to private ownership, and falls within parcels owned by and under the fee title ownership of Sequoia Investments X, LLC,; California Redwood Company; Pacific Gas & Electric Company (PG&E); Freshwater Tissue Company, LLC; and HBHRCD. As Vance Avenue is mostly a privately-controlled road, it does not currently have a functional classification. The average paved width for this road segment is 20.3 feet. The proposed paved width is 32 feet, resulting in an average increase in paved width of 11.7 feet.

Improvements to and use of Segment 3 will require the acquisition of fee title, or acquisition of an easement over a 60-foot right-of-way to accommodate proposed paved roadway, shoulders, and drainage features.

Segment 3, facing south

Segment 3 runs roughly north/south, and is bordered on the western side by property owned by DG Fairhaven Power Co., LLC, and HBHRCD. The eastern side of the road segment is within the parcels owned by Sequoia Investments X, LLC; California Redwood Company; PG&E; HBHRCD; and Freshwater Tissue Company, LLC. A 20-foot PG&E utility easement is located along the western edge of the right-of-way. An 80-foot PG&E tower line easement crosses Segment 3 at station 6+00; the eastern boundary of the easement intersects with the road segment at station 23+00. A line of joint utility poles is located directly adjacent to the existing paved roadway on both the western and eastern sides of this road segment. Near station 29+00, the 50-foot railroad right-of-way overlaps with the western edge of the proposed right-of-way of Segment 3. This minor encroachment (a matter of five feet or less) continues to the intersection of Segment 3 and Segment 5.

The road segment is predominantly vegetated with ruderal (weedy) species, with intermittent willow hollows located adjacent to the paved roadway primarily along the southern half of the road segment. An active osprey nest was observed on a utility pole adjacent to the paved roadway, near the PG&E substations. The shoulders of Segment 3 are both sloped with western aspects, resulting in a cut bank on the eastern shoulder and a fill slope on the western shoulder. Widening the roadway to AASHTO standards will likely require large volumes of engineered fill.

We recommend that this segment of Vance Avenue be upgraded to Major Collector functional classification, and that it be added to the National Highway System. The preliminary cost estimate for Segment 3 is $2,336,000.

8.4 Segment 4: Vance Avenue – Samoa Pulp Lane to North Spur

Segment 4, which comprises Vance Avenue from its intersection with Samoa Pulp Lane to its intersection with Segment 6, totals 1,788 feet in length. Vance Avenue is a former county road that was abandoned to private ownership, and falls within parcels owned by and under the fee title ownership of California Redwood Company and Freshwater Tissue Company, LLC. As Vance Avenue is a privately-controlled road, it does not currently have a functional classification. The average paved width for this road segment is 23 feet. The proposed paved width is 32 feet, resulting in an average increase in paved width of 9 feet. Improvements to and use of Segment 4 will require the acquisition of fee title, or acquisition of an easement over a 60-foot right-of-way to accommodate proposed paved roadway, shoulders, and drainage improvements.

Segment 4, facing north

The 50-foot railroad right-of-way overlaps with the western edge of the proposed right-of-way of Segment 4 at the intersection of Segment 4 and Segment 5. This minor encroachment continues northward along the western edge of Segment 4, where the encroachment into the railroad right of way between station 55+00 and the railroad crossing at station 61+50 grows more pronounced as the railroad splits and forms two parallel tracks. The two parallel railroad tracks cross the road segment at a skew near station 61+50. Additional accessory tracks near the road segment are privately owned and are remnants of past land uses. A small outbuilding is located next to the joint utility pole near station 60+50; this structure may not currently be in use.

The shoulders along Segment 4 are relatively flat and do not pose any topographic constraints to road widening. While the vegetation along Segment 4 is predominantly ruderal (weedy) species, a small number of willow hollows (western shoulder) and some remnant native dune mat habitat (western and eastern shoulders) are found along the roadway. Widening the roadway to AASHTO standards may require some form of mitigation to address impacts to either of these habitats.
We recommend that this segment of Vance Avenue be upgraded to Major Collector functional classification, and that it be added to the National Highway System. The preliminary cost estimate for Segment 4 is $1,094,000.

8.5 Segment 5: Samoa Pulp Lane – New Navy Base Road to Vance Avenue

Segment 5, which comprises Samoa Pulp Lane from New Navy Base Road to Vance Avenue, totals 220 feet in length. Samoa Pulp Lane is a County-owned and maintained road. The road has a functional classification designation of Local Road. The average paved width of this road segment is 23.5 feet. The proposed paved width is 32 feet, resulting in an average increase in paved width of 8.5 feet. The road is located within an 80-foot public right-of-way.


Segment 5, facing west

Remnant infrastructure from the bygone boom era of lumber processing still remain at the eastern end of Segment 5, namely, an old guard tower, fencing, and defunct automated gate. In addition, a 50-foot HBMWD water line easement crosses the road near its midpoint, and follows the marked depression located on either side of the paved roadway. The 50-foot NCRA railroad right-of-way crosses Segment 5 at station 1+50. The crossing is un-signaled, and the rails are paved over.

No habitats or plant communities other than ruderal were observed along Segment 5.

We recommend that this segment of Samoa Pulp Lane be upgraded to Major Collector functional classification, and that it be added to the National Highway System. The preliminary cost estimate for Segment 5 is $239,000.

8.6 Segment 6: North Spur

Segment 6 is a proposed road where no road currently exists. The road segment begins at its intersection with Vance Avenue at the northern end of Segment 4, and continues generally eastward to the western boundary of APN 401-031-040, owned by HBHRCD. As there is currently no paved roadway along Segment 6, a new 32-foot-wide road is proposed. Since the proposed road segment is on private property owned by California Redwood Company, improvements to and use of Segment 6 will require the acquisition of fee title, or the acquisition of an easement over a recommended 60-foot right of way to accommodate proposed paved roadway, shoulders, and drainage improvements.
The proposed road crosses remnant building footprints and a paved log yard which is dotted with utility poles crisscrossing the property. Some of these utility poles appear not to be in use. The final location of Segment 6 on the paved log yard is not rigid, thereby affording some flexibility during advanced design to avoid active existing utilities. Parallel railroad tracks within a 50-foot railroad right-of-way cross the proposed Segment 6 right-of-way near station 3+50.

Segment 6 crosses ruderal areas and remnant paved areas before it drops 10 feet over a 150-foot distance. This slope will require greater excavation and/or fill than most other areas to maintain a road grade that meets AASHTO standards. A small number of pocket freshwater wetlands are found in depressions in the pavement across the former log deck property. These have not been delineated. Delineation and classification will be required prior to advanced design or road construction.


Segment 6, facing east

We recommend that this segment of road be functionally classified as a Major Collector, and that it be added to the National Highway System upon construction. The preliminary cost estimate for Segment 6 is $746,000.

8.7 Segment 7: South Spur

Segment 7 is a proposed road where no road currently exists. The road segment begins at its intersection with Vance Avenue (Segment 3), at approximately station 15+00, and follows the southern boundary of APN 401-112-021, owned by HBHRCD. Near the eastern side of the peninsula, the road segment takes a turn northward to tie into the existing paved roadway along the waterfront on APN 401-112-021. The road segment ends where the existing paved road intersects with the eastern boundary of APN 401-112-011 (owned by the State of California). As there is currently no paved roadway along Segment 7, a new 32-foot-wide road is proposed. Improvements to Segment 7 will require accommodation of the proposed paved roadway, shoulders, and drainage improvements.


Segment 7, facing east

There are few utilities on or near Segment 7, save a utility pole easement granted to PG&E, which is located approximately 50 feet from the midline of this road segment, at its closest point to the proposed road segment. Near station 14+00, Segment 7 crosses a pair of outfall or intake pipes. These pipes do not appear to be working at this time and may be able to be removed or relocated to avoid conflict with the proposed road segment. Private railroad tracks overlap the proposed Segment 7 right-of-way near station 15+00.

Segment 7 is relatively flat, except for a slight incline from its intersection with Segment 3. The substrate is made up of bay dredge fill and other fill of an unknown origin, and native dune mat and beachgrass pockets; the presence of this substrate will require significant engineering to reach AASHTO standards for a paved roadway. A small population of dark-eyed gilia (*Gilia millefoliata*) is found within the western third of the road segment, which will require mitigation activities to be determined by California Department of Fish & Wildlife staff prior to advanced design or construction. In addition, an active osprey nest was observed in the vicinity of Segment 7.

We recommend that this segment of road be functionally classified as a Major Collector, and that it be added to the National Highway System upon construction. The preliminary cost estimate for Segment 7 is $1,033,000.

Table 10. Road Segment Summary Table

Segment Number	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Length (linear ft. / miles)	13,176 / 2.49	2,103 / 0.4	4,612 / 0.87	1,788 / 0.39	224 / 0.04	872 / 0.17	1,645/ 0.31
Conceptual Level Improvement Costs	$1,929,000	$978,000	$2,336,000	$1,094,000	$239,000	$746,000	$1,001,000
Description	New Navy Base Road from its intersection with State Route 255 to its intersection with Bay Street	Bay Street from its intersection with New Navy Base Road, to its intersection with Vance Avenue	Vance Avenue from its intersection with Bay Street to its intersection with Samoa Pulp Lane	Vance Avenue from its intersection with Samoa Pulp Lane to the property line between Samoa Pacific Group (APN 401-031-065) and California Redwood Company (CRC; 401-031-061), where this property line intersects with Vance Avenue.	Samoa Pulp Lane (formerly known as LP Drive)	Extends northeast from the northern terminus of Segment 4, leaving Vance Avenue and the adjacent railroad track, and follows the northern boundary of APN 401-031-061 and then 401-031-054 until the Segment ends at the western boundary of APN 401-031-040.	Begins at Vance Avenue, approximately 1,380 feet north of the intersection of Vance Avenue and Bay Street. The Segment extends east from Vance Avenue, following the southern boundary of APN 401-112-021, approximately midway between the existing fence line to the north and the utility line to the south. Toward the eastern end of the peninsula, the Segment takes a turn northward to tie into the existing paved roadway along the waterfront on APN 401-112-021. The Segment ends where the existing paved road intersects with the eastern boundary of APN 401-112-011.
Current Ownership	County of Humboldt	County of Humboldt	Private - Freshwater Tissue Company, LLC; Pacific Gas & Electric Company; California Redwood Company; and Sequoia Investments X, LLC.	Private - Freshwater Tissue Company, LLC and California Redwood Company	County of Humboldt	Private - California Redwood Company	HBHRCD
Proposed Ownership	County of Humboldt	County of Humboldt	HBHRCD (Fee Title or Easement)	HBHRCD (Fee Title or Easement)	County of Humboldt	HBHRCD (Fee Title or Easement)	HBHRCD (Fee Title)
Fee Title or Easement Acquisition Needed?	No	No	Yes	Yes	No	Yes	No
Current Functional Classification	Major Collector	Local Road	n/a	n/a	Local Road	n/a	n/a
Proposed Functional Classification	Major Collector	Major Collector	Major Collector	Major Collector	Major Collector	Major Collector	Major Collector
Proposed NHS Designation?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Current Average Paved Width (feet)	36.2	30.3	20.3	23	23.5	0	0
Proposed Paved Width (feet)	36.2	32	32	32	32	32	32
Proposed Average Increase in Pavement Width (feet)	0	1.7	11.7	9	8.5	32	32
Proposed Shoulder Improvements?	None	None	LID drainage features	LID drainage features	LID drainage features	LID drainage features	LID drainage features
Existing Right-of-Way Width (feet)	200	65	0	0	80	0	0
Proposed Right-of-Way Width (feet)	200	65	60	60	80	60	60
Proposed Right-of-Way Width Increase (feet)	0	0	60	60	0	60	60
Biological Characteristics	Listed plant species in native dune habitats along shoulders. Lupine scrub and coastal forests toward northern end of road segment. No anticipated significant impacts.	Ruderal dominant. Willow hollow habitats, beach grass habitats, and native dune mat habitats in vicinity of roadway. No anticipated significant impacts.	Ruderal dominant. Willow hollow habitats along roadway in various locations. Osprey nest observed adjacent to roadway.	Ruderal dominant. Willow hollow habitats and small remnant native dune mat habitat adjacent to roadway.	Ruderal dominant.	Ruderal dominant. Majority paved over. Small freshwater wetland habitats in manmade roadway and log deck drainage features.	Ruderal along western end, transitioning into native dune mat and beach grass habitats. Dark eyed gilia (*Gilia millefoliata*) present within proposed roadway footprint. Will require CEQA consideration and mitigation.
Geologic Characteristics	Loose silty sands and loose poorly-graded fine sands. Potentially contaminated soil and groundwater, requiring assessment.	Loose silty sands and loose poorly-graded fine sands. Potentially contaminated soil and groundwater, requiring assessment.	Loose silty sands and loose poorly-graded fine sands. Potentially contaminated soil and groundwater, requiring assessment.	Loose silty sands and loose poorly-graded fine sands. Potentially contaminated soil and groundwater, requiring assessment.	Loose silty sands and loose poorly-graded fine sands. Potentially contaminated soil and groundwater, requiring assessment.	Soft, saturated, fine-grain native subgrade soils with anticipated high compressibility , low bearing capacity, and high liquefaction potential beneath the eastern end of this segment. Undocumented fill soils are anticipated, with the thickest and poorest quality fill anticipated beneath the eastern end of this segment. Groundwater within 5 feet of ground surface in low lying areas. Remnants of old foundations in the vicinity of this segment, associated with prior development.	Soft, saturated, fine-grain native subgrade soils with anticipated high compressibility , low bearing capacity, and high liquefaction potential beneath the eastern end of this segment. Undocumented fill soils are anticipated to be ubiquitous within the project area with the thickest and poorest quality fill anticipated beneath the entire length of this segment. Surface evidence of bay fills on eastern half of segment. Groundwater within 5 feet of ground surface in low lying areas.
Cultural and Historic Resources	No anticipated impacts	No anticipated impacts	No anticipated impacts	Vicinity to railroad may trigger historic registry review	No anticipated impacts	Highly disturbed - no anticipated impacts	May be in vicinity of Loud Site 20.
Utility Constraints	None.	30-foot HBMWD water line easement; joint utility poles along north side	20-foot PG&E gas line easement; 80-foot PG&E tower line easement; joint utility poles on both sides of the road segment	Joint utility poles along both sides of the road segment	50-foot HBMWD water line easement	Joint utility poles near the road segment	PG&E utility line south of road segment; two intake or outfall pipes
Physical Constraints	None.	Sloped bank on southern side may constrain road widening to the south.	Sloped shoulders toward northern end of road segment. Will likely require extra cut and/or fill.	None.	Steep decline along both shoulders. Will likely require additional fill to meet AASHTO standards.	Steep decline at western end of road segment.	Manmade berm north of proposed road footprint. Must be crossed resulting in excavation within County wetland buffer.
Railroad Crossings	None.	Two RxR crossings approximately midway along Segment.	RxR track located approximately 23 feet west of pavement. Track crosses intersection with Segment 5.	Multiple RxR tracks within 11 feet west of pavement. Multiple tracks cross Segment at northern end.	RxR crossing at intersection with Segments 3 and 4.	One RxR crossing at approximate halfway point.	Private RxR at eastern end of road segment.
Regulatory Requirements* (based on preliminary site visits and biological evaluation - subject to change)	None anticipated.	USACE 404, NCRWQCB 401/WDR, CDP, SP, GP	USACE 404, NCRWQCB 401/WDR, CDP, SP, EP, GP	USACE 404, NCRWQCB 401/WDR, CDP, SP, EP, GP	CDP, GP	USACE 404, NCRWQCB 401/WDR, CDP, SP, EP, GP	USACE 404, NCRWQCB 401/WDR, CDP, SP, CCC CDP, EP, GP

* Permit Abbreviations:
UASCE 404: US Army Corps of Engineers 404 Permit
NCRWQCB 401/WDR: North Coast Regional Water Quality Control Board 401 Water Quality Certification/Waste Discharge Requirements
CDP: County of Humboldt Coastal Development Permit
SP: County of humboldt Special Permit
CCC CDP: California Coastal Commission Coastal Development Permit
EP: County of Humboldt Encroachment Permit
GP: County of Humboldt Grading Permit

LACO

9.0 PRIORITIZATION METHODS AND RESULTS

9.1 Prioritization Criteria

The primary goal of this Plan is to identify a roadway PAR and prioritize the seven road segments for solicitation of future public funding for design and construction. In preparation for consultation with HBHRCD to identify the road segment priorities (see Section 9.2), LACO identified the following prioritization criteria for consideration:

Constraints

As discussed in previous sections of this Plan, each road segment has specific constraints that affect the feasibility of design and construction of that segment to desired standards. These constraints were identified through field surveys, title research, mapping exercises, and stakeholder outreach. The following constraints were designated as criteria for road segment prioritization:

- Biological Characteristics: The presence of potential coastal wetland habitats, native dune mat habitats, rare or listed plant species, or raptor nests within or adjacent to the proposed road segment.
- Geologic Characteristics: The presence of low-grade subgrade soils, potential soil or groundwater contamination, high groundwater levels, undocumented or documented fill soils.
- Cultural and Historic Resources: Potential presence of archeological sites.
- Utility Constraints: Presence of power, phone, or other utility lines within or directly adjacent to the proposed road segment right-of-way, which may require relocation of the utility or realignment of the proposed road segment.
- Physical or Topographic Constraints: Presence of topographic features (hills or hollows) that may require additional excavation or fill; presence of fences, gates, or other security infrastructure that may require relocation or replacement.

Fee Title or Easement Acquisition Needed

The need for HBHRCD to acquire the proposed right-of-way for a road segment is an additional step and additional cost toward the development of that road segment. Whether the negotiation results in fee title or easement acquisition will depend on the discussions with each property owner along that road segment.

Area Served

The future investment of public funds to design and construct road segments for enhanced waterfront access and future economic development will result in tangible benefit for property owners and users on the Samoa Peninsula. To evaluate the relative benefits to the public from construction of each road segment, the area served by each road segment was estimated.

Preliminary Construction and Non-Construction Cost Estimates

Section 6.0 identifies preliminary construction and non-construction cost estimates for each road segment. While the cost of each road segment is only a minor factor, the relative difficulty in securing sufficient public funding to construct each road segment to AASHTO standards was considered.

Condition of Waterfront Infrastructure
As improved access to waterfront parcels is intended to support an enhanced waterfront industry on the Samoa Peninsula, significant investment to prepare a portion of waterfront for future development is an additional step and expense to realizing this goal. If the waterfront infrastructure (i.e. docks, shoreline revetments, if necessary, and waterfront buildings) is in good condition and immediately operable, then the road segments leading to this portion of the waterfront provide a more immediate benefit.

Timing of Need
There has been a recent spate of investment into properties within the PAR by property owners, namely Eel River Resource Recovery, California Redwood Company, and HBHRCD. Anticipated increases in activity and the more immediate need for an improved transportation network were considered when addressing the relative timing of improvements within the PAR.

Railroad Crossings and Encroachments
A specific goal of this Plan is to retain the feasibility of restoring rail transport on the Samoa Peninsula. The presence of rail crossings or encroachments may present additional challenges to road construction, but also affords opportunities to preserve the existing railroad, allow for future new railroad facilities, and incorporate rail improvements with road construction activities. Of course, these rail improvement considerations are directly linked to a future determination of feasibility of reestablishing an East-West or North-South connection. This prioritization criterion is encompassed in other ranking criteria identified above:

- Constraints: The presence of a railroad right-of-way encroachment may require alterations to the road segment design. These alterations may be in the form of realignment of the road segment to avoid the encroachment, or installation of safety features (e.g. walls or other barriers) to accommodate the proximity of the road to the rail line while maintaining an acceptable level of safety.
- Fee Title or Easement Acquisition Needed: The North Coast Railroad Authority owns portions of the railroad right-of-way in fee, while other portions are controlled through easements. In either case, crossings or encroachments will require negotiation with North Coast Railroad Authority.
- Improvement Costs: Retention of viable rail crossings will require additional design work and other construction and non-construction costs.
- Condition of waterfront infrastructure: In cases where waterfront infrastructure is suitable to accommodate a cargo terminal or other major shipping hub, the location of a key intertie of the roadway PAR, projected conceptual rail alignment, and dock facility is an asset that may bolster the road Segment's priority. One example of such a site is the former LP mill site, recently acquired by HBHRCD.

9.2 HBHRCD Consultation

On June 23, 2013, LACO Associates project staff met with HBHRCD CEO, Jack Crider, and Principal Planner for Planwest Partners, George Williamson, to discuss the prioritization criteria, as described above, and to establish the order of priority of road segments for future funding solicitation and construction. The meeting attendees reviewed the preliminary cost estimate for each road segment, discussed the various prioritization criteria as they related to one another and between each road segment, and reviewed the overall PAR configuration in relation to current and future development scenarios.

The conclusion of the prioritization meeting was that a pragmatic, needs-based approach would best serve the goals of this Plan. Based on the current efforts of California Redwood Company, Eel River Resource Recovery, and HBHRCD to revitalize operations within the vicinity of the PAR, and increase operational efficiencies for existing property uses, the road segments that would most immediately serve the needs of those revitalization efforts were given the highest priority. Segments 3, 4, and 5 have the potential to provide improved and efficient access to support existing operations and new businesses. Therefore, these road segments were given higher priority than other road segments. As investment in waterfront infrastructure is a longer-term reality, and alternate unofficial routes can provide short-term access to existing functional waterfront facilities, those road segments providing more focused access to the waterfront parcels (Segments 6 and 7) received a lower priority.

9.3 Prioritization Results

Table 11 shows the assigned prioritization for road segment funding and construction, based on the methods described in section 9.1 and the considerations described in Section 9.2.

Table 11. Preferred Alternative Route Road Segments Prioritization

Priority No.	Segment No.	Description	Justification
1	3	Vance Ave - Bay Street to Samoa Pulp Lane	Road improvements will immediately improve internal circulation within the PAR to benefit current property owners and short-term future development scenarios. Access for the greatest number of property owners.
2	4	Vance Ave - Samoa Pulp Lane to North Spur	Road improvements will immediately improve internal circulation within the PAR to benefit current property owners and short-term future development scenarios. Major existing railroad infrastructure located adjacent to road segment.
3	5	Samoa Pulp Lane - New Navy Base to Vance Ave	While currently sufficient for short-term use, road improvements will provide better connection from New Navy Base Road to the industrial properties.
4	2	Bay Street - New Navy Base Road to Vance Ave	Road improvements will support secondary access to internal circulation, as well as improved access to waterfront properties in Fairhaven.
5	7	South Spur off Vance Avenue	Significant biological, geologic, and regulatory constraints exist. There is an existing short-term, unofficial, alternate access route to Redwood Berth 2. Future dock improvements and Segment 7 road construction will improve utility. Opportunity for key intertie with railroad and shipping facilities at eastern end of road segment.
6	6	North Spur off Vance Avenue	Redwood Berth 1 is in advanced disrepair, requiring signficant investment. Plans for renovation or relocation are not yet developed. Potential future benefit as a major shipping facility. Opportunity for intertie with conceptual rail alignment at eastern end of road segment.
7	1	New Navy Base Road - Bay Street to SR 255	Improvements to this road segment are directly tied to Samoa Town Master Plan and 30-year build-out scenario. No immediate need for improvements, as the road segment meets AASHTO standards for NHS.

LACO

10.0 FUNDING OPPORTUNITIES AND NEXT STEPS

10.1 Funding Opportunities

We anticipate the PAR segments will be developed and improved over time, based on each segment's development priority and the availability of funds. We also anticipate that changes in the economic environment over time may cause priorities and opportunities to shift.

The Federal Moving Ahead for Progress in the 21st Century Act (MAP-21), was signed into law in July 2012, and is the first long-term highway funding authorization enacted since 2005. While the details of some of the act's funding programs are still being determined, several of the most common transportation programs will continue to be funded in the coming years. In particular, the following Federal-aid programs will continue, and will be the most likely sources of funding for the Samoa Industrial Waterfront Transportation Improvement Plan.

1. **Surface Transportation Program (STP)** – The STP provides flexible funding that may be used by states and localities for projects to preserve and improve the conditions and performance on Federal-aid highway, bridge, and tunnel projects on public roads; pedestrian and bicycle infrastructure; and transit capital projects.
2. **Congestion Mitigation and Air Quality Program (**CMAQ**)** - The CMAQ program is continued in MAP-21 to provide a flexible funding source to state and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. Funding is available to reduce congestion and improve air quality for areas that do not meet the National Ambient Air Quality Standards for ozone, carbon monoxide, or particulate matter (nonattainment areas) and for former nonattainment areas that are now in compliance (maintenance areas). The North Coast Air Basin is in nonattainment for the state 24-hour PM_{10} standard. There may also be potential in the future for HBHRCD to partner with another port facility to reduce emissions in an area in nonattainment for another criteria pollutant, by increasing shipments through Humboldt Bay, thereby redirecting shipping traffic from the partnering port.
3. **National Highway Performance Program (**NHPP**)** – The NHPP provides support for maintaining the condition and performance of the NHS and for constructing new NHS facilities. The NHPP also includes monitoring to ensure that investments of Federal-aid funds in highway construction are directed to support progress toward the achievement of performance targets established in a state's asset management plan for the NHS.

In addition, Humboldt Bay is on the federally-designated Marine Highway (M-5), and may be eligible for funds from the **Marine Highway Grant Program**. The Marine Highway Grant Program is a U.S. Department of Transportation program to expand the use of our Nation's navigable waterways to relieve landside congestion, reduce air emissions, and generate other public benefits by increasing the efficiency of the surface transportation system. Marine Highway grants are awarded to qualified applicants to implement Marine Highway projects or components of a designated Marine Highway project.

Also, the Transportation Investment Generating Economic Recovery, or TIGER **Discretionary Grant Program**, provides opportunities for the U.S. Department of Transportation to invest in road, rail, transit, and port projects that promise to achieve critical national objectives. Congress dedicated $1.5 billion for TIGER I and $600 million for TIGER II, and provided additional TIGER Grant funding of $526.944 million for FY 2011 and

$500 million for the FY 2012, to fund projects that have a significant impact on the nation, a region, or a metropolitan area.

All of the Federal-aid funding programs mentioned above are competitive. Each program has different requirements, but the following steps are typical of Federal-aid projects.

1. Include project in HCAOG's RTP and program in the Federal Statewide Transportation Improvement Program (FSTIP).
2. Obtain obligation of funds for preliminary engineering.
3. Complete preliminary environmental studies.
4. Hold field review with Caltrans.
5. Complete NEPA and CEQA documents and certifications.
6. Develop plans, specifications and cost estimate.
7. Obtain obligation/authorization of funds for right-of-way acquisition (if needed).
8. Complete right-of-way acquisition.
9. Obtain obligation/authorization of funds for construction.
10. Advertise and award the construction contract.
11. Complete construction.

While acknowledging that completion of the improvements for each segment will depend on the availability of funding, we have prepared the following 'typical' timeline for the completion of each segment. The actual time to complete each segment will vary depending on the degree of environmental impacts, mitigation measures, right of way or easement acquisitions, and utility and railroad coordination.

DEVELOPMENT PHASE	YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5			
Obtain obligation, begin preliminary engineering	■																			
Complete preliminary environmental studies	■	■																		
Hold field review with Caltrans			■																	
Complete NEPA and CEQA documents and certifications				■	■															
Develop plans, specifications and cost estimate						■	■	■												
Obtain obligation or authorization of funds for right-of-way acquisition (if needed)									■											
Complete right-of-way acquisition										■	■									
Obtain obligation or authorization of construction funds												■								
Advertise and award the construction contract													■	■						
Complete construction															■	■	■			

10.2 Next Steps

The successful use of Federal-aid or State funds requires close coordination of programming, monitoring, and reporting between the local agency (HBHRCD), HCAOG, and Caltrans. As of the date of this report, all segments of the PAR are included in Table *Goods-3: Regional Goods Movement Projects & Improvements,* of the *Draft Humboldt Regional Transportation Plan 2013 Update*. The RTP update is scheduled to be completed and adopted by HCAOG by the end of 2013 or early 2014. Upon adoption by HCAOG, and as funding becomes available, select projects are submitted for funding to the California Transportation Commission in the Regional Transportation Improvement Program, and subsequently incorporated into the State Transportation Improvement Program (STIP).

To successfully implement this Plan, we recommend HBHRCD pursue the following actions:

1. We recommend that HBHRCD develop a relationship with HCAOG to ensure the greatest success in obtaining transportation funding. In particular, HBHRCD should submit a written request to HCAOG for appointments to their Technical Advisory Committee (TAC) and Policy Advisory Committee (PAC). Upon approval, HBHRCD should appoint a staff member or representative to participate in the TAC. The PAC is currently made up of the HCAOG Board of Directors (elected representatives from each city in the County, and a County Supervisor), and representatives from Caltrans and the Humboldt Transit Authority. Every two years, based on federal and state

transportation funding estimates, HCAOG develops and submits a list of projects to be included in the State Transportation Improvement Program. The project list is established with input from the TAC and PAC. In addition to being "at the table" when funding recommendations are made, involvement in the TAC and PAC are good ways to stay abreast of other transportation issues and funding opportunities.

2. We recommend that HBHRCD follow-up with the Humboldt County Public Works Department to ensure that Bay Street and Samoa Pulp Lane are reclassified as Major Collector roads. As of the date of this Plan the necessary forms, maps, and draft resolution have been provided to the County, and the County Public Works Department is aware of HBHRCD's interest in the reclassification.

3. We recommend that HBHRCD continue to recommend that Caltrans and Humboldt County pursue adding New Navy Base Road and SR 255 between Samoa and Eureka to the National Highway System. Presently the Humboldt County Public Works Director is not convinced there will be sufficient increased funding for New Navy Base Road to offset the potential additional maintenance and monitoring costs required for NHS roads. Caltrans has promised to study the issue of adding SR 255 to the NHS when they update their SR 255 corridor report in 2014. HBHRCD should monitor progress of that report, and continue to educate both the County and Caltrans on the benefits to the area of having these segments, and the rest of the PAR, added to the National Highway System.

4. We recommend that HBHRCD continue to engage stakeholders and major property owners on the Samoa Peninsula, to look for opportunities for mutually beneficial project development opportunities. These opportunities may come in the form of public or private investment in infrastructure or new commercial or industrial ventures. Coordinated development between HBHRCD and private and public partners will support orderly and efficient growth on the Peninsula, and maximize utility of existing and planned transportation and utility infrastructure.

5. We recommend that HBHRCD continue to research new funding opportunities for development that will utilize and be facilitated by the PAR in future phases. These funding sources may support harbor development, goods movement, or upgrades to the aging infrastructure on the Peninsula. Recognizing the limited contribution that a revitalized road network will have for the Samoa Peninsula without the other improvements that will incentivize and enable desired growth, while continuing targeted efforts to procure those improvements (e.g. sewer, electrical, high-speed internet), will lend to a more attractive landscape for redevelopment.

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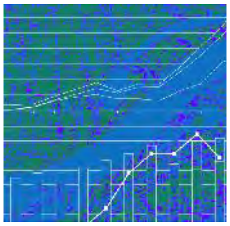
APPENDIX 1

Humboldt Bay Alternative Rail Corridor Concept Level Construction Cost and Revenue Analysis (BST Associates, 2013)



Humboldt Bay Alternative Rail Corridor Concept Level Construction Cost and Revenue Analysis

Final Report

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Humboldt Bay Alternative Rail Corridor
Concept Level Construction Cost and Revenue Analysis

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Executive Summary

BST Associates, along with the Burgel Rail Group, was retained by the Humboldt Bay Harbor, Recreation and Conservation District to examine the concept of restoring rail service to the Samoa Peninsula, either through restoration of the existing North Coast Rail line or through construction of a new east-west rail corridor linking the Humboldt Bay region with the mainline rail system near Red Bluff.

This analysis involved two main tasks: in the first task, the Burgel Rail Group developed preliminary cost estimates for constructing a new east-west alignment to the Red Bluff vicinity, as well as for reconstructing the existing North Coast Rail corridor. In the second task, BST Associates estimated the volume of cargo that would be required to cover construction costs if the project were to be self-financed, based on the net revenue generated per ton of cargo. This analysis assumes that the project would be financed through bonds, and the analysis used a range of interest rates to illustrate both public and private financing.

The goal of this analysis was to provide a preliminary estimate of the volume of rail cargo needed to make rail service to Humboldt County economically viable. The focus of this analysis is dry bulk cargos such as coal, iron ore, grain, potash, and others. The identification of these commodities was not intended to provide a market analysis for a rail line to the Humboldt Bay region, and makes no recommendations regarding potential rail cargo. Rather, these commodities were chosen due to the fact that they now move by rail in high volumes, and that these existing movements provide the revenue and cost data needed to estimate the volume of rail cargo required to finance a rail line to Humboldt Bay.

Because the focus of this analysis was high-volume cargoes, containerized cargo was not included. The concept of a container port on Humboldt Bay has been the subject of several past studies, and the cost estimates presented in this analysis assume that the rail corridor would support double-stack container operations. However, given the relative strength of the bulk cargo markets compared with the container market, bulks represent a stronger potential market for a Humboldt rail line at this time.

Conclusion

Rail service to Humboldt County will require a major investment, through either a new East-West rail alignment or through reconstruction of the former North-South line. In order for this investment to be financially feasible, the rail line will need to generate large volumes of cargo.

A rail line to Humboldt County would face strong competition from existing ports, primarily those on the U.S. West Coast. Humboldt County would face several competitive disadvantages relative to these other ports, including the need to cover the cost of constructing the new line, and the lack of a rail distance advantage.

In addition to the lack of rail infrastructure, waterborne exports of large volumes of bulk commodities (or containers) would likely require substantial investments in new cargo terminals. Also, the Humboldt Bay navigation channel is not as deep as that at most of the competing ports, which would also require a substantial investment.

In conclusion, development of rail service to Humboldt County is likely to be both high cost and high risk.

Humboldt Bay Rail Analysis

Introduction

BST Associates was retained by the Humboldt Bay Harbor, Recreation and Conservation District to examine the concept of restoring rail service to the Samoa Peninsula, either through restoration of the existing North Coast Rail line or through construction of a new east-west rail corridor linking the Humboldt Bay region with the mainline rail system near Red Bluff.

BST was founded by Paul Sorensen in 1986, and specializes in economic and financial evaluations of port and transportation projects. BST Associates expertise focuses on: financial planning (including bond feasibility studies), rate/tariff assessments, sensitivity analysis, market research, strategic planning, demand forecasting, benefit/cost analysis, cost effectiveness analysis, economic impact assessment, life cycle cost analysis, and project risk assessment. BST Associates has worked on several past projects in the Humboldt Bay region, including the *Port of Humboldt Bay Harbor Revitalization Plan* (2002), and the *NCRA Freight Rail Demand Assessment* (2002). BST Associates has completed port and transportation projects for most West Coast ports, including San Diego, Los Angeles, Long Beach, Oakland, San Francisco, Richmond, Coos Bay, Astoria, Longview, Kalama, Vancouver (WA), Portland, Grays Harbor, Seattle, Tacoma, Olympia, and others.

BST Associates worked closely with the Burgel Rail Group (BRG) on this project. BRG is led by Bill Burgel, who has more than 41 years of experience in engineering and railway operations. He has managed railway operations for several consulting companies and served as project manager/project engineer for railway and transportation engineering projects throughout the nation. Mr. Burgel understands the operations of railroads, including freight/materials movement, and passenger railroad traffic flow issues. He is a recognized expert in solving interface and capacity issues between the different modes. Mr. Burgel understands the importance of the total integration of a rail system in a corridor throughout the planning, design and implementation phases.

The current Humboldt Bay Rail Analysis involved two main tasks:

Task 1 – Preliminary Cost Estimates. In the first task, the Burgel Rail Group developed preliminary cost estimates for constructing a new east-west alignment to the Red Bluff vicinity, as well as for reconstructing the existing North Coast Rail corridor. Cost estimates for the east-west alignment were based on visual analysis of potential routes, conducted by air and by ground, as well as analysis of topographic maps, previous surveys, and other available information. The cost estimate for reconstructing the North Coast Rail alignment was based in large part on previous analyses of this line, updated with current costs.

Task 2 – Estimated Cargo Volumes. In the second task, BST Associates estimated the volume of cargo that would be required to cover construction costs. These estimates were developed using total revenue, total railroad cost, and net railroad revenue. Average revenue per ton-mile was based on current rail moves of various potential cargo types, using data from the Surface Transportation Board (STB). Railroad costs were estimated using the revenue to variable cost (RVC) data developed by the STB, and net revenues were estimated by subtracting cost from gross revenue. Based on this net revenue, the total volume of cargo required to covered costs was calculated.

The focus of this analysis is high-volume rail-served cargoes. Specifically, these included dry bulk cargos, such as coal, iron ore, grain, potash, and others.

Overview of Rail Service to Humboldt County

The following section was prepared by the Burgel Rail Group.

History

Beginning in 1902, the Humboldt Bay Region was served by the former Northwest Pacific (NWP) line of the Southern Pacific (SP). The NWP was an amalgam of over 43 different rail companies, including the Eureka & Oregon, which the SP pieced together with the Santa Fe Railway until that company's ownership was bought out by SP in 1929. The NWP connected the communities of Trinidad, Arcata, Samoa, Korbel, Blue Lake and Eureka with communities in Mendocino, Sonoma and Napa counties as well as the national rail network.

The railroad's alignment generally paralleled the northwest/southeast trending topography that resulted from ancient and on-going geologic processes associated with terrane and marine sediment accretion related to the Gorda Plate Subduction Zone. These processes create a series of ridges and valleys that run parallel to the Pacific Coast. The northern portion of the NWP rail line generally followed the Eel River through one of the valleys then crossed over a divide near Willits eventually dropping in the Russian River drainage until reaching Santa Rosa. US Highway 101 roughly follows this same path.

While owned by Southern Pacific, the primary traffic transported by the railroad was lumber and other forest products generated by the numerous sawmills located in Humboldt County and along the rail corridor. This business was routed south along the NWP to the SP main line near Vallejo, and then routed to the SP yard in Roseville (near Sacramento) for eventual transport to the product's final destination.

Throughout its history, the NWP was difficult to maintain and keep in service. In fact, the rail corridor has been out of service since the portion of the rail line most difficult to maintain (Eel River canyon near Dos Rios) washed out in 1998 and has not yet been placed back in service. Even before that washout, however, the number of carloads moving on the line had decreased, and in the 1980's SP sold portions of the line at various times to a shortline operator.

Even though the NWP continued to generate traffic into the 1990's, SP decided to sell the line due in part to its high maintenance costs. These costs were two to three times higher than on other branch lines owned and operated by SP. Limited shipments continued under the new ownership until the line washed out in the Eel River Canyon. The Federal Railroad Administration (FRA) embargoed the railroad in 1999, with only the southern portion south of Windsor reopened in 2011.

Current Situation

Lumber and forest products continue to be produced by Humboldt County mills. A portion of the output from these mills is currently transported over the North Coast Range to transload operations (locations where cargo is transferred from truck to rail or vice versa) located in the Redding area, via California Highway 299 that connects the Arcata/Eureka area with Redding.

Once the cargo is loaded onto a railcar in Redding, it is moved on Union Pacific (UP) "through" trains to its ultimate destination. The California Highway 36 corridor, located south of Eureka, is also used to transport a small amount of cargo. However, because of the tight curvature of this highway, trucks are limited to less than the California Legal length.

The Sacramento Valley is also a major center of agricultural production that generates significant volumes of export commodities. These commodities are currently shipped by rail or truck to ports in the Bay Area, as well as Sacramento and Stockton.

Preliminary Cost Analysis

Regional Setting

Proponents of rail service to the Humboldt Bay region have suggested that an alternative east/west rail route that roughly parallels the existing truck route might better serve their commercial interests. In this analysis three potential routes have been suggested that begin in the Eureka/Arcata/Samoa area and extend east to Union Pacific railheads in Redding, Red Bluff and/or Gerber. A fourth route was also examined connecting some of the portions of the three routes with a direct connection to Red Bluff. The ultimate interchange location would likely be a decision for the Union Pacific based on what would make it operationally functional. None of the potential routes provides a connection to the Burlington Northern Santa Fe (BNSF). The potential routes are briefly described in the next section and are examined in depth in the body of the report.

The proposed east/west rail routes begin at Humboldt Bay and trend eastward through the very mountainous North Coast Range. The route profile presented at the bottom of Figure 1 demonstrates the extreme ruggedness of a potential east-west route. This route cross-section shows the ridges and valleys that lie along a direct route between Eureka and Redding, represented by the red line in the satellite image at the top of Figure 1.

As illustrated, a number of prominent ridges and valleys must be crossed between Eureka and Redding. Because trains can only climb 50 to 80 feet per mile, ridges that climb more steeply than that present difficulties in laying out a rail alignment. The direct 94-mile route between Eureka and Redding contains six or more such ridges. As with other western rail routes, the challenge is to design an alignment that provides the best trade-off between costs (construction and operations) and train operating speeds.

Figure 1 – Topography of Potential East-West Rail Route

Proposed Rail Routes

Three routes were developed for this analysis, including:

- Rail route #1 – Blue Lake Alignment
- Rail route #2 – Alton Alignment
- Rail route #3 – Eel Canyon/Southern Alignment

For the purposes of this report, all alignments use Cookhouse Road in Samoa as the initial milepost (MP 0.0). The analysis used three potential locations in the Sacramento Valley for interchanging rail traffic with the Union Pacific (UP), which included Redding, Red Bluff and Gerber.

For sections where a rail alignment route currently exists, this analysis used the existing alignment. For costing purposes however, the trackage will be upgraded to at least 115-pound rail (or better) and bridges to accommodate the 286K loading that is standard for bulk trains and containers. Although the market analysis in this report focuses on bulk shipments, the cost estimates assume that existing tunnels will be “cleared” to accommodate high-cube/double stack container rail equipment, so as to not preclude that type of traffic. Industry accepted unit costs were used. In 1909, Jess Lentell described two alignments which are also included in the analysis.

Railroad Engineering Basics

Since the 1830’s, railroads throughout the nation have generally followed river valleys and gentle plains as they connect cities and industry along their routes. Locating a railroad along routes with favorable topography had not only a direct impact on their capital costs (CAPEX) but over time reflected lower operating and maintenance (O&M) costs. If a competing railroad had already occupied a desirable river valley alignment, the next-to-build railroad had no choice but to locate on less desirable terrain with its attendant higher CAPEX and O&M costs.

Building westward from the Atlantic seaboard however, the nation’s railroads had no choice but to climb up and over the Allegheny Mountains. They did this on a 2.25% grade connecting the Potomac River grade near Cumberland, Maryland with Pittsburgh. Once west of Pittsburgh, the flat farmlands and prairies presented little opposition to the construction of hundreds of miles or railroads until the Rocky Mountains were encountered. In the building of the nation’s first transcontinental railroad, President Lincoln recognized that building in mountainous terrain was much more difficult than the flatland and paid out a subsidy three times as much ($48K/mile vs. $16K/mile for flat terrain).

Today, the agreed-upon design criteria for an optimal maximum railroad gradient is generally around 1.0%. Certainly steeper gradients are commonly encountered but seldom exceed the 2.25% grade that was initially used to lay out the first mountain crossing (this corridor, CSX’s main line, is still in use today).

Ideally, a railroad is located on as flat a grade as possible. In this manner, operating speeds can be optimized; once a hill is encountered, then velocities both for ascending as well as descending trains can be affected. If the railroad is composed of fairly gentle curves, sufficient horsepower can be placed on the train to allow ascending trains to achieve track speed. In other words, if a 1.5% gradient is encountered, one of the Class 1’s (a railroad such as BNSF or Union Pacific) can equip an important train with approximately 4.0 horsepower per trailing ton and the train can achieve speeds of 60 mph to 70 mph up the grade.

Descending a grade can be a problem, however, as it is necessary to control the speed of the down-slope train by using one or both of two braking methods: setting the air brakes on the train and/or using the dynamic braking located on the locomotives.

Braking on steep gradients in excess of 2.0% creates a problem, especially for heavy trains; once a train picks up speed, it is difficult to slow down. Accordingly, many railroads invoke a calculation known as Tons per Operative Brake (TOPB) which limits trains to fairly slow speeds (usually in the 20 mph to 25 mph range) as the train descends the grade.

This practice is similar to the speed restrictions placed on semi-trucks that are descending a mountain pass. In this example, the authorized truck speed is a function of the cargo weight being transported by the truck; the heavier the lading, the slower the maximum speed the truck is allowed on a steep descending grade.

In addition to steep grades, railroads traversing mountainous terrain are often characterized by numerous curves. Curves sharper than two and a half to three degrees will affect the operating velocity. For instance, a five degree curve can be negotiated at no faster than 40 mph. This speed is normally adequate for most freight trains. When curvature reaches ten degrees, however, the speed drops to 20 to 25 mph.

When combining grades and curves, the gradient must be lessened to compensate for the increased resistance a train experiences while pulling through a curve or series of curves. This factor is very important in assessing the amount of horsepower to place on a train. Without the curves, a train might otherwise be able to ascend a grade; however, the curves offer enough resistance that the train will stall if the grade has not been “compensated”. For this analysis, a gradient of 1.5% is recommended as this slope, at 80 feet of rise or fall per mile, allows trains to operate at track speed on both the ascending and descending grades. Given the numerous curves likely to be encountered, the compensated curves will likely require the same horsepower as a 1.75% grade would require.

Route selection of a railroad by the pioneers combined all these factors. However, if a mountain range was encountered, the optimum grade sought after by all railroad scouts was a gentle grade that sloped upward (or downward) in the direction of travel that matched the gradient necessary to cross the pass ahead. This geographic feature was known as a “gangplank” and the most famous one was discovered by General Grenville Dodge when scouting a route for the first transcontinental railroad, the Union Pacific, just west of Cheyenne, Wyoming. Another key factor in mountainous railroading is to maintain as level a grade as possible. If a scout had a choice between maintaining a level route that was, for instance, 10 miles longer than a route that descended 500 feet then regained this same elevation, the more expeditious alignment might be the one that maintained the level alignment. This is due to the fact that train handling, locomotive horsepower assignments, and fuel consumption are all likely to be improved on the flatter but longer route.

The Federal Railroad Administration has designated Class of Track as a function of its track condition and geometry with associated maximum allowable speeds. According to a summary presented in *Trains Magazine*, the first primary freight rail line classifications include:

- Class 1: 10 mph for freight, 15 mph for passenger,
- Class 2: 25 mph for freight, 30 mph for passenger,
- Class 3: 40 mph for freight, 60 mph for passenger, and
- Class 4: 60 mph for freight, 80 mph for passenger.

Class 3 commonly includes regional railroads and secondary main lines, while Class 4 is the dominant class for main-line track used in passenger and long-haul freight service.

For the purposes of this study, the components that make up the track will likely be new or good second-hand material. The track will nominally be rated at Class 3 (40 mph) in order to provide acceptable service speed. However, because the actual curve geometry has not been determined, this rating is advisory only and the actual track class must wait until the railroad is more precisely located and the degree of curvature for each curve determined. This is an iterative process that goes hand-in-hand with grading volumes and over all construction costs. For example, if a modest-size side canyon is encountered while laying out the railroad, grading costs could be minimized if the curve is sharpened with minimal fill placed in spanning the side canyon. However, if this curve is perhaps the only curve in the vicinity that would otherwise limit an unrestricted timetable speed, then it might make sense to straighten out the curve and by doing so, increase the amount of fill (at higher costs) required to construct a more tangent subgrade.

Route Selection of a Railroad in the North Coast Range

Route Design Considerations

When designing a rail corridor, the factors discussed in the previous section must be evaluated in terms of the intended use of the railroad. One of the first questions to be addressed is whether the proposed railroad will be primarily passenger or freight.

Assuming that the primary rail traffic will be freight, modest grades not exceeding 2.0 degrees are recommended. Curves should be no sharper than 5.5 degrees.

Because the Coast Range in Northern California is rugged and steep, it is likely that numerous curves will be encountered as the proposed rail routes ascend and descend the multiple ridges between the Pacific Coast and Central Valley. For this reason, curves up to ten degrees and perhaps sharper are likely.

The location of restricting curves will have a significant impact on what train speed can actually be attained. For example, if the maximum allowable speed on a proposed route is 40 mph, but the route contains curves approximately every mile with speeds restricted to 25 mph, the entire corridor will effectively be operated at 25 mph. Typical dry bulk trains can have 100 cars or more and stretch for more than a mile, and the entire train must pass through the restricted curve at 25 mph before the head-end can accelerate. If restricted curves are located roughly a mile apart, then the head-end of the train will be entering another restricted curve just as the rear of the train clears the first curve.

Realistically, given the relatively slow acceleration and deceleration of a freight train, if restrictive curves are located every two miles apart, then the effect will likely be the same; namely that the entire railroad will operate at 25 mph instead of the desired 40 mph.

A grade of 1.0% climbs or descends approximately 50 feet for every mile traveled, and a grade of 2.0% climbs of descends approximately 100 feet per mile. If a proposed route crosses a mountain pass that is 3,000 feet in elevation and this pass is located 60 miles from the beginning of the line, the average grade along the route would be 1% (i.e. 50 feet per mile x 60 miles = 3,000 feet).

However, in this example there may be places where the ascending grade crosses relatively flat areas. If 50 feet of elevation is not gained over every mile, then the route must be lengthened in order to maintain the 1% grade. Therefore, terrain must be located that allows the track to continue to ascend.

As a second example, if the 3,000-foot pass is located only 30 miles from the beginning of the line, then either the grade must be steepened to 2.0% (100 feet per mile x 30 miles = 3,000 feet), or the line may be lengthened by an additional 30 miles to maintain a 1.0% grade. This additional mileage can be achieved by incorporating switchbacks and loops in order to gain or lose elevation in a gradual and uniform manner.

Rail Route Analysis

Burgel Rail Group (BRG) was retained by the Humboldt Bay Harbor, Recreation and Conservation District to conduct the rail route analysis. The inspection team was led by Mr. Bill Burgel, principal of BRG, who has an extensive background in rail engineering and operations as well as a professional understanding of geology.

The east/west rail routes were examined during a three day period beginning April 22nd through April 24th, 2013. The reconnaissance included a fly-over of Rail Route #1 that began on April 22nd by flying north to Fieldbrook then turning 180 degrees to then follow the west flank of Redwood Creek to South Fork Mountain, then a flight long Hayfork Creek to Wildwood with a continuation of the flight toward Platina. After following the Platina-Redding Road for approximately 20 miles, the flight recon then followed Rail Route #2 from a location southeast of Platina then along the South Fork of the Trinity River until reaching the ridge crest of South Fork Mountain. From Dinsmore, the flight followed the Van Duzen River Canyon then Hwy 36 until reaching Hwy 101 which concluded the flight inspection.

Figure 2 – Aerial View of the Van Duzen River Along Highway 36 West of Carlotta

Source: Burgel Rail Group

On April 23rd and 24th, Rail Routes #1 & #2 were surveyed by driving along the prescribed alignments. This windshield survey included an inspection of the terrain on either side of Highway 299 from its intersection with Hwy 101 east to the general vicinity of Lord Ellis Pass. The inspection also included a drive along Hwy 36 to Bridgeville, then north along Kneeland Road to the 2500 foot elevation to observe the Van Duzen River Corridor. The driving inspection continued east through the community of Mad River, over South Fork Mountain and through Forest Glen as well as the Hayfork River Canyon from Hayfork to Hyampom.

Over 800 photos were taken of the region through which these rail routes are proposed. Using the railroad basics discussed in the section above, the various alignments that connect Humboldt Bay communities with the Central Valley were plotted using Google Earth. This tool saved countless man-hours of route analysis plus the added expense of acquiring the necessary USGS Quadrangle topographic sheets for the various routes. Google Earth allows a route to be depicted and saved on a map by placing a “node” at the proposed location and elevation. By connecting these nodes, an alignment can be produced that displays the route at the proper gradient. By right-clicking, a profile of the route can be generated that shows route mileage, gradient (general and specific) and other pertinent features. Sites where bridges and tunnels will be required can also be determined using this technique. Google Earth cannot produce quantity estimates of cuts and fills necessary to accurately determine grading costs. At this scale of examination, the degree of curvature for each curve along the various alignments was not calculated although this type of analysis could be performed during future studies.

Existing reports were also reviewed including the 1909 Lentell alignment (which is, apparently, the general trend of Rail Routes #1 & #2). USGS geologic maps of the area were also inspected. It must be pointed out that “no silver bullets” were discovered during the analysis. As Lentell discovered in 1909, it is difficult to design an acceptable rail alignment connecting Humboldt Bay with the Central Valley.

In addition, Mr. Burgel, on a previous unrelated inspection, hi-railed the NWP from Willits to Fortuna when the line was still in-service.

Based on this reconnaissance, the following factors were used to more accurately determine the potential routes:

1) The numerous landslides evident along Hwy 299 between Blue Lake and Lord Ellis Pass (and confirmed by USGS maps) demonstrate that the area just north of Hwy 299 in the vicinity of Blue Lake should be avoided at all costs due to on-going landslides. Mapping performed by Lentell and others shows Rail Route #1 to be routed through this area of unstable ground.

2) Landslides on both the west and east flank of South Fork Mountain were seen during the fly-over and during the driving inspection. Both Rail Route #1 and Rail Route #2 traverse this area. Some of these observed landslides were major, and no alternative route was readily apparent.

3) The Carlotta Grove of redwoods east of Carlotta was avoided by placing Rail Route #2 high up the ridge, above the grove.

4) Placing Rail Route #2 on the ridge also avoids numerous landslides that are evident along Hwy 36 between Carlotta and Bridgeville, but may encounter ancient landslide areas upon closer inspection.

Description of Rail Routes

Maps of the rail routes described below are presented on pages 18-20.

Rail Route #1 – Blue Lake Alignment

Beginning in Samoa, this alignment follows the Samoa Branch of the NWP to the Arcata Wye, then proceeds north along the former Arcata and Mad River alignment, crossing the Mad River and Hwy 299 near Glendale. There the new alignment climbs northwesterly at a 1.5% (80 foot to the mile) grade before doubling back through several tunnels toward Hwy 299.

Figure 3 – Former Blue Lake Station

Source: Burgel Rail Group

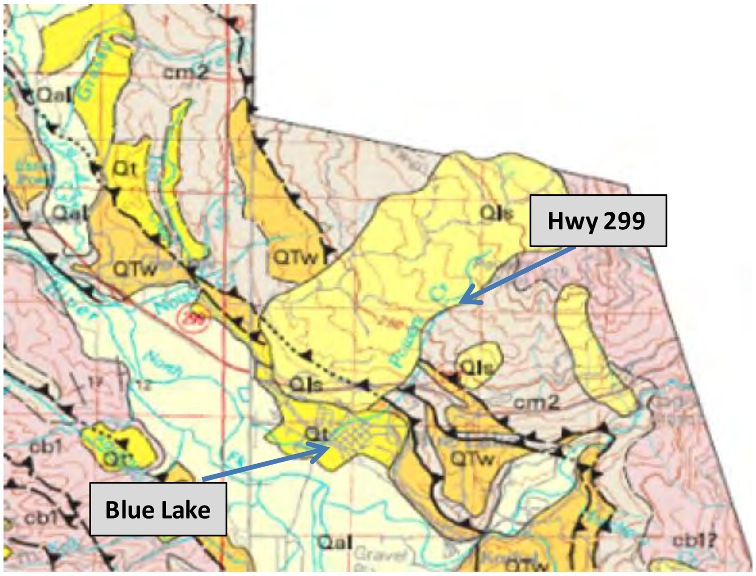
The alignment passes through a summit tunnel near Lord Ellis Pass then continues climbing on a 1.0% grade along the western flanks of Redwood Creek until summiting near Elev. 3,500 feet near Spike Buck Mountain. The alignment crosses into the South Fork Trinity River drainage through a summit tunnel using South Fork Mountain to descend 2,100 feet in the Hyampom Valley.

Near Hyampom, Rail Route #1 swings to the east following Hayfork Creek passing through numerous tunnels climbing at a 1.5% grade until reaching the community of Hayfork where the alignment turns south following Wildwood Road and Hayfork Creek climbing on a 1.5% grade reaching the Highway 36 corridor just south of the Trinity/Tehama County Line.

Here Rail Route #1 joins a continuation of one of the Rail Route #2 alignments (Alton to Red Bluff) and proceeds east to a 3800 foot summit before descending on a 1.5% grade into Platina where Rail Route #1 splits into three alignments that connect with (a) Redding, (b) Red Bluff and (c) Gerber respectively. These three routes all descend in an easterly direction at a 1.5% grade until reaching the valley floor where the slope flattens out.

The Lentell alignment generally follows this same path. However, in this analysis the first 20 miles from the Mad River Bridge until Elev. 1,400 is reached is on an entirely different alignment, passing just east of Fieldbrook and avoiding the large landslide located just north of Hwy 299 at Blue Lake (see Figure 4). This landslide is now apparent on the route identified by Lentell.

Figure 4 – Portion of Geologic Map near Blue Lake



Note: . The light yellow mass labeled Qls (code for landslide) is essentially the entire hillside just north of Blue Lake and Hwy 299

It should be noted that the Lentell alignment recommended a nominal gradient of 1.5% along Rail Route #1. The Fieldbrook bypass is approximately 0.8 miles longer than the original Lentell alignment.

Rail Route #2 – Alton Alignment

This route also begins in Samoa and turns south at the Arcata Wye, passing through Eureka and then following the former NWP railroad grade (roadbed) through Loleta and Fortuna before reaching Alton. Here, Rail Route #2 follows the grade of the former Carlotta Branch for 5.0 miles until reaching Carlotta.

One of the elevations through which this route must pass is at the 2,400 foot level near Dinsmore, 24 miles away. To reach this elevation, it is necessary to begin ascending immediately from Carlotta (elevation 120 ft) on a 1.5% grade in order to meet the elevation at Dinsmore (a 1.5% slope, which rises at 80 feet to the mile, requires nearly 29 miles to reach 2,400 feet).

The Lentell alignment which rises at a 1.0% grade is described below. Just east of Carlotta, the proposed Rail Route #2 alignment begins to climb roughly following the Van Duzen River corridor and CA Highway 36. The alignment then reaches Bridgeville where the route swings to the north, passing through two long tunnels before crossing the Van Duzen River on a high trestle.

The route continues to climb but the Van Duzen River climbs even faster and the proposed railroad and river are nearly next to each other as Dinsmore is approached. The route and river diverge again with the railroad climbing almost immediately east of Dinsmore to reach the small summit that marks the divide between the Van Duzen and Mad River drainages. The route crosses the Mad River at Elevation 2,500 feet before climbing South Fork Mountain before reaching a summit tunnel at 3,800 feet.

Crossing into the South Fork of the Trinity River drainage, the route descends to a possible junction with the Red Bluff (b) alternative of Rail Route #2.

At this junction, the Red Bluff alternative drops down to a 2400 foot elevation, crossing the South Fork of the Trinity River before swinging north and climbing on a 1.5% grade towards Forest Glen. This alternative route generally follows Hwy 36 passing through several tunnels and summiting at 3,900 feet and again at 4,200 feet before dropping down to Wildwood. The alignment between the 4200 foot summit and Wildwood (Elev. 3400') is convoluted, with many switchbacks, as the route must descend 900 feet in just 3.0 miles. Just east of Wildwood, the Red Bluff Alternative of Rail Route #2 connects with the routes mapped in the Rail Route #1 analysis.

Rail Route #2 continues southeast at the 3,700 foot elevation on virtually a level grade of nearly 20 miles until reaching the Black Rock Mountain area where the alignment begins to climb on a 1.5% up the East Fork of the Trinity River until reaching the 4,300 foot level where a 1.4 mile long tunnel crosses under the Stuart Gap divide and the Trinity/Tehama County Line. Because the elevation of the valley near Cold Fork is approximately 1,400 feet ,which is only 16 miles (as the crow flies) from Stuart Gap, it is necessary to run off the 2,900 feet of elevation difference over 36 miles of terrain. In other words, more than 20 extra miles will be needed to descend (or ascend) the mountain grade on a 1.5% slope.

Using the Wells Creek drainage, the route descends back on itself three times before reaching Vestal Road. Here Rail Route #2 connects with the Gerber Alignment established during the Rail Route #1 analysis. The 1909 Lentell alignment begins to rise on a 1.0% grade just outside of the town of Alton. A major fill and bridge over Yager Creek is required just north of Carlotta. The ascending grade is uniformly held at 1.0% until reaching the 2,600-2,700 foot elevation near the community of Mad River, where the grade flattens to nearly level.

After crossing Mad River, the alignment crosses through South Fork Mountain on a 1.5 mile long tunnel with both portals located at approximately 2,800 feet. Two routes were explored, with each route beginning at the east portal. Alignment "A" attempts to follow the Lentell graphic portrayal with about 10 miles of fairly gentle descending grade in a southeast direction until reaching the South Fork Trinity River near Elevation 2,800. Here the alignment begins to climb at a 1.0 % grade until reaching Elev. 3,500, after which a nearly flat grade should have been encountered. However, no such plateau was discovered, with most of the land surface rising in the shadow of Black Rock Mountain to nearly 5,300 feet.

A search for a continuation of this route in this general direction was halted and Alignment B was investigated. This route also begins at the east portal of the tunnel and descends on a 1.0% grade to cross the South Fork of the Trinity River at 2,800 foot elevation on a high bridge nearly 400 feet above the river near the Hwy 36. A route ascending at a 1.0 % grade was found and a flat grade of roughly 20 miles was also discovered. The route terminates in Redding after descending 65 miles on a 1.0% grade. This alignment seems to match the 1909 Lentell sketch with fair accuracy.

Rail Route #3 Alignment – Eel Canyon Alignment

This route takes advantage of using the former NWP alignment from Samoa and Eureka south to Fort Seward roughly 67 miles south of Eureka. The roadbed and general condition of the existing railroad is relatively good. However, several at-grade highway/rail crossings have been paved over.

Rail Route #3 breaks off from the NWP before it reaches the chronically fragile locations of the existing railroad south of Fort Seward. After crossing the Eel River on a bridge placed high above the Eel River, this alternative generally follows the North and South Forks of Dobbyn Creek as well as Alderpoint Road and Zenia Bluff Road to climb out of the Eel River Canyon.

One of the summits that this route must cross is located just southeast of the town of Xenia, at an elevation of 3,500 feet. Although this pass is only 10 miles from Fort Seward (as the crow flies), approximately 39 miles of railroad would be required to overcome the difference of elevation between these two locations at the railroad's slope of 80 feet to the mile. Consequently, Rail Route #3 must negotiate five switchbacks on a 1.5% grade in order to reach the pass. Tunneling through this ridge was also considered, and a three- to four mile tunnel might make sense as opposed to building the numerous switchbacks to maintain a 1.5% grade.

Once on the east side, the alignment trends north to avoid the North Fork of the Eel River Canyon before dropping into the Mad River drainage at elevation 2,800 feet. Here the route follows the North Fork of the Mad River to elevation 3,160 feet before resorting to switchbacks and tunnels to reach the South Fork Mountain summit, which it crosses using a 0.7 miles long tunnel. Once over the pass, Rail Route #3 connects with the previously described Rail Route #2, with a mainline connection at Gerber.

North-South Alignment – Connection with NCRA at Windsor

For purposes of comparison, the cost to reconstruct the former NWP line was also included. This line would run south from Humboldt County to Windsor, a distance of 214 miles, where it would connect to the NCRA. Rail service on the NCRA currently terminates at Windsor.

From Windsor, the currently existing NCRA service runs south through Santa Rosa and Petaluma to Schellville. Between Schellville and Fairfield trains run on the California Northern, and at Fairfield they are interchanged with the Union Pacific (Union Pacific assumed ownership of the Southern Pacific in 1997).

Summary of Proposed Rail Route Alignments

Table 1 summarizes the proposed rail route alignments that were analyzed for this report. All routes begin at Samoa. For comparison, highway distances are 148 miles to Redding; 162 miles to Red Bluff and 172 miles to Gerber. In all cases the additional mileage is used to ascend and descend the mountains with the grade not exceeding 1.5%.

It should be noted that the recent Drewry report examining the feasibility of a container port on Humboldt Bay specified that an acceptable alternative rail corridor for container service would require a grade not exceeding 1.0%.

Table 1 – Summary of Rail Route Alignments

Alignment	End	Mileage	Comments
Lentell #1	Redding	193.8	1.5% grade used east of Hayfork
Route #1	Redding	188.5	Avoids landslide area north of Blue Lake
Route #1	Red Bluff	200.5	
Route #1	Gerber	208.6	
Lentell #2	Redding	212.6	Generally follows Hwy 36, 1.5 mi long tunnel under South Fork Mountain
Lentell #2	Gerber	212.6	1.5 mi long tunnel under South Fork Mountain
Route #2	Redding	200.1	Generally follows Hwy 36 to Platina
Route #2	Red Bluff	211.6	Generally follows Hwy 36 to Red Bluff
Route #2	Gerber	220.6	1.4 mile long tunnel near Black Rock Mtn.
Route #3 Southern/ Eel Canyon	Gerber	257.9	Departs from NWP alignment at Fort Seward; 1.4 mile long tunnel near Black Rock Mtn.
North-South Route	Windsor	214.0	Connects with NCRA at Windsor.

North Coast Range Geology

Overview

The geology of the North Coast Range presents significant challenges for the sufficient siting of a railroad alignment. In particular, many landslides were observed during the fly-over and during the car reconnaissance (see photos below). The impact of the sensitive geology likely to be encountered by the various rail routes is that the cost of construction will likely be much higher than if the terrain through which the railroad was located was composed of competent bedrock.

Opening up the hillsides can certainly be accomplished (for example, numerous logging roads criss-cross the path of many of the proposed alignments). However, approval for the construction must be obtained, and to do so, comprehensive geologic surface and subsurface investigations must be performed. If an active or ancient (inactive) slide is discovered, then mitigation must be proposed and implemented. Even then, a slide can be reactivated with devastating and costly consequences.

Figure 5 – Photos of Active Landslides Near Proposed Rail Routes

According to the *Geology of Humboldt County* website:

> "The complexities of the geology and geological history of Humboldt County are largely responsible for the rugged topography of the Coast Range Mountains and geologic hazards of the area. The geology of coastal Humboldt, Shasta, Trinity and Tehama Counties consists of folded and faulted sedimentary rocks that include competent sandstone; intensely sheared, fine-grained material (melange); and youthful, poorly consolidated marine and river sediments. The combination of the broken and weak rocks and heavy rainfall in the region produces very high erosion rates and considerable slope

instability. Landslides are common within areas underlain by the less-sheared rock types, and slow-moving earthflows are characteristic in melange terrains. The probability of landslides and earthflows is greatly increased during the rainy season. Engineering structures (particularly roads) on or below unstable slopes are particularly at risk from slope failure during heavy precipitation events. Humboldt County routinely receives 100 inches of precipitation during the rainy season which is primarily during the winter months."

Eel River Basin

The Eel River basin is a mountainous area uplifted in the post-Miocene era and underlain by a deformed, faulted, locally sheared, and, in part, metamorphosed accumulation of subducted continental margin deposits. About 99 percent of the bedrock underlying the basin is sedimentary and metasedimentary. The four planning watersheds in the Eel River Basin (South Fork Eel, Lower Eel, Middle Main Eel, and Van Duzen) are generally comprised of highly erodible rocks, including substantial amounts of Franciscan Complex rocks. Over 85 percent of the Middle Main Eel and 65 percent of the Van Duzen are Franciscan Complex.

Klamath-Trinity Basin

The Klamath-Trinity Basin, composed of the Lower Klamath, Lower Trinity, and South Fork Trinity planning watersheds, is the only basin with notable amounts of plutonic and metavolcanic rocks. The Humboldt County portion of the basin encompasses the North Coast Ranges province. In the North Coast Ranges, landslides and soil slips are common due to the combination of sheared rocks, shallow soil profile development, steep slopes, and heavy seasonal precipitation. In addition, both the Lower Klamath and South Fork Trinity have substantial amounts of Franciscan Complex rocks.

Grassland Soils

The general characteristics of grassland soils vary widely. They range from shallow loamy soils to deep clay soils. Their permeability ranges from moderate to slow. The general nutrient level of these grassland soils is higher than that of the adjacent forest soils. The major portion of these soils is intermingled with other soils in the Douglas Fir zone beyond the fog belt. Some of these soils are formed on Franciscan parent material. Many of these are found in the shear zone or fault gouge material or on the melange material of the Franciscan. This parent material weathers rapidly, forming a grey-blue clay subsoil (commonly called "blue goo") that tends to slip when wet. Thus, because of the parent material, these soils are found in landslide topography."

According to the *Humboldt County General Plan Draft EIR*[1]:

"Landslides are characteristically abundant in areas of high seismicity, steep slope, and high rainfall, but may be triggered by any or a mixture of the following: (1) type and structure of earth materials; (2) steepness of slope; (3) water; (4) vegetation; (5) erosion; and (6) earthquake-generated groundshaking.

"The characteristics listed above are representative of the many complex variables contributing to the formation of landslides. The prediction of slope failure at a specific site, therefore, requires an analysis of all possible factors. As part of the Humboldt

[1] Humboldt County General Plan Update Draft Environmental Impact Report, April 2, 2012.

County General Plan, relative slope stability maps have been prepared to provide general identification of the relative slope stability hazard associated with various bedrock types. These maps do not identify the hazards at particular sites but indicate the relative likelihood of site instability.

"Steep slopes, which are shown in *Natural Resources and Hazards Report Volume 1*, Figure 10-3, occur in a large portion of the county, including 775,203 acres in the 30–50 percent range and 531,179 acres with over 50 percent slopes. Slope information for each planning watershed is shown in Natural Resources and Hazards Report Volume 1, Table 10-2, (Appendix D) and available at http://co.humboldt.ca.us/gpu/documentsbackground.aspx .

"Landsliding is a major hazard concern in Humboldt County that cannot be eliminated. Many existing roads in hillside areas would continue to be affected by this hazard and in many cases; they require constant upkeep and maintenance. Many existing communities are currently affected by this hazard or would be in the future. An area of instability along U.S. 101, commonly referred to as the Confusion Hill slide, would close US-101 in both directions for an extended period of time. Caltrans constructed two bridges over the Eel River was completed in October 2009, at a total cost of over $50 million bypassing the slide area. A massive slide blocked both lanes of U.S. 101 north of Garberville on March 30, 2011. The highway was opened to one-way traffic within several days."

The purpose for including the above sections is the following: Humboldt County has adopted the California Building Code (CBC). Under Policy S-PX1, Site Suitability, new development may be approved only if it can be demonstrated that the proposed development will neither create nor significantly contribute to or be impacted by geologic instability or geologic hazards.

Wild and Scenic Rivers

Two rivers in the study area are including in the Wild and Scenic River designation. These include the South Fork of the Trinity River (along portions of Rail route #1) and the Van Duzen River (along portions of Rail route #2). It is likely that prohibitions as to the amount of sediment that can be introduced into these protected streams will affect the design and placement of the railroad.

**Figure 6 – Van Duzen River near Bridgeville (left photo)
and South Fork Trinity River (right photo)**

Capital Costs

Track

Rebuilding existing track on established railroad sub-grade is typically estimated to cost $1.0 million per mile. For example, a recent report by AndersonPenna estimated that rehabilitation costs for the 14.9 miles of track between Samoa and Eureka to range between $14.2 and $16.5 million[2]. Accordingly, this cost will be used to rehab existing track and to provide a placeholder price for new track.

A "per mile" allowance for the installation or rehabilitation of at-grade highway/rail crossings is included in this $1.0 million/mile figure. The $1.0 million/mile figure is a composite of the costs of providing 2.0 linear miles of rail plus cross-ties (either concrete or creosoted wood) plus fasteners plus ballast. Also included is the labor to assemble and install these components on a roadbed that is essentially prepared. This assumes that minor culverts and bridges have been installed on a roadbed that has been graded using local materials on a nominally graded topography, with cuts and/or fills that range from two to four feet in height or depth. Costs not included in new construction are at-grade road crossings, signal appliances, fencing, engineering, and environmental approvals.

Also, not included in this analysis is the connection cost at the interchange (east) end of the alignment. Depending on the location of the connection and negotiations with Union Pacific, these costs could range from negligible to over $5 to $10 million.

A third item not included in the cost estimates is the construction of a switching/storage yard at or near Samoa. Class I railroads now insist that sufficient trackage is constructed to hold all of the cars and locomotives that new business is expected to generate. In contrast, in the past this storage was typically split between origin & destination sites.

Finally, not included in the budget are the costs for sidings for the meeting and passing of trains. Typically, sidings cost about $5 to $7 million each. Depending on the train volume, the number of sidings required may range from as few as one to as many as ten.

Grading

Grading costs are approximately $1.5-3.0 million per mile. The lower number applies to the relatively flat terrain found outside of Red Bluff and Gerber, while the higher figure applies to the majority of the alignments where extensive grading is required. The higher cost reflects the

[2] *Railroad Corridor Condition Assessment Northwestern Pacific Railroad (NWP), North Humboldt Bay, Eureka to Samoa*, AndersonPenna Partners, Inc., October 2012.

fact that nearly every surface for the proposed roadbeds either cuts into the side of a fairly steep slope or requires major fills to support the roadbed on the inside of the numerous curves encountered.

Typically, railroad roadbeds are 30 feet in width and are covered with 0.5 feet of sub-ballast. Cuts and fills are engineered to generally 2:1 slopes, with rock-supported cuts designed to 3:1 or 4:1 slopes. Roadbeds are widened to accommodate rock-fall and include a 10-foot wide ditch with a flat-bottom profile to aid in ditch clean-out. Rock slopes are either covered with mesh to minimize spalling, or the railroad is protected by a rock fence which is integrated with the signal system to provided locomotive engineers up to date information on the status of the track ahead.

Bridges

The number of bridges was estimated, with major bridges called out and costing an estimated $10,000 per linear foot (based on conversations with contractors and bridge eingineers). Existing bridges would also be upgraded to handle 286,000 pound rail cars.

Tunnels

Tunnels were estimated to cost $13,000 per linear foot (based on conversations with tunnel engineers). Tunnels were sited whenever the cost of tunneling was estimated to be lower than the cost of constructing track up and over the mountain to be crossed.

Landslide Mitigation

Much of the ground over which these rail routes are located is likely to be susceptible to landslides, and will therefore require extensive geotechnical investigations and possible mitigation. This cost is estimated to be $1.0 million per mile in the mountainous areas of the alignment.

At first glance, this cost appears to be rather high; however, a recent “fix” of a landslide on Hwy 299 was pegged at $50 million. The $1.0 million per mile figure could be viewed as a contingency for dealing with the fragile landscape common in the North Coast range. Included in this cost is the environmental review that will also be necessary.

Property Acquisition

Property acquisition costs are assumed to be roughly $25,000 per acre. Right-of-way width is assumed to be 100 feet, which is common in the railroad industry. Construction and slope easements were not included in the estimates.

Environmental Mitigation

Costs for environmental mitigation are not included.

Operations and Maintenance (O&M)

O&M costs are generally not considered during the preliminary engineering phase. However, this routing analysis is an exception because of the very difficult terrain over which these proposed routes are planned to cross.

As described elsewhere in this report, a shorter route may incur lower construction costs but higher operating and maintenance costs. For example, if the roadbed is “pinned” to a side of a steep mountain, it will be necessary to install slide fences and construct a wide apron on to which rockfalls could be accommodated.

While the construction cost of such features is included under the capital expenses, the maintenance of these features will be over and above the normal maintenance dedicated to just the track structure. As noted above, the former Southern Pacific spent three times as much for maintenance on the NWP line through Eel River Canyon as it did for other tracks. Assuming $90,000 per mile for maintenance, the annual maintenance budget may range between $18 and $20 million.

Typical Class I maintenance costs range in the $45,000 to $60,000 per mile. As noted previously, the experience of the SP in with the NWP was that maintenance costs for that line were three times the national average. Based on the higher cost to maintain the NWP, the higher maintenance cost of $90,000 per mile was used for the routes between Humboldt Bay and the Central Valley.

Train operations and its attendant costs are discussed below.

Summary of Cost Estimates:

These tables represent general costs for the various alignments between the Humboldt Bay area and the Central Valley. As indicated, the cost per mile of new and rehab costs ranges between $5.0 million to $5.9 million per mile of roadbed and track. While these costs may appear high, another recent analysis of a proposed 200-mile, 60-mph line to the Pacific Coast (not in Humboldt County) produced estimated construction costs of $2.3 billion, or over $11.0 million per mile.

Rebuild costs for the North-South route were based on the high cost estimate presented in the *NCRA Strategic Plan Update, February 15, 2007*, and which were updated to reflect inflation. The *NCRA Strategic Plan Update* presented range of costs that varied based on the level and timing of repair. The high estimate, used in this analysis, is based on upgrading the line to Class 3 standards, as are the cost estimates for the East-West routes. This will allow the route to carry the heavy-weight trains used in transporting bulk cargoes, which typically carry 10,000 tons of cargo or more.

As summarized in Table 2, the total construction cost for an east-west rail line between Humboldt County and the northern Sacramento Valley and is estimated to range between $1.1 and $1.2 billion. The construction cost per mile is estimated to range between $5.00 million and $5.90 million per mile. Reconstruction of the north-south line between Samoa and Windsor is estimated to cost $600 million, or $2.80 per mile.

Table 2 – Summary of Capital Costs by Route

Rail Route	From	To	Total Length (miles)	Total Cost ($ million)	Cost per mile ($ million)
Lentell #1	Samoa	Redding	194	$1,080	$5.60
Lentell #2	Samoa	Redding	213	$1,234	$5.80
	Samoa	Gerber	217	$1,166	$5.40
RR #1	Samoa	Redding	189	$1,067	$5.60
	Samoa	Red Bluff	201	$1,127	$5.60
	Samoa	Gerber	209	$1,239	$5.90
RR #2	Samoa	Redding	200	$1,066	$5.30
	Samoa	Red Bluff	212	$1,095	$5.20
	Samoa	Gerber	221	$1,197	$5.40
RR #3 Eel Canyon	Samoa	Gerber	241	$1,203	$5.00
Restore North- South	Samoa	Windsor	214	$.609	$2.80

Figure 7: Rail Route 1 (Lentell Route 1, Blue Lake to Redding)

Lentell #1 =

Alternative Route to Avoid Landslide Area =

Former NWP =

Diagram #1: Lentell Route - Blue Lake to Redding (Rail Route #1)
190 miles with Mileage beginning at Samoa.
Maximum Gradient: 1.5%
Maximum Speed: 40 MPH

Figure 8: Rail Route 2 (Lentell Route 2, Alton to Redding)

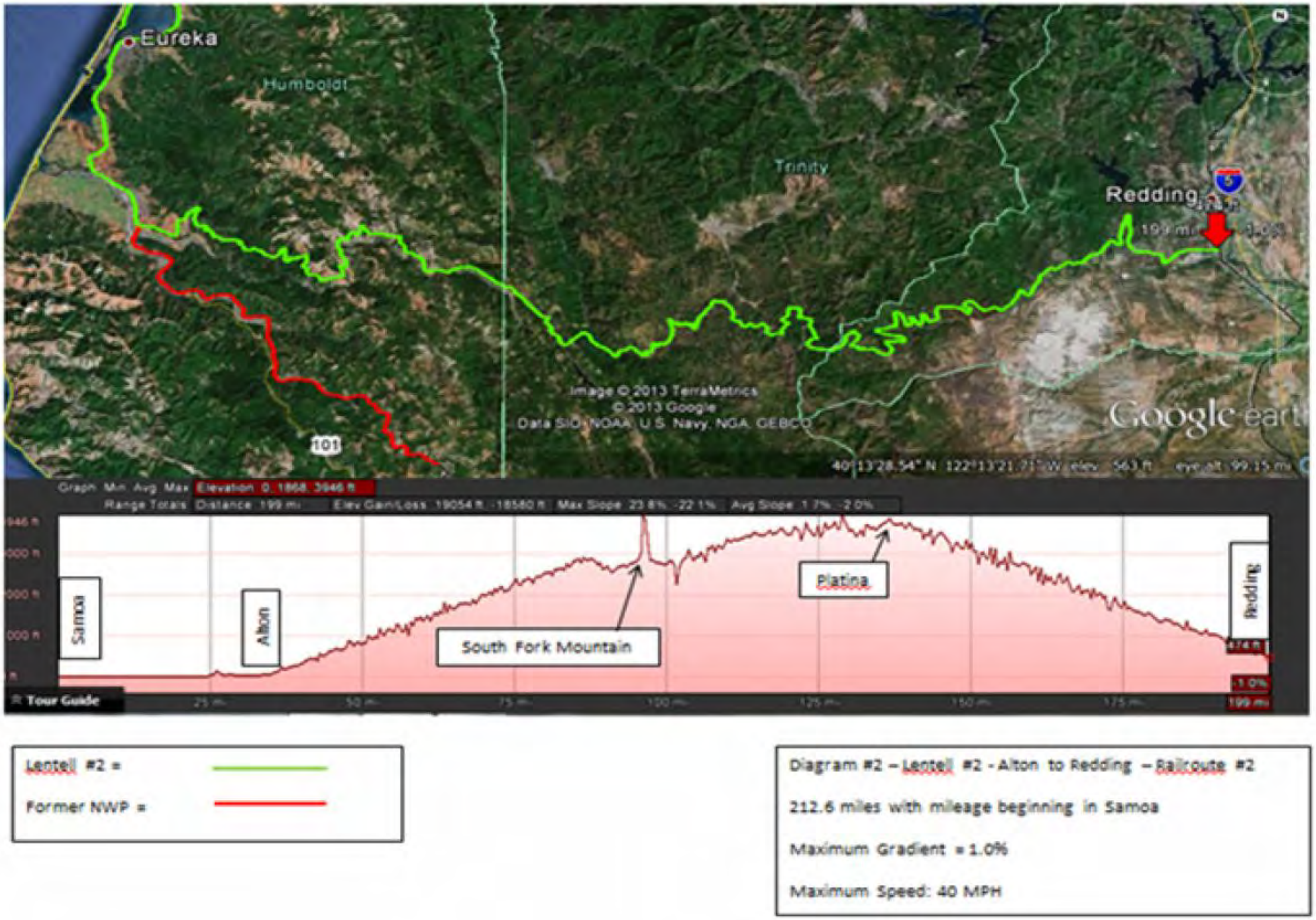


Figure 9: Rail Route 3 (Eel Canyon Route)

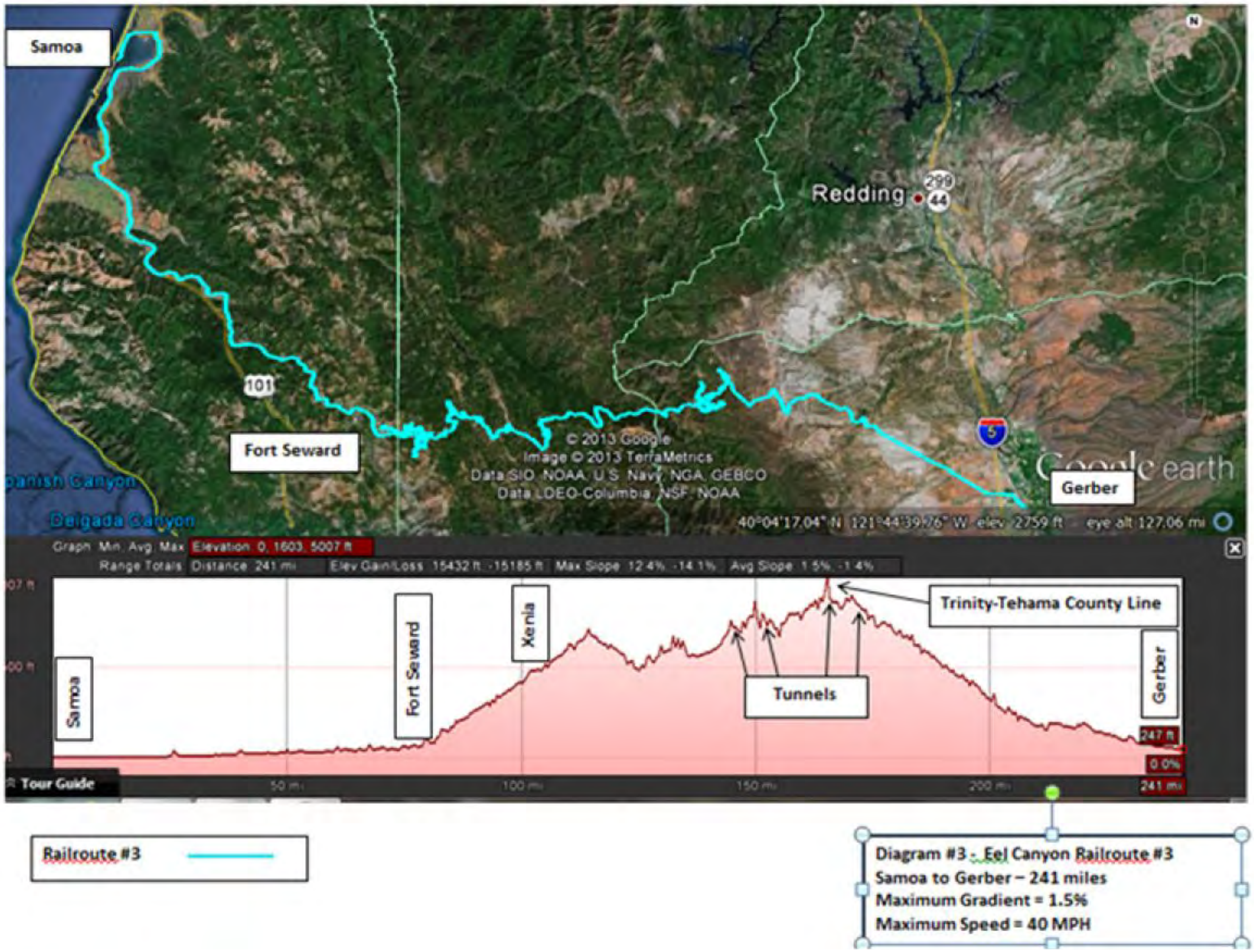


Figure 10: NWP Rail Route

Train Operations

The criteria for the various east/west rail routes described above was to determine whether or not it would possible to design a 1.0% grade railroad that could be operated at 40 mph (FRA Class 3 standard, acceptable for freight service). Notwithstanding the calculation of curve radius and its significant influence on grading costs (i.e. the more tangent the track, the more fill required), let's assume that 40 mph can be achieved. If this is the case, then the average mileage for the 10 routes listed above is 211 miles.

At 40 mph, it should require about 5.5 hours for a train to negotiate the distance between Samoa and Central Valley interchange locations. However, 40 mph is not likely to be realized between Samoa and Blue Lake or between Samoa and Alton or Fort Seward, with 25 mph a more realistic operating speed. As the proposed train service reaches the outskirts of Redding, Red Bluff and/or Gerber, the train will also need to slow to approximately 25 mph. These slower velocities will make the average run approximately 6 to 7 hours.

A rule of thumb in train operations is that running time of 6 to 7 hours is the upper limit for a train crew due to the 12 hour "Hours of Service" regulation. If financial considerations dictate that grading costs need to be reduced, then curve radii will necessarily increase, resulting in decreased operating speed. If this occurs then two crews will be needed to handle a train between Samoa and the Central Valley interchange locations. Along Rail Route #1 and #2, a logical train crew change out location could be Wildwood or Platina. There does not appear to be a logical crew change location along Rail Route #3.

Estimated Cargo Volumes

Identification of Potential Commodities

The second task in this analysis was to estimate the volume of cargo required to make a rail route economically viable. The first part of this task involved identifying cargoes that might potentially use the rail line to Humboldt County. BST Associates prepared this section using data from the U.S. Department of Commerce and the Surface Transportation Board.

Potential commodities were identified in two ways. First, waterborne export data was used to document the types of commodities that are currently exported from the United States, with an emphasis on those commodities destined for Asia. The analysis focused on non-containerized exports.

Rail volumes were documented using Public Use Waybill Sample data from the Surface Transportation Board. This portion of the analysis focused on commodities shipped by rail and destined for coastal areas.

This identification of commodities is not intended to be a market analysis for a rail line to the Humboldt Bay region, and makes no recommendations regarding potential rail cargo. Its sole purpose is to identify those commodities that currently move by rail in high volumes, in order to estimate potential revenue and the volumes required to finance a rail line.

Waterborne Exports

A new or rebuilt rail line to Humboldt County is likely to require a large volume of cargo in order to cover capital costs. Based on previous analyses it is likely that local industry does not generate this volume of cargo. As a result, waterborne trade would be the most likely driver of demand for rail service.

Waterborne cargo can be divided into several major categories, including: containerized, dry bulk, liquid bulk, breakbulk, and roll-on/roll-off.

- Containerized cargo moves in standard 20-foot or 40-foot vans, on specially designed cellular container vessels.
- Dry bulk cargo is shipped by water in bulk vessels, and is loaded and unloaded in loose form, typically via conveyor belt. A large share of dry bulk cargo is shipped to port by rail.
- Liquid bulk cargo is moved in tankers, and is loaded and unloaded via pipes or hoses. On the West Coast, the largest share of liquid bulk cargo is made up of crude oil and refined petroleum products. Most of this moves directly to and from refineries located at waterfront locations.
- Breakbulk cargo includes a wide variety of commodities that are loaded onto ships by crane. This category includes logs, palletized cargo, and others.
- Roll-on/roll-off (“RO/RO”) cargo includes motor vehicles and other equipment that is driven on and off of ships.

Because of the large volumes shipped by rail from inland points, exports of dry bulk cargoes were the focus of this analysis. Exports of dry bulk commodities also represent a strong and growing market for West Coast ports.

The potential to move containerized cargo through Humboldt Bay has been investigated in several past analyses. Because there is significant competition from existing container ports and few capacity constraints, containers do not present the same market potential as dry bulks. Most recently, the Drewry consulting firm delivered a report to Security National that summarized the conditions necessary to justify investing in a container port on Humboldt Bay. In highlighting the risk of such an investment, this report concluded that "*Under no foreseeable circumstances should Security National consider building a new container terminal at the port, without the prior contractual support of at least one shipping line, in the hope that 'the lines will come when it is built'*". The report also concluded that "*The difficulty will lie in convincing the shipping lines that the Port of Humboldt Bay offers sufficient competitive advantages over Prince Rupert, Vancouver, Seattle, Tacoma, Portland and Oakland for it to fully support the project before construction commences*."

Breakbulk cargo and Ro/Ro commodities move in relatively limited volumes, and are less likely than dry bulks to produce sufficient revenue to cover the construction cost of a rail line to Humboldt County.

The Sacramento Valley is also a major center of agricultural production that generates significant volumes of export commodities. These commodities are currently shipped by rail or truck to ports in the Bay Area, as well as Sacramento and Stockton. Because of the competition from these existing ports, and the need to focus on high-volume rail-shipped commodities, exports of products from the Sacramento Valley were not included in this analysis. It is possible, however, that an east-west rail line might be able to attract a portion of this cargo.

Non-Containerized Waterborne Exports

The following analysis documents waterborne exports in two parts: the first part focuses on exports from the U.S. West Coast to all world destinations, while the second focuses on exports to Asia from all U.S. port regions.

In 2011 and 2012 the volume of U.S. West Coast non-containerized exports averaged 85 million metric tons. Of this volume, 20 commodities accounted for approximately 90% of the total, and most of these consisted of farm products, petroleum products, forest products, chemicals, and waste products. (See Table 3)

Farm products include grain (e.g. wheat and corn), oilseeds (e.g. soybeans), hay and feed, and by-products of grain and oilseed processing (e.g. distilling dregs from ethanol production and oil seed meal). Combined, these commodities account for approximately 31 million metric tons, or nearly 37% of the total.

Petroleum products, including petroleum coke and petroleum oils, generated 16 million metric tons of exports, or 19% of the total. Chemicals (including carbonates, potassic fertilizer, and sulfur), waste paper, and ferrous waste (scrap steel) each generated more than 5.6 million metric tons, or nearly 7% of the total.

Table 3 – West Coast Non-Containerized Exports (1,000 Metric Tons)

Rank	HS Code	Description	2009	2010	2011	2012
1	1001	WHEAT	9,540	10,850	13,500	12,440
2	1201	SOYBEANS	9,710	10,480	7,960	10,780
3	2713	PETROLEUM COKE	7,370	7,240	7,670	8,120
4	2710	PETROLEUM OILS	7,270	6,440	8,010	7,960
5	1005	CORN	8,540	9,920	9,200	5,670
6	4707	WASTE PAPER	4,810	4,830	6,040	5,640
7	7204	FERROUS WASTE	5,510	5,470	6,280	5,290
8	4403	LOGS	2,240	3,910	5,820	4,930
9	2836	CARBONATES	2,120	2,680	2,730	3,170
10	1214	HAY, FEED	1,170	1,250	1,410	1,710
11	3104	POTASSIC FERTILIZER	1,030	2,500	2,590	1,670
12	2701	COAL	140	620	1,230	1,620
13	4401	WOOD CHIPS	1,070	1,610	1,540	1,360
14	2601	IRON ORE	-	200	1,520	1,270
15	2303	DISTILLING DREGS	510	1,230	710	1,140
16	1208	OIL SEED MEAL	40	30	50	970
17	2503	SULFUR	550	580	610	940
18	0802	NUTS	210	220	270	480
19	4407	LUMBER	160	300	530	450
20	2603	COPPER ORES	340	360	320	410
		OTHER	7,890	9,240	8,850	8,170
		TOTAL	70,220	79,960	86,840	84,190

Source: U.S. Department of Commerce

In order to expand the list of potential commodities for a Humboldt Rail line, the list of non-containerized commodities was expanded to show what is currently shipped to Asia from all U.S. ports. For this list it is assumed that if Humboldt County were to attract a commodity that is not currently shipped through another West Coast port, it would most likely be destined for Asia. As illustrated in Table 4, the list of top 20 non-containerized commodities exported to Asia from all U.S. ports is similar to the list of West Coast commodities illustrated in Table 3.

The primary commodity that is currently shipped through U.S. West Coast ports in only limited volumes, but does move from the East Coast, Gulf Coast, and Canadian West Coast to Asia, is coal. The volume of coal shipped to from U.S. ports to Asia has risen sharply in recent years, to more than 16 million metric tons in 2012. In addition, a number of coal export terminals have been proposed in Oregon and Washington, several of which are currently in the environmental permitting process.

Corn is a major export commodity for West Coast ports; more than 12 million tons of corn was exported to Asia in 2012, with West Coast accounting for less than 6 million tons.

In addition to coal and oil, other commodities that are exported to Asia in larger volumes from East and Gulf Coast ports than from the West Coast include several coal products and petroleum products.

Table 4 – U.S. Non-Containerized Exports to Asia (1,000 Metric Tons)

Rank	HS Code	Description	2009	2010	2011	2012
1	2701	COAL	4,480	8,560	15,760	16,350
2	1005	CORN	23,700	24,430	20,570	12,480
3	1001	WHEAT	7,530	8,500	10,020	10,060
4	2710	PETROLEUM OILS	7,730	8,350	7,760	7,680
5	2713	PETROLEUM COKE	5,600	4,950	5,300	7,490
6	1201	SOYBEANS	5,690	5,620	4,200	5,200
7	7204	FERROUS WASTE	5,670	5,220	5,520	5,150
8	4403	LOGS	2,350	2,480	2,510	2,630
9	2707	COAL DISTILLATE	3,210	3,370	3,340	2,470
10	2836	CARBONATES	1,020	1,460	1,480	1,710
11	3105	MINERAL FERTILIZERS	3,880	2,960	2,470	1,460
12	4707	SCRAP PAPER	1,260	1,160	1,310	1,230
13	2303	DISTILLING DREGS	770	1,100	940	1,160
14	4401	WOOD CHIPS	940	1,480	1,320	1,120
15	1208	OIL SEED MEAL	150	150	230	1,060
16	3104	POTASSIC FERTIILIZER	790	1,250	1,000	870
17	1214	HAY & FEED	930	800	740	810
18	2711	PETROLEUM GASES	930	1,170	1,050	700
19	2909	ETHERS & ALCOHOLS	210	680	590	690
20	2902	HYDROCARBONS	680	700	720	670

Source: U.S. Department of Commerce

Commodities Moving by Rail

There is not a direct way to link export commodities to movements by rail. However, Surface Transportation Board (STB) data can be use to illustrate what is currently moving by rail, and this information can then be compared to the waterborne cargo statistics.

Table 5 presents a summary of the tonnage that moved by rail to coastal destinations in 2011 (most recent data available). These rail movements may be associated with exports, but may also represent products destined for domestic users. In this usage, coastal destinations are defined as those Business Economic Areas (BEAs) that border the East, Gulf, or Pacific coasts, in addition to British Columbia. (BEAs are the type of region used in STB data).

As illustrated in Table 5, coal represents the largest volume moved by rail to coastal destinations. The amount of coal that terminated in coastal destinations in 2011 was more than three times that of the next highest-volume commodity, aggregates, which do not represent major a waterborne export.

Corn, wheat and soybeans, which are all key waterborne exports, all move by rail in large volumes to coastal regions. The combined volume of these three commodities is more than 48 million metric tons. Sodium compounds (primarily soda ash) and potassium compounds (primarily potash) are also key waterborne exports that move by rail.

Based on the waterborne export data and the rail data, six commodities were chosen to use as potential cargoes for a Humboldt Rail line. These included wheat, coal, potash, soda ash, and iron ore. In the next section, a financial model was created to estimate the volume of these cargoes that would be needed to make the Humboldt rail lines financially feasible.

Table 5 – Rail Volumes Terminating at Coastal Regions in 2011
All U.S. Coasts and British Columbia

Rank	STCC Code	STCC Description	Metric Tons (1,000's)
1	11212	Coal	123,468
2	14219	Aggregates	35,648
3	01132	Corn	20,432
4	28211	Plastics	17,784
5	01137	Wheat	17,624
6	28184	Alcohols	13,983
7	01144	Soybeans	10,121
8	26311	Fiberboard & paperboard	6,046
9	29121	Liquefied gases	5,497
10	20923	Soybean cake	3,959
11	24211	Lumber	3,722
12	28123	Sodium compounds	3,690
13	40211	Steel scrap	3,674
14	37111	Vehicles	3,473
15	28125	Potassium compounds	3,404
16	20461	Corn syrup	3,207
17	33123	Steel sheet & strip	3,178
18	26111	Pulp	2,914
19	28712	Superphosphate	2,779
20	14413	Industrial Sand	2,370

Source: Surface Transportation Board data

Rail Volume Requirements

The second portion of Task 2 was to estimate the volume of cargo that would be needed for a rail line to Humboldt County to be financially feasible. BST Associates prepared this analysis based on the commodities discussed above.

The financial feasibility of the construction of a new rail line to Humboldt County will depend on the net revenue generated by the transport of cargo by rail. This net revenue is a function of the gross freight revenue generated by the railroad, less the cost of operations, maintenance, and other expenses.

Rail Cost

In this analysis, rail costs were estimated using the USRail.desktop model from RSI Logistics, Inc. This model is used by major rail shippers to understand how railroads set rates, and to provide them information for use in negotiating with the railroads.

The USRail.desktop model provides estimates of the variable cost of providing rail service, and includes such items as

- Fuel cost
- Labor
- Road locomotive
- Switching
- Equipment costs, and
- Track & right of way maintenance

Because the proposed east-west rail lines between Humboldt Bay and the Central Valley do not currently exist, they are not in the USRail.desktop model. In order to estimate the total cost to ship the selected commodities from their origin to Samoa (Humboldt County), the model used Gerber, California as the termination point, although the actual interchange location would be a decision made by the UP. Based on the distance of the haul and the volume of cargo per train, costs were calculated on a ton-mile basis. (A ton-mile is equal to one ton of cargo moved one mile). The additional cost for the rail move between Gerber and Samoa was estimated based on this ton-mile figure and the additional mileage. Similarly, for the north-south route the USRail.desktop model was used to calculate the distance and cost to Windsor (the current end of the line), and then that information was used to estimate the cost for the Windsor to Samoa portion.

As discussed previously in this analysis, because the route between Gerber and Samoa is winding and mountainous it is likely to have significantly higher maintenance costs. The model created for this analysis assumed that the maintenance cost will be double that of the mainline portion of the haul, but the cost could be even higher. The north-south route has a demonstrated history of higher maintenance costs, and for this analysis they were also assumed to be double the route average.

Based on the analysis of waterborne cargo presented above, rail costs were analyzed for six different bulk cargoes, including two grains (wheat and corn), three minerals (coal, potash, and soda ash), and one metal ore (iron ore).

The origin for each of these commodities was chosen based on STB waybill data, which shows the origin and destination of existing rail moves. Preference was also given to origins where the distance to Humboldt Bay was relatively competitive with other West Coast ports. For example, the largest volume of potash exported from the West Coast originates in Saskatchewan, Canada, and Humboldt Bay is significantly farther from Saskatchewan than are ports in western Canada and the Pacific Northwest. Instead, potash that originates in the Ogden, Utah region is more proximate to Humboldt Bay, and was chosen for this analysis.

For coal, wheat, and corn, three different points of origin were used for each commodity. These commodities are all produced in multiple locations, and using multiple origins allows the analysis of the feasibility of several rail moves. Production of potash, soda ash, and iron ore is more localized, so one origin for each was analyzed.

The costs shown in Table 6 for the east-west routes are for the shortest of the three routes identified, which is 194 miles in length. For the other east-west routes, the portion of the rail cost for Gerber to Samoa would be higher. The north-south line would extend 214 miles from Samoa to the current end of service at Windsor.

Table 6 – Railroad Cost for Selected Commodities

`	East-West Routes					North-South Route				
	Distance (miles)			$/ton-mile		Distance (miles)			$/ton-mile	
Commodity/Origin	Origin to Gerber	Gerber to Samoa	Total	Origin to Gerber	Gerber to Samoa	Origin to Windsor	Windsor to Samoa	Total	Origin to Windsor	Windsor to Samoa
Coal										
Antelope Mine, WY	1,537	194	1,731	0.0161	0.0213	1,564	214	1,778	0.0172	0.0232
Oak Creek, CO	1,296	194	1,490	0.0163	0.0213	1,324	214	1,538	0.0176	0.0232
Sharp, UT	908	194	1,102	0.0167	0.0213	936	214	1,150	0.0186	0.0232
Soda Ash										
Green River, WY	957	194	1,151	0.0159	0.0207	984.6	214	1,199	0.0178	0.0231
Wheat										
Great Falls, MT	1,403	194	1,597	0.0183	0.0230	1,635	214	1,849	0.0193	0.0239
Sioux Falls, SD	1,921	194	2,115	0.0174	0.0230	1,948	214	2,162	0.0184	0.0239
Topeka, KS	1,813	194	2,007	0.0175	0.0230	1,841	214	2,055	0.0174	0.0239
Corn										
Minneapolis, MN	2,109	194	2,303	0.0173	0.0227	2,136	214	2,350	0.0183	0.0240
Grand Island, NE	1,622	194	1,816	0.0176	0.0227	1,650	214	1,864	0.0188	0.0240
Des Moines, IA	1,956	194	2,150	0.0174	0.0227	1,983	214	2,197	0.0184	0.0240
Potash										
Ogden, UT	780	194	974	0.0207	0.0269	807	214	1,021	0.0169	0.0220
Iron Ore										
Cedar City, UT	967	194	1,161	0.0170	0.0221	994	214	1,208	0.0231	0.0300

Source: USRail.desktop, BST Associates

Sacramento Valley Cargo

As discussed previously in this report, the Sacramento Valley is a major center of export production, particularly of agricultural products. These exports currently move through existing ports, such as Sacramento, Stockton, Oakland, and other Bay Area ports. It is possible that a portion of these exports may be able to use an east-west rail line for export through Humboldt Bay, providing additional traffic to that line. For the purpose of this report, however, the focus was on commodities moving in the highest volumes, i.e. dry bulk export commodities.

In addition to the focus on high-volume commodities, the rail distance from Sacramento Valley origins to Humboldt Bay for the most part does not offer shippers an advantage over existing ports. Humboldt Bay is most competitive from the north end of the valley, in Redding. The farther south the products originate, however, the greater the rail disadvantage to Humboldt Bay becomes. (See Table 7).

Distance is also an important factor in determining whether cargo moves by rail or by truck. In general, the longer the haul the more competitive rail is compared to truck. A rule of thumb is that for distances of less than 500 miles trucks have an advantage over rail, unless the commodity has a low unit value and moves in high volumes. The relatively short distance between the Sacramento Valley and the Humboldt Bay region is likely to limit the volume of cargo that shippers would choose to move by rail rather than truck.

Table 7 – Rail Distance from Sacramento Valley Origins

	Port			
Inland Location	Samoa	Richmond	Oakland	West Sacramento
Redding	189	178	192	161
Red Bluff	201	143	157	126
Gerber	209	133	147	116

Source: USRail.desktop, BST Associates

Rail Revenue

In this analysis, rail revenue was estimated using data from the Surface Transportation Board (STB) *Commodity Revenue Stratification Report for 2011*. This report analyzes the revenue and variable cost for commodities moved by rail, which are used to calculate the Revenue to Variable Cost (”RVC”) ratio. The RVC is an important indicator for examining freight rail rates, because traffic with rates greater than 180% RVC are subject to potential STB review for being unreasonably high.

Based on the RVC calculated from the data in the *Stratification Report*, as well as the costs developed in the previous section, the revenue per ton for the 194-mile move between Gerber and Samoa was estimated for each of the commodities. These are shown in Table 8.

Table 8 – Estimate of Rail Revenue, Gerber to Samoa

	Gerber to Samoa				Windsor to Samoa			
Origin	Cost/ ton-mile	RVC	Rail Cost per Ton	Rail Rev. per Ton	Cost/ ton-mile	RVC	Rail Cost per Ton	Rail Rev. per Ton
Coal								
Antelope Mine, WY	0.0213	1.636	$4.12	$6.75	0.0232	1.636	$4.96	$8.11
Oak Creek, CO	0.0213	1.636	$4.12	$6.75	0.0232	1.636	$4.96	$8.11
Sharp, UT	0.0213	1.636	$4.12	$6.75	0.0232	1.636	$4.96	$8.11
Soda Ash								
Green River, WY	0.0207	1.727	$4.02	$6.94	0.0231	1.727	$4.94	$8.53
Wheat								
Great Falls, MT	0.0230	1.498	$4.47	$6.69	0.0239	1.498	$5.11	$7.66
Sioux Falls, SD	0.0230	1.498	$4.47	$6.69	0.0239	1.498	$5.11	$7.66
Topeka, KS	0.0230	1.498	$4.47	$6.69	0.0239	1.498	$5.11	$7.66
Corn								
Minneapolis, MN	0.0227	1.498	$4.39	$6.58	0.0240	1.498	$5.14	$7.70
Grand Island, NE	0.0227	1.498	$4.39	$6.58	0.0240	1.498	$5.14	$7.70
Des Moines, IA	0.0227	1.498	$4.39	$6.58	0.0240	1.498	$5.14	$7.70
Potash								
Ogden, UT	0.0269	1.727	$5.23	$7.40	0.0220	1.727	$4.71	$8.14
Iron Ore								
Cedar City, UT	0.0221	1.638	$4.29	$8.56	0.0300	1.638	$6.42	$10.53

Source: USRail.desktop, BST Associates

Estimated Rail Volume

The volume of cargo that would be needed to make a rail line to Humboldt County financially feasible was estimated based on the net present value of the projected revenue and cost streams. Several assumptions were included in the net present value calculations, including:

- Construction period – three years
- Ramp up in rail volume – five years from end of construction to reach target volumes
- Discount rate – 3%, 7% and 15% (The discount rate is the rate used to calculate the current value of future cash flows; higher-risk investments tend to have higher discount rates)
- Finance period – 50 years

Table 9 presents the results of these calculations. Under the most optimistic scenario (i.e. low construction cost estimate and 3.0% discount rate), between 11.5 million and 18.5 million metric tons of cargo per year would be required. Under the highest-cost scenario (i.e. high construction cost and 15.0% discount rate), between 65.6 million and 100.0 million metric tons of cargo would be needed.

Under the North-South scenario, a discount rate of 3.0% would require 5.6 million metric tons to 9.1 million metric tons per year, while a 15.0% discount rate would require between 26.2 million and 42.3 million metric tons. The lower discount rates are applicable to a publicly financed project, while the higher discount rate is reflective of privately financed project. As illustrated in Table 9, the lower discount rates result in lower volume requirements.

For a project of this scale and level of risk, the higher discount rate is most appropriate.

Table 9 – Estimate of Required Rail Volumes

	East-West Routes		North-South Route
	Low	High	High
Construction Cost ($ billion)	$1.066	$1.239	$0.609
Discount Rate			
3.0%	11.5 - 18.5	14.2 - 21.5	5.6 - 9.1
7.0%	24 - 36.7	27.9 - 42.6	11.2 - 18.1
15.0%	56.5 - 86.2	65.6 – 100.0	26.2 - 42.3

Source: BST Associates

As discussed previously, the scope of this project involved estimating the cost to construct a rail alignment to Class 3 (40 mph) standards, which are the costs shown in Table 9. The construction costs could be reduced by constructing the line to Class 2 (25 mph) or Class 1 (10 mph) standards. Doing so, however, would significantly increase the running time, thereby increasing operating costs. This would result in a different RVC ratio, and therefore in different volume requirements.

These calculations also assume that the necessary port facilities and navigation channel improvements will be in place when the rail line opens. Although these items were not included in the scope of this analysis, they are discussed briefly below.

Other Considerations

The financial feasibility of the proposed rail routes to Humboldt County is only one of several factors in determining whether the project is viable. Other key factors include: rail distance to competing ports, railroad market considerations, vessel characteristics of potential fleet, marine terminal requirements, and navigation channel needs. Without addressing each of these factors, the rail line in and of itself will not generate the traffic needed to justify the construction cost.

Rail Distance to Competing Ports

For most of the commodities and origins studied in this analysis, the proposed rail routes to Humboldt County do not offer a rail distance advantage. As illustrated in Table 10, the Humboldt County routes offer no advantage relative to Richmond and Stockton, California, or to Longview, Washington, for any of commodities and origins. In several instances the Humboldt routes do have a rail distance advantage, but for the most part these advantages are small. Commodities and origins for which the east-west Humboldt County rail routes have an advantage include:

- For wheat originating in Great Falls, Montana, Humboldt County is 370 miles closer than Los Angeles,
- For most commodities the east-west route to Humboldt County is shorter than the existing line to Coos Bay, but this difference is relatively small,
- There is a very slight advantage versus Aberdeen, Washington, for coal, potash, and iron ore, from some origins,
- Potash and iron ore from Utah are approximately 60 miles closer to Humboldt County than to Seattle, and
- For coal from Utah and Colorado, the east-west Humboldt route is approximately 200 miles shorter than to the neighboring ports of Cherry Point, Washington and Roberts Bank, British Columbia. Prince Rupert, British Columbia is a much longer rail move.

A critical advantage that all of these other ports have relative to Humboldt County is that the rail lines are already in place. In addition, most of these existing rail routes are capable of handling large volumes of heavy rail traffic, without the billion dollar-plus investment needed for an east-west route to Humboldt County.

Table 10 – Rail Distance Advantage/Disadvantage to Humboldt

Commodity	Origin	Los Angeles, CA	Stockton, CA	Richmond, CA	Coos Bay, OR	Longview, WA	Aberdeen, WA	Seattle, WA	Cherry Point, WA	Roberts Bank, BC	Prince Rupert, BC	Humboldt
Rail Miles												
Coal	Sharp, UT	705	865	968	1,229	1,025	1,124		1,289	1,314	2,258	1,102
Coal	Oak Creek, CO	1,189	1,253	1,356	1,617	1,413	1,512		1,677	1,702	2,646	1,490
Coal	Antelope Mine, WY	1,576	1,493	1,596	1,790	1,364	1,463		1,624	1,649	2,593	1,731
Soda Ash	Green River, WY	997	914	1,017	1,211	1,007	1,106		1,272	1,296	2,240	1,151
Wheat	Great Falls, MT	1,967	1,439	1,475	1,123	906	1,005	1,046				1,597
Wheat	Sioux Falls, SD	1,960	1,878	1,981	2,091	1,874	1,973	2,014				2,115
Wheat	Topeka, KS	1,728	1,770	1,873	2,067	1,863	1,962	2,003				2,007
Corn	Minneapolis, MN	2,148	2,065	2,168	2,036	1,819	1,918	1,959				2,303
Corn	Grand Island, NE	1,661	1,579	1,682	1,876	1,672	1,771	1,812				1,816
Corn	Des Moines, IA	1,995	1,912	2,015	2,209	2,005	2,104	2,145				2,150
Potash	Ogden, UT	823	736	840	1,098	897	996	1,036				974
Iron Ore	Cedar, UT	859	923	1,026	1,284	1,083	1,182	1,223				1,161
Humboldt Rail Advantage (Miles)												
Coal	Sharp, UT	8	**(237)**	**(134)**	126	**(77)**	22		187	212	1,156	
Coal	Oak Creek, CO	**(301)**	**(237)**	**(134)**	126	**(77)**	22		187	212	1,156	
Coal	Antelope Mine, WY	**(155)**	**(237)**	**(134)**	60	**(366)**	**(268)**		**(106)**	**(82)**	862	
Soda Ash	Green River, WY	**(155)**	**(237)**	**(134)**	60	**(144)**	**(45)**		120	145	1,089	
Wheat	Great Falls, MT	370	**(158)**	**(122)**	**(474)**	**(691)**	**(592)**	**(551)**				
Wheat	Sioux Falls, SD	**(155)**	**(237)**	**(134)**	**(24)**	**(241)**	**(142)**	**(101)**				
Wheat	Topeka, KS	**(279)**	**(237)**	**(134)**	60	**(144)**	**(45)**	**(5)**				
Corn	Minneapolis, MN	**(155)**	**(237)**	**(134)**	**(267)**	**(484)**	**(385)**	**(344)**				
Corn	Grand Island, NE	**(155)**	**(237)**	**(134)**	60	**(144)**	**(45)**	**(5)**				
Corn	Des Moines, IA	**(155)**	**(237)**	**(134)**	60	**(144)**	**(45)**	**(5)**				
Potash	Ogden, UT	**(151)**	**(237)**	**(134)**	124	**(77)**	22	62				
Iron Ore	Cedar, UT	**(301)**	**(237)**	**(134)**	124	**(77)**	22	62				

Note: Numbers in parentheses indicate a disadvantage, or longer distance, to Humboldt
Source: BST Associates

Existing West Coast Bulk Traffic

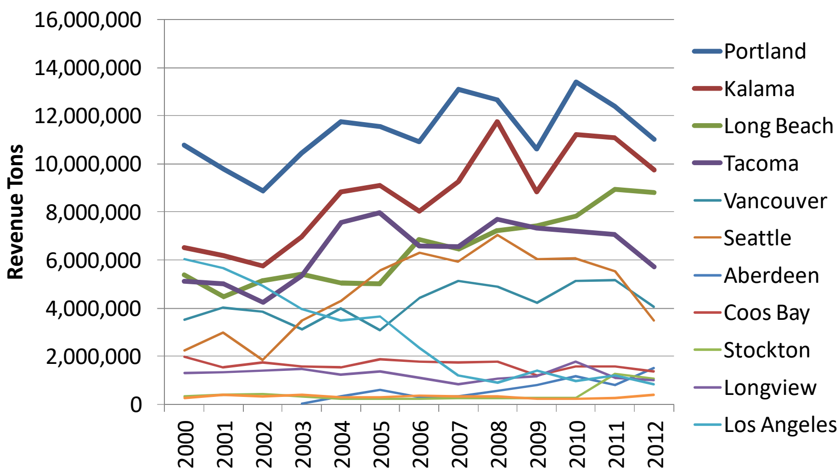
The estimated volume of rail cargo required to make a new rail route to Humboldt County economically feasible would make Humboldt Bay one of the largest dry bulk ports on the West Coast. As shown in Table 9 above, the lowest volume requirement is for rebuilding the north-south line using on a discount rate of 3.0%. Under these assumptions, the volume required would likely range between 5.6 million and 9.1 million metric tons per year. For the east-west lines, the lowest estimated volume requirement is 11.5 million to 18.5 million metric tons per year, assuming a 3.0% discount rate. Under higher discount rates the volume increases sharply, to as much as 100 million metric tons per year.

Typical shuttle trains for dry bulk commodities carry 10,000 tons of traffic or more. At a range of 5.6 million to 9.1 million metric tons per year, this would translate to approximately 1.5 to 2.5 full trains per day, or 3.1 to 5.0 total trains per day. The low estimate for east-west lines of 11.5 million to 18.5 million metric tons per year translates into approximately 3.1 to 5.1 full trains per day, or 6.3 to 10.1 total trains per day. Using higher discount rates and/or higher construction costs will substantially increase the number of trains.

Data from the Pacific Maritime Association shows that the level of cargo needed for an east-west line this level of exports would be among the largest bulk export volumes on the West

Coast (see Figure 11). The Columbia River ports of Portland, Oregon and Kalama, Washington have each exported an average of more than 10 million tons of dry bulk commodities per year in recent years. Long Beach exported approximately nine million tons in 2012, but since 2000 no other port has exported more than eight million tons of dry bulk commodities per year.

Figure 11 – Bulk Export Volumes at West Coast Ports



Source: Pacific Maritime Association data

Navigation Channel Requirements

The navigation channel in Humboldt Bay is authorized for a depth of 38 feet. This compares favorably with several other ports on the West Coast, but is substantially less than at most of the major bulk-handling ports.

As illustrated above, the largest bulk exporting ports on the West Coast are on the lower Columbia River. In addition to Portland and Kalama, these ports include Vancouver, Washington and Longview, Washington. As shown in Table 11, the authorized channel depth to Longview (and the other lower Columbia River ports) is 43 feet. The lower Columbia River channel was deepened in recent years from 40 feet down to 43 feet, and vessel transit data shows an upward trend in the draft of loaded vessels.

Table 11 – Navigation Channel Depths at West Coast Ports

Port	Channel Depth
Los Angeles, CA	50+
Stockton, CA	35
Richmond, CA	38
Humboldt, CA	38
Coos Bay, OR	37
Longview, Kalama, and Vancouver, WA and Portland, OR	43
Grays Harbor, WA	36
Seattle, WA	50+
Cherry Point (WA)	78
Roberts Bank (BC)	68
Prince Rupert (BC)	48+

Source: NOAA, USACE, individual ports

In addition to the 43 feet in the Columbia River, Puget Sound ports (e.g. Seattle) have water depth of 50 feet or more at their bulk facilities. Farther north, the neighboring port facilities at Cherry Point, Washington and Roberts Bank, British Columbia have water depth of 68 feet or more. To the south, Los Angeles has a depth of 50 feet or more at many of its facilities.

Humboldt Bay would likely require a deeper navigation channel to handle the numbers and sizes of ships needed to handle the estimated volume of cargo. Such a deepening project would likely be costly.

Marine Terminal Requirements

Dry bulk cargos such as grain, coal, ores, and minerals are increasingly being moved in shuttle trains with as many as 100 to 125 cars per train. New facilities to handle these trains typically require rail trackage sufficient to hold several complete trains at once, as well as unloading equipment that can send a train back out in less than one day. This trackage is typically in the form of a rail loop, but sometimes consists of several long, linear tracks. The mainline railroads offer their lowest rates to facilities that are able to receive, unload, and return the empty train in less than 24 hours.

A prime example of such a facility is the new EGT grain export terminal in Longview, Washington. This terminal has a loop track layout capable of holding four trains, and which can unload two trains simultaneously. This facility was required by the railroads to include four extra loop tracks in order to accommodate all of EGT's train sets in the event of a rail stoppage The grain terminals at both Seattle and Tacoma have long parallel tracks, or "ladder tracks", instead of loop tracks, but both are able to turn shuttle trains in the required time.

The Samoa Peninsula may be too narrow for a loop track, necessitating the use of ladder tracks.

In addition to rail infrastructure, a new bulk terminal may require a new dock, as well as storage facilities and handling equipment.

While the cost of a new bulk terminal has not been included in this analysis, the $200 million investment in the new EGT terminal provides a recent example of the potential cost.

Figure 12 – EGT Longview Terminal

Source: EGT

Railroad Market Considerations

All three Central Valley interchanges are located on the Union Pacific Railroad. For shippers seeking to use the east/west railroad, also having access to the Burlington Northern Santa Fe (BNSF) would be desirable for obtaining competitive rates. BNSF operates transcontinental service fairly near the Redding/Red Bluff/Gerber area. However, their nearest railhead is located at Bieber Junction and/or the Stockton – Richmond area. It is not likely that Union Pacific would grant BNSF access to the Redding/Red Bluff/Gerber interchanges. With only one Class 1 carrier accessing the Humboldt Bay area, shippers could be subjected to higher rates, with reduced market access.

Should interest continue in developing a new east/west rail line to connect the UP mainline with the Humboldt Bay area, it will be necessary to present to the STB an environmental impact statement that describes the potential impact of the new line.

Conclusion

Rail service to Humboldt County will require a major investment, through either a new East-West rail alignment or through reconstruction of the former North-South line. In order for this investment to be financially feasible, the rail line will need to move very large volumes of cargo.

A rail line to Humboldt County would face strong competition from existing ports, primarily those on the U.S. West Coast. Humboldt County would face several competitive disadvantages relative to these other ports, including that rail traffic would need to generate sufficient net revenue to finance the construction of a rail line, and the lack of a rail distance advantage.

In addition to the lack of rail infrastructure, waterborne exports of large volumes of bulk commodities would likely require substantial investments in new cargo terminals. Also, the Humboldt navigation channel is not at deep as that at most of the competing ports, which would also require a substantial investment.

In conclusion, development of rail service to Humboldt County is likely to be both high cost and high risk.

Appendix

Table 12 – Rail Alignment Cost Details
1909 Lentell Alignment 1

Cost Item	Length	Unit Cost	Subtotal	Comments
Track	194 mi	$1.0 (M/mile)	$194M	Samoa to Redding
Grading (Hvy)	150 mi	$3.0 (M/mile)	$450M	
Grading (Lite)	34 mi	$1.5 (M/mile)	$51M	Deducts 10.0 miles between Samoa and Aldergrove
Landslide Mitigation	150 mi	$1.0 (M/mile)	$150M	Incl Environmental Review and Contingency
Tunnels	7000 LF	$13K/LF	$90M	Includes 5 tunnels in Hayfork River Cyn
Bridges	9000 LF	$10K/LF	$90M	
Property	184 mi	$300K/mile	$55M	Deducts 10.0 miles between Samoa and Aldergrove
		Total	$1080M	$5.6M/mile

Table 13 – Rail Alignment Cost Details
Rail Route 1

Cost Item	Length	Unit Cost	Subtotal	Comments
Track	189 mi	$1.0 (M/mile)	$189M	Samoa to Redding
Grading (Hvy)	150 mi	$3.0 (M/mile)	$450M	
Grading (Lite)	29 mi	$1.5 (M/mile)	$44M	Deducts 10.0 miles between Samoa and Aldergrove Rd
Landslide Mitigation	150 mi	$1.0 (M/mile)	$150M	Incl Environmental Review and Contingency
Tunnels	7000 LF	$13K/LF	$90M	Includes 5 tunnels in Hayfork River Cyn
Bridges	9000 LF	$10K/LF	$90M	
Property	179 mi	$300K/mile	$54M	Deducts 10.0 miles between Samoa and Aldergrove Rd
		Total	$1067M	$5.6M/mile

Cost Item	Length	Unit Cost	Subtotal	Comments
Track	201 mi	$1.0 (M/mile)	$201M	Samoa to Red Bluff
Grading (Hvy)	175 mi	$3.0 (M/mile)	$525M	
Grading (Lite)	16 mi	$1.5 (M/mile)	$24M	Deducts 10.0 miles between Samoa and Aldergrove Rd
Landslide Mitigation	140 mi	$1.0 (M/mile)	$140M	Incl Environmental Review and Contingency
Tunnels	7000 LF	$13K/LF	$90M	Includes 5 tunnels in Hayfork River Cyn
Bridges	9000 LF	$10K/LF	$90M	
Property	191 mi	$300K/mile	$57M	Deducts 10.0 miles between Samoa and Aldergrove Rd
		Total	$1127M	5.6M/mile

Cost Item	Length	Unit Cost	Subtotal	Comments
Track	209 mi	$1.0 (M/mile)	$209M	Samoa to Gerber
Grading (Hvy)	190 mi	$3.0 (M/mile)	$570M	
Grading (Lite)	20 mi	$1.5 (M/mile)	$30M	Deducts 10.0 miles between Samoa and Aldergrove
Landslide Mitigation	190 mi	$1.0 (M/mile)	$190M	Incl Environmental Review and Contingency
Tunnels	7000 LF	$13K/LF	$90M	Includes 5 tunnels in Hayfork River Cyn
Bridges	9000 LF	$10K/LF	$90M	
Property	199 mi	$300K/mile	$60M	Deducts 10.0 miles between Samoa and Aldergrove Rd
		Total	$1239M	$5.9M/mile

Table 14 – Rail Alignment Cost Details
1909 Lentell Alignment 2

Cost Item	Length	Unit Cost	Subtotal	Comments
Track	213 mi	$1.0 (M/mile)	$213M	Samoa to Redding
Grading (Hvy)	176 mi	$3.0 (M/mile)	$528M	
Grading (Lite)	mi	$1.5 (M/mile)	$M	Deducts 37.0 miles between Samoa and Alton
Landslide Mitigation	160 mi	$1.0 (M/mile)	$160M	Deducts 10.0 miles of relatively flat ground near Redding; Incl Environmental Review and Contingency
Tunnels	13,000 LF	$13K/LF	$170M	Includes 1.5 miles tunnel under South Fork Mtn.
Bridges	11,000 LF	$10K/LF	$110M	Incl Major 400' high bridge over SF Trinity River
Property	176 mi	$300K/mile	$53M	Deducts 37.0 miles between Samoa and Alton
		Total	$1234M	$5.8M/mile

Cost Item	Length	Unit Cost	Subtotal	Comments
Track	217 mi	$1.0 (M/mile)	$217M	Samoa to Gerber
Grading (Hvy)	150 mi	$3.0 (M/mile)	$450M	
Grading (Lite)	30 mi	$1.5 (M/mile)	$45M	Deducts 37.0 miles between Samoa and Alton
Landslide Mitigation	120 mi	$1.0 (M/mile)	$120M	Deducts 30.0 miles of relatively flat ground near Gerber; Incl Environmental Review and Contingency
Tunnels	13,000 LF	$13K/LF	$170M	Includes 1.5 miles tunnel under South Fork Mtn.
Bridges	11,000 LF	$10K/LF	$110M	Incl Major 400' high bridge over SF Trinity River
Property	180 mi	$300K/mile	$54M	Deducts 37.0 miles between Samoa and Alton
		Total	$1166M	$5.4M/mile

Table 15 – Rail Alignment Cost Details
Rail Route 2

Cost Item	Length	Unit Cost	Subtotal	Comments
Track	200 mi	$1.0 (M/mile)	$200M	Samoa to Redding
Grading (Hvy)	153 mi	$3.0 (M/mile)	$459M	
Grading (Lite)	10 mi	$1.5 (M/mile)	$15M	Deducts 37.0 miles between Samoa and Alton
Landslide Mitigation	143 mi	$1.0 (M/mile)	$143M	Deducts 10.0 miles of relatively flat ground near Redding; Incl Environmental Review and Contingency
Tunnels	7,000 LF	$13K/LF	$90M	
Bridges	11,000 LF	$10K/LF	$110M	Incl Major 400' high bridge over SF Trinity River
Property	163 mi	$300K/mile	$49M	Deducts 37.0 miles between Samoa and Alton
		Total	$1066M	$5.3M/mile

Cost Item	Length	Unit Cost	Subtotal	Comments
Track	212 mi	$1.0 (M/mile)	$212M	Samoa to Red Bluff
Grading (Hvy)	155 mi	$3.0 (M/mile)	$465M	
Grading (Lite)	20 mi	$1.5 (M/mile)	$30M	Deducts 37.0 miles between Samoa and Alton
Landslide Mitigation	135 mi	$1.0 (M/mile)	$135M	Deducts 20.0 miles of relatively flat ground near Red Bluff; Incl Environmental Review and Contingency
Tunnels	7,000 LF	$13K/LF	$90M	
Bridges	11,000 LF	$10K/LF	$110M	Incl Major 400' high bridge over SF Trinity River
Property	175 mi	$300K/mile	$53M	Deducts 37.0 miles between Samoa and Alton
		Total	$1095M	$5.2M/mile

Cost Item	Length	Unit Cost	Subtotal	Comments
Track	221 mi	$1.0 (M/mile)	$221M	Samoa to Gerber
Grading (Hvy)	154 mi	$3.0 (M/mile)	$462M	
Grading (Lite)	30 mi	$1.5 (M/mile)	$45M	Deducts 37.0 miles between Samoa and Alton
Landslide Mitigation	1240 mi	$1.0 (M/mile)	$124M	Deducts 30.0 miles of relatively flat ground near Gerber; Incl Environmental Review and Contingency
Tunnels	14,000 LF	$13K/LF	$180M	Incl 1.4 mile long tunnel near Black rock Mtn
Bridges	11,000 LF	$10K/LF	$110M	Incl Major 400' high bridge over SF Trinity River
Property	184 mi	$300K/mile	$55M	Deducts 37.0 miles between Samoa and Alton
		Total	$1197M	$5.4M/mile

Table 16 – Rail Alignment Cost Details
Rail Route 3 (Eel Canyon)

Cost Item	Length	Unit Cost	Subtotal	Comments
Track	241.0 mi	$1.0 (M/mile)	$241M	Samoa to Gerber
Grading (Hvy)	144 mi	$3.0 (M/mile)	$432M	
Grading (Lite)	30 mi	$1.5 (M/mile)	$45M	Deducts 67.0 miles between Samoa and Fort Seward
Landslide Mitigation	113 mi	$1.0 (M/mile)	$113M	Deducts 30.0 miles of relatively flat ground near Gerber; Incl Environmental Review and Contingency
Tunnels	14,000 LF	$13K/LF	$180M	Incl 1.4 mile long tunnel near Black rock Mtn
Bridges	11,000 LF	$10K/LF	$140M	Incl major 400' high bridge over Eel River at Ft. Seward ; incl $30M to upgrade existing Van Duzen and Eel River bridges to 286K
Property	174 mi	$300K/mile	$52M	Deducts 67.0 miles between Samoa and Fort Seward
		Total	$1203M	$5.0M/mile

APPENDIX 2

August 17, 2012 Joint Stakeholder Meeting Deliverables Packet

LACO

August 23, 2012

7591.00

Humboldt Bay Harbor, Recreation & Conservation District
Post Office Box 1030
Eureka, California 95502

Attention: Jack Crider, Chief Executive Officer

Subject: Humboldt Bay Industrial Waterfront Transportation Access Project
August 17, 2012 Joint Stakeholder Meeting Project Deliverables

Dear Mr. Crider:

LACO Associates is pleased to provide you the task deliverables for Task 3002 – Joint Stakeholder Meeting (the Meeting), for the Humboldt Bay Industrial Waterfront Transportation Access Project. On August 17, 2012, LACO Associates and HBHRCD hosted the Meeting at the Samoa Women's Club, which was well-attended by invited area landowners and agency representatives.

This deliverables packet includes:

1. Final Meeting Invitation Packet
    a) Invitation Letter
    b) List of Invitees
    c) Meeting Agenda
    d) Route Alternatives Map
2. PowerPoint Slides
3. Samoa Peninsula Ownership Map
4. Meeting Minutes
5. Field Visit Photos
6. Stakeholder Meeting Sign-In Sheet

After the Meeting, a smaller group representing California Redwood Company (CRC), Timber Heritage Association, HBHRCD, and the LACO project team conducted a brief tour of the project site. Following the site visit, an updated Alternative 2 was discussed, which would potentially include:

1. A revised entry route configuration from the Vance Avenue and Cookhouse Road intersection
2. Use of a portion of the existing roadway on CRC property west of the current Alternative 2 route

3. Relocation of the existing HBHRCD easement on CRC property northeast of its current location, connecting with Vance Avenue.
4. Following the property line of CRC and Freshwater Tissue southeast toward Redwood Dock No. 2 (this may involve acquisition of fee title by HBHRCD)

Presently, LACO prefers to consult with HBHRCD on this topic in greater detail prior to implementing a formal redesign of the preferred alternative.

A copy of the Meeting minutes and PowerPoint slides will be delivered to each meeting attendee and invitee. We anticipate the finalization of the route alternatives, incorporating the feedback and new information we received at the Meeting and including consultation with HBHRCD, to occur over the next two weeks.

Please contact me at (707) 443-5054 with any questions.

Sincerely,
LACO Associates

Mike Nelson
Planning Director

Cc: Scott Kelly, LACO Project Manager

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LACO

August 10, 2012

7591.00

[NAME]
[ADDRESS]
[CITY, STATE, ZIP]

Subject: Samoa Industrial Waterfront Transportation Access Project
Joint Stakeholder Meeting, Friday, August 17, 2012, 10:00 AM

Dear [OWNER NAME]:

The Humboldt Bay Harbor, Recreation & Conservation District (HBHRCD) and LACO Associates (LACO) have begun a multi-phase project to analyze potential transportation routes for commercial vehicles from State Highway 255/New Navy Base Road to harbor-dependent properties on the Samoa Peninsula. The HBHRCD's mission is to serve all the people of Humboldt County by promoting harbor use, enhancing recreational opportunities, and protecting bay and tidal environments. This project will create the opportunity to improve access to underutilized waterfront properties and promote coastal-based industry and economic development on Humboldt Bay.

LACO has conducted initial field surveys and worked with HBHRCD to identify three alternative access routes. In order to present these options to affected landowners on the northern Samoa Peninsula, we cordially invite you to attend and participate in our upcoming Joint Stakeholder Meeting, to be held on Friday, August 17, 2012, from 10:00 AM to 12:00 PM. An optional one-hour site walk will take place from 12:00 PM to 1:00 PM. The meeting will be held at the Samoa Women's Club (115 Rideout Ave., Samoa, CA 95564), and will provide interested stakeholders an opportunity to see what work has been done to date and provide input in the formation of a preferred alternative route. A light lunch will be provided.

If possible, please let us know if you will be able to participate in the Joint Stakeholders Meeting by emailing Ryan Wells at wellsr@lacoassociates.com. Please direct any questions to Mr. Wells, Associate Planner at LACO Associates, at (707) 443-5054.

We look forward to your participation.

Sincerely,
LACO Associates

Mike Nelson
Planning Director

cc: Jack Crider, CEO, HBHRCD
Scott Kelly, Project Manager

Samoa Industrial Waterfront Transportation Access Project
Joint Stakeholder Meeting, Friday, August 17, 2012, 10:00 AM

List of Invitees

City of Eureka
Coast Seafoods
DG Fairhaven Power, LLC.
FoxFarm Soil & Fertilizer Company
Freshwater Tissue Company, LLC.
Humboldt Bay Harbor, Recreation, & Conservation District
Humboldt Bay Municipal Water District
Laurent Zerlang
Peninsula Union School District
Planwest Partners, Inc.
Samoa Cookhouse
Samoa Pacific Group, LLC
Samoa Properties, Inc.
Sequoia Investments X, LLC
Taylor Mariculture, LLC
Timber Heritage Association
Trueman Vroman

Samoa Industrial Waterfront Transportation Access Plan

Joint Stakeholder Meeting

Friday, August 17, 2012: Samoa Women's Club

Meeting Agenda

10:00 Welcome, Introductions
10:10 Reasons for project, site description (Harbor District)
10:20 Work completed so far
10:30 Alternative 1
- Existing Conditions
- Project strengths
- Project weaknesses

10:45 Alternative 2 (Preferred Alternative)
- Existing Conditions
- Project strengths
- Project weaknesses

11:00 Alternative 3
- Existing Conditions
- Project strengths
- Project weaknesses

11:15 Priorities for scheduling/funding improvements
- Potential funding sources
- Public/private investment

11:25 Discussion
- Stakeholder input

11:55 Next steps
12:00 One-hour site walk (Optional)
1:00 Close

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Humboldt Bay Harbor, Recreation, and Conservation District:

Samoa Industrial Waterfront Transportation Access Project

Joint Stakeholder Meeting

Friday, August 17, 2012, 10:AM

Samoa Women's Club, Samoa, CA

Samoa Industrial Waterfront Transportation Access Plan

Joint Stakeholder Meeting

Friday August 17, 2012 : Samoa Women's Club

Meeting Agenda

10:00	Welcome, Introductions
10:10	Reasons for project, site description (Harbor District)
10:20	Work completed so far
10:30	Alternative 1
10:45	Alternative 2 (Preferred Alternative)
11:00	Alternative 3
11:15	Priorities for scheduling/funding improvements
11:25	Discussion
11:55	Next steps
12:00	One-hour site walk (Optional)
1:00	Close

Hammond Lumber Co., Samoa

Jan 4, 1947

Path: \\LACO-FS3\Projects\7500\7591 HBHRCD\7591.00 Samoa Waterfront\12 Figures_Maps\GIS\7591.00_SAMOA_PENINSULA-OWNERSHIP-20120822.mxd

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Date: 8/22/2012 Time: 11:56:02 AM
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DIST	COUNTY	ROUTE	MILE POST TOTAL PROJECT	SHEET No	TOTAL SHEETS

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

w-trans
490 Mendocino Avenue, Suite 201
Santa Rosa, CA 95401
Ph: 707 542-9500

REVISED BY | DATE

CALCULATED/DESIGNED BY | CHECKED BY

- Assumes abandonment of rail line
- Minimizes impacts to roundhouse area

N

ALT 2 – ROUNDABOUT OPTION A

1" = 100'

Xrefs:
Path: N:\AAA\HUX\HUX\052HUX\CAD\

Layout: Alt 2 Opt A
DWG File: HUX052 Roundabout-Concept.dwg

Plot Date: Aug 15, 2012
Plot Time: Wed – 02:52 pm

LAST REVISION
8/15/2012

DIST	COUNTY	ROUTE	MILE POST TOTAL PROJECT	SHEET No	TOTAL SHEETS

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
No.
Exp.
CIVIL
STATE OF CALIFORNIA

w-trans
490 Mendocino Avenue, Suite 201
Santa Rosa, CA 95401
Ph: 707 542-9500

REVISED BY | DATE

CALCULATED/ DESIGNED BY | CHECKED BY

- Located to place rail crossing at appropriate location
- Requires roadway realignment

N

ALT 2 – ROUNDABOUT OPTION B

1" = 100'

Xrefs:
Path: N:\AAA\HUX\HUX\052HUX\CAD\

Layout: Alt 2 Opt B
DWG File: HUX052 Roundabout-Concept.dwg
Plot Date: Aug 15, 2012
Plot Time: Wed – 02:53 pm

LAST REVISION
8/15/2012

DIST	COUNTY	ROUTE	MILE POST TOTAL PROJECT	SHEET No	TOTAL SHEETS

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
No.
Exp.
CIVIL
STATE OF CALIFORNIA

w-trans
490 Mendocino Avenue, Suite 201
Santa Rosa, CA 95401
Ph: 707 542-9500

REVISED BY
DATE
CALCULATED/DESIGNED BY
CHECKED BY

- Relocates rail line
- Minimizes realignment and ROW take at intersection
- potential implications to roundhouse area

N

ALT 2 – ROUNDABOUT OPTION C

1" = 100'

Xrefs:
Path: N:\AAA\HUX\HUX\052HUX\CAD\

Layout: Alt 2 Opt C
DWG File: HUX052 Roundabout-Concept.dwg
Plot Date: Aug 15, 2012
Plot Time: Wed – 02:56 pm

LAST REVISION
8/15/2012

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Meeting Minutes

Humboldt Bay Harbor, Recreation, and Conservation District:
Humboldt Bay Industrial Waterfront Transportation Access Project

Joint Stakeholder Meeting

August 17, 2012, 10 AM

Samoa Women's Club, Samoa, CA

Attendees:

Mike Kellogg, Timber Heritage Association
Vicky Childs, Foxfarm Soil & Fertilizer
Michael Wheeler, Humboldt County Planning & Building Dept.
Craig Compton, Green Diamond Resource Co.
Mitch White, Taylor Mariculture
Marcella Clem, HCAOG
Mike O'Hern, Kelly O'Hern Associates
Lisa Savage, City of Eureka
Sheila Parrott, City of Eureka
Steve Weinberger, W-Trans
Davey Stone, Sequoia Investments X, LLC.
Greg Dale, Coast Seafoods
Mike Wilson, HBHRCD
Richard Marks, HBHRCD
Jack Crider, HBHRCD
Dan Berman, HBHRCD
Scott Kelly, LACO Associates
Mike Nelson, LACO Associates
Ryan Wells, LACO Associates

1. Mike Nelson of LACO Associates welcomed the attendees; all present introduced themselves and their affiliations.

2. Mike Wilson, HBHRCD Commissioner, presented an introduction on, discussed the funding source and requirements for, and explained the ultimate goal of the Project.

3. Mike Nelson then described the overall site condition and the three current route alternatives, their benefits, and challenges. In summary:
   - Alternative 1 begins at the existing northern entrance of the HBHRCD property. The route cuts southeast through an existing hill and turns sharply southwest. The route follows the HBHRCD property line until it cuts west to meet an existing road on Sequoia Investments X, LLC property. The route then continues west along a curve to meet Vance Avenue and reconnect with New Navy Base Rd. via

LP Drive. The existing roadway is a major benefit to the route, thereby reducing the need to create new impermeable surface. The main challenge to the route is the need to traverse non-HBHRCD property, which creates a need to negotiate new easements and may cause obstacles to future development on neighboring properties, as well as potential impacts to property values due to public access. The Timber Heritage Association (THA) expressed concern about conflicts with the entrance location and potential future railroad museum development.

- Alternative 2 begins at the existing northern entrance of the HBHRCD property. The route circumvents the mound and the THA lease site, swinging northeast before turning southwest and following the inside of the HBHRCD property line until its terminus at Redwood Dock No. 2. The route avoids conflicts with neighboring properties and provides a direct connection with existing dock facilities while providing space for future coastal-related development. The route runs through coastal wetlands, and will likely need re-routing along sections, or mitigation for fill in coastal wetlands, to be pursued. This is the preferred alternative, although THA expressed concerns over the route's proximity to the Samoa shop complex.
- Alternative 3 begins at the intersection of Vance Avenue and Cookhouse Rd. and enters the HBHRCD property at a gate approximately 500 feet west of the existing main entrance. The route follows an existing road, then roughly follows the waterfront southwest until the terminus at Redwood Dock No. 2. For the last approximately 1,000 feet, Alternatives Nos. 2 and 3 follow roughly the same path. The route provides direct access to the waterfront and future potential development, while preserving the maximum open space on HBHRCD property for future industrial development. Due to CA Coastal Commission oversight and future sea level rise predictions, it is assumed the regulatory and design barriers would prevent this Alternative from being feasible.

4. The following notes reflect questions or comments presented by attendees of the Joint Stakeholder Meeting during the discussion of the Alternatives:
   - Will the main entryway (presumed to be the existing entry at the northern end of the HBHRCD property) be gated, or allow free public entry?
   - It will be important to include trucking industry representatives in the discussion regarding a potential roundabout at the Vance Ave./Cookhouse Rd. intersection, due to previous challenges from their installation at other locations.
   - Is access to the HBHRCD property via Vance Avenue from the south a viable option, rather than making the northern entry the main access point?
   - How will the Plan incorporate security issues for working dock facilities?
   - Relate the Transportation Access Plan to the Samoa Master Plan, in particular:
     - Vance Avenue is expected to remain a private road
     - Residential traffic is expected to be routed along Vance Avenue, while commercial traffic will be redirected to a side road to the southeast, avoiding noise and traffic impacts to future residences.
   - Any route alternative will require easements across the existing railroad

5. Steve Weinberger then presented a series of conceptual roundabout design options:
   - Option A is a 160’ diameter roundabout that contains a radius curve that meets up with the existing road south of the roundhouse. Steve stated that a roundabout better addresses the separation of residential and commercial traffic than a traffic signal. There was a question of how the roundabout design would accommodate bicycle traffic; Steve replied that in-lane and off-lane access options were available, to be determined at a finer design detail stage.
   - Option B is a 130’ diameter roundabout with a truck apron. The roundabout would be located on existing HBHRCD property northeast of the existing intersection, in order to avoid impacts to the existing rail line (which would run through the southern leg of the roundabout).
   - Option C is a 130’ diameter roundabout with a truck apron centered on the existing intersection of Vance Ave. and Cookhouse Road. This configuration would require the relocation of the existing rail line southward to accommodate the roundabout. Mike Kellogg of the Timber Heritage Association commented that the steep grade at the entrance to the Samoa Cookhouse would likely be a constraint to the relocation of the rail, as would be the Cookhouse itself.

6. After a brief break, Mike invited comments from the stakeholders themselves to assist the Project proponents to understand the sentiment of affected parties (stakeholders not mentioned, did not express any comments):
   - California Redwood Company: Safety is a primary concern. Active shipping and high traffic volumes create the potential for traffic and safety issues. This high volume industrial use may conflict with public access, which is a potential component to the Project. What is the actual deliverable of this stage of the project?
   - Sequoia Investments X, LLC: Curious about how the plans might conflict with the railroad.
   - Samoa Pacific Group (SPG): Would likely be in favor of Alternative 2 or 3. SPG had plans for a road similar to Alternative A as part of the Samoa Master Plan.
   - Taylor Mariculture: Private ownership routes (i.e. Alternative 1) may help to avoid permitting. CA Coastal Commission likely would have issues with Alternative 3. Is there available grant funding assistance for permitting preparation and fees?
   - Coast Seafoods: Doesn’t feel the Vance Ave. and Cookhouse Road intersection is an optimal access point to waterfront parcels.
   - HBHRCD: Does the Federal Highway Designation (and potential related funding) require public road status? (Likely, but not necessarily unrestricted public access.) Plan for high traffic intensity – when pulp mill was running at full capacity multiple hundreds of trucks were running daily.
   - Humboldt County: Industrial traffic near residential areas won’t work. Alternative 3 won’t pass CA Coastal Commission review.

7. Mike Kellogg from the Timber Heritage Association (THA) requested time to make a short presentation on the local rail history and THA goals for a rail museum.
    - THA leases the existing Samoa shops complex on HBHRCD property, with the goal of creating and operating a Timber Heritage Museum.
    - The Samoa shop complex is one of the largest lumber company shop complexes in CA.
    - The complex includes the 1893 roundhouse, one of four left on the Pacific coast, and the oldest.
    - The tracks are an integral part of the complex; THA wants to re-install tracks at the complex.
    - Public access to the property is a concern with regard to liability.
    - The entry road for the Transportation Access Project would likely cross multiple tracks at the roundhouse "fan." The preferred entry would be along the existing road.
    - Propose a separate entry from New Navy Base Road to the Alt. 3 entry gate, through the HBHRCD dredge spoils site. This would better separate residential from commercial traffic.
    - The roundhouse is zoned Coastal Dependent Industrial; the Planning Commission-recommended General Plan Update would change the zoning of the site to Commercial Recreation.

8. After the Joint Stakeholder Meeting, all attendees were invited to attend a brief site visit to the HBHRCD property. A small number of people attended the field tour.


8.17.12 – Joint Stakeholder Mtg., Field Tour: Roundhouse in background


8.17.12 – Joint Stakeholder Mtg., Field Tour

8.17.12 – Joint Stakeholder Mtg., Field Tour: Historic rail cars

HBHRCD Joint Stakeholder Meeting
Sign In Sheet
August 17, 2012

Name	Affiliation	Phone/Email
MIKE WILSON	HBHRCD	mwilson@humboldt1.com
JACK Crider	HBHRCD	JCrider@portofhumboldtbay.org
Richard Marks	HBHRCD	445-3432
Dan Berman	HBHRCD	dberman@portofhumboldtbay.org
MIKE KELLOGG	TIMBER HERITAGE ASSN.	kellogg1807@att.net
Vicky Childs	FoxFarm Soil & Fertilizer	vchilds@foxfarmfertilizer.com
Michael Wheeler	HCP&B	268-3730 ~~wheeler~~ mwheeler@co.humboldt.ca.us
CRAIG COMPTON	GREEN DIAMOND	707-668-4424 ccompton@greendiamond.com
MITCH WHITE	TAYLOR MARICULTURE	499-8839 / kuiper.mariculture@live.com
Marcella Clem	HCAOG	4448208 Marcella.Clem@hcaog.net
MIKE O'HERN	KELLY-O'HERN ASSOC.	442-7283 kellyohern@sbcglobal.net
Lisa Savage	C of E	441-4186 lsavage@ci.eureka.ca.gov
Sheila Parrott	City of Eureka	441-4350 sparrott@ci.eureka.ca.gov
Scott Kelly	WACO	

HBHRCD Joint Stakeholder Meeting
Sign In Sheet
August 17, 2012

Name	Affiliation	Phone/Email
Davey Stone	SequoiaX	476-2775 DStone@SNSC.com

APPENDIX 3

January 21, 2013 Preferred Alternative Route Property Owner Support Letters, and Property Owner Responses

LACO

January 21, 2013

7591.00

Freshwater Tissue Company, LLC
PO Box 248
Samoa, California, 95564-0248

Attention: Robert Simpson, President

Subject: Humboldt Bay Harbor, Recreation, & Conservation District (HBHRCD)
Samoa Industrial Waterfront Transportation Access Plan Preferred Route

Dear Robert:

In early December 2012, LACO Associates provided you with a preferred route map as part of the HBHRCD's Samoa Industrial Waterfront Transportation Access Plan (Project). The goal of the Project is to provide truck access routes for transport of commercial and industrial goods to and from existing and potential Humboldt Bay waterfront developments on the Samoa Peninsula. This project presents an opportunity to improve shipping and access connectivity for the Samoa Peninsula, providing more efficient transit routes to your property via on- and off-shore locations. The first phase of the project has consisted of stakeholder outreach, assessment of site conditions including biological resources and wetlands, and development of a preferred access route to points along the waterfront. Subsequent phases of this Project, funded by Caltrans and the Federal Highways Administration (FHWA), include environmental impacts analysis (CEQA/NEPA compliance), preliminary engineering for road improvements, identification of existing and required easements, and changes in road classifications to increase eligibility for construction funding.

As a stakeholder and potentially-impacted property owner on the Samoa Peninsula, we want to ensure that you have had ample opportunity to review the preferred route, to provide input, and to offer general agreement with the route's configuration, before the project enters the next phase.

I have attached a copy of the preferred route map to this letter. Please review the route, particularly in the vicinity of your property, which has been outlined in the attached figure. We have made efforts to discuss your concerns with regard to this route; if you have any additional questions or concerns please feel free to contact me at the number below. If you are in general agreement with the configuration of the preferred route, please sign below and return the signed page to us (see page 2). By signing this letter, you are not obligating yourself to any agreements or property access. Alternatively, please provide your own written response. We are solely seeking general consensus on the Project route prior to investing grant dollars into more detailed project analysis and design.

Sincerely,
LACO Associates

Mike Nelson
Planning Director, Vice President

cc: Jack Crider, CEO, HBHRCD

By signing below, I am indicating my general agreement with the preferred route for the Humboldt Bay Harbor, Recreation, & Conservation District's preferred route for the Samoa Industrial Waterfront Transportation Access Plan, as shown in Figure 1, attached. I also generally support the HBHRCD's continuation with preliminary route design and solicitation of additional funding for this project.

____

Robert Simpson, President
Freshwater Tissue Company, LLC

REUSE OF DOCUMENTS: This document and the ideas and design incorporated herein, as an instrument of professional service, is the property of LACO Associates and shall not be reused in whole or part for any other project without LACO Associates express written authorization.

DRAWN	RAW
CHECK	RAW
APPROVED	MDN
DATE	12/04/2012
JOB NO.	7591.00
SHEET	1

SAMOA INDUSTRIAL WATERFRONT
TRANSPORTATION ACCESS PLAN
HBHRCD PREFERRED ROUTE

HUMBOLDT BAY HARBOR, RECREATION, & CONSERVATION DISTRICT

NO.	HISTORY/REVISION	BY	CHK.	DATE

LACO
EUREKA • UKIAH • SANTA ROSA
1-800-515-5054 www.lacoassociates.com

Date: 1/22/2013 Time: 10:25:03 AM
Path: P:\7500\7591 HBHRCD\7591.00 Samoa Waterfront\12 Figures_Maps\GIS\7591.00_FreshwaterTissue.mxd

The California Redwood Company
P.O. Box 1089
Arcata, CA 95518-1089

May 24, 2013

LACO Associates
21 W. 4th Street
Eureka, CA 95501

Attention: Mike Nelson, Planning Director, Vice President

Subject: Humboldt Bay Harbor, Recreation & Conservation District (HBHRCD) Samoa Industrial Waterfront Transportation Access Plan Preferred Route

Dear Mike,

This letter is provided in response to the letter from LACO Associates dated January 21, 2013 regarding the HBHRCD's Samoa Industrial Waterfront Transportation Access Plan (Project). A copy of the letter, and associated figure, is attached for reference.

The California Redwood Company (CRC) generally supports the efforts of the HBHRCD to improve transportation of commercial and industrial goods to and from existing and potential Humboldt Bay waterfront developments on the Samoa Peninsula however CRC is not inclined to sign the letter provided by LACO Associates. Alternatively CRC would like to provide the following written response.

The HBHRCD Preferred Alternative route, as proposed and shown on the map provided by LACO Associates, does not appear to fully optimize access to existing Humboldt Bay waterfront developments. CRC would like to propose an additional route for consideration as part of the overall Project, the location of which is shown on the attached Figure.

It is of interest to CRC that the HBHRCD Preferred Alternative route accurately depicts which portions of the route are currently public or private. The HBHRCD has repeatedly stated that it is not the intent of the Samoa Industrial Waterfront Transportation Access Plan to provide public access over roads which are currently private. To the extent that HBHRCD proposes any roads that are currently private for use as public access, we request that those private road portions of the Preferred Alternative route be clearly shown on all maps.

It is of interest to CRC that access routes proposed as part of the Samoa Industrial Waterfront Transportation Access Plan are reciprocal to allow unrestricted access to HBHRCD docks/berths for all properties currently zoned industrial. The value of any benefit or burden gained or relinquished by affected landowners through the implementation of the Samoa Industrial Waterfront Transportation Access Plan should be justly compensated based upon the fair market value of such interests that are granted by and any reciprocal rights granted to owners of private roads.

Again, CRC generally supports the efforts of the HBHRCD to improve transportation of commercial and industrial goods to and from existing and potential Humboldt Bay waterfront developments on the Samoa Peninsula, however CRC does not consider an assessment of access to be the only element of infrastructure critical to support current uses or future development on the Samoa Peninsula. It is the opinion of CRC that all infrastructure needs for the Samoa Peninsula should be evaluated and considered by HBHRCD to ensure that future development can be supported. Infrastructure improvements such as water (domestic and industrial), electric, sewer, and internet could be designed to be placed within the HBHRCD Preferred Alternative route where feasible.

Assuming it is the intent of the HBHRCD project to facilitate the use and development of the Samoa Peninsula, it is the opinion of CRC that the HBHRCD should establish and assume responsibility for a Samoa Peninsula Service District providing adequate infrastructure for the Samoa Peninsula including water, sewer, and transportation. While it is impossible to know what future development may occur on the Samoa Peninsula, it is clear that all infrastructure needs, including transportation, should be considered to facilitate further development and therefore should be the focus of the HBHRCD project.

Sincerely,

Craig A. Compton

Craig Compton, Manager
Land Management and Business Development

Cc: Mike Pruett, Vice President, Land Management and Business Development
Otto van Emmerik, Operations Manager
File

Attachments

HBHRCD Preferred Alternative
CRC additional route
California Redwood Company (CRC)
Approximate Railroad Alignment
Roads
N
255
Samoa
Vance Ave.
New Navy Base Rd.
Vance Ave.
Bay St.
New Navy Base Rd.
Bendixen St.
Lincoln Ave.
Fairhaven
Eureka
Miles
0
0.2
0.4

By signing below, I am indicating my general agreement with the preferred route for the Humboldt Bay Harbor, Recreation, & Conservation District's preferred route for the Samoa Industrial Waterfront Transportation Access Plan, as shown in Figure 1, attached. I also generally support the HBHRCD's continuation with preliminary route design and solicitation of additional funding for this project.

Charles Benbow

CHARLES BENBOW, PARTNER
Freshwater Tissue Company, LLC

COMMENT,
WHILE I AM INDICATING MY "GENERAL AGREEMENT" I WOULD ADD THAT THE ROAD FOLLOWING THE DARK GREEN LINE INDICATING THE NE; E BOUNDARY OF FTC PROPERTY SHOULD BE CONSIDERED AS A "PREFERRED ROUTE." CB

LACO

January 21, 2013

7591.00

Samoa Pacific Group, LLC
5251 Ericson Way
Arcata, California, 95521

Attention: Dan Johnson

Subject: Humboldt Bay Harbor, Recreation, & Conservation District (HBHRCD)
Samoa Industrial Waterfront Transportation Access Plan Preferred Route

Dear Dan:

In early December 2012, LACO Associates provided you with a preferred route map as part of the HBHRCD's Samoa Industrial Waterfront Transportation Access Plan (Project). The goal of the Project is to provide truck access routes for transport of commercial and industrial goods to and from existing and potential Humboldt Bay waterfront developments on the Samoa Peninsula. This project presents an opportunity to improve shipping and access connectivity for the Samoa Peninsula, providing more efficient transit routes to your property via on- and off-shore locations. The first phase of the project has consisted of stakeholder outreach, assessment of site conditions including biological resources and wetlands, and development of a preferred access route to points along the waterfront. Subsequent phases of this Project, funded by Caltrans and the Federal Highways Administration (FHWA), include environmental impacts analysis (CEQA/NEPA compliance), preliminary engineering for road improvements, identification of existing and required easements, and changes in road classifications to increase eligibility for construction funding.

As a stakeholder and potentially-impacted property owner on the Samoa Peninsula, we want to ensure that you have had ample opportunity to review the preferred route, to provide input, and to offer general agreement with the route's configuration, before the project enters the next phase.

I have attached a copy of the preferred route map to this letter. Please review the route, particularly in the vicinity of your property, which has been outlined in the attached figure. We have made efforts to discuss your concerns with regard to this route; if you have any additional questions or concerns please feel free to contact me at the number below. If you are in general agreement with the configuration of the preferred route, please sign below and return the signed page to us (see page 2). By signing this letter, you are not obligating yourself to any agreements or property access. Alternatively, please provide your own written response. We are solely seeking general consensus on the Project route prior to investing grant dollars into more detailed project analysis and design.

Sincerely,
LACO Associates

Mike Nelson
Planning Director, Vice President

cc: Jack Crider, CEO, HBHRCD

By signing below, I am indicating my general agreement with the preferred route for the Humboldt Bay Harbor, Recreation, & Conservation District's preferred route for the Samoa Industrial Waterfront Transportation Access Plan, as shown in Figure 1, attached. I also generally support the HBHRCD's continuation with preliminary route design and solicitation of additional funding for this project.

Dan Johnson
Samoa Pacific Group, LLC

The data shown on this map are from publicly-available sources or developed through visual interpretation of aerial photography. LACO cannot guarantee the accuracy of these data.

DRAWN	RAW
CHECK	RAW
APPROVED	MDN
DATE	12/04/2012
JOB NO.	7591.00
SHEET	1

SAMOA INDUSTRIAL WATERFRONT
TRANSPORTATION ACCESS PLAN
HBHRCD PREFERRED ROUTE

HUMBOLDT BAY HARBOR, RECREATION, & CONSERVATION DISTRICT

NO.	HISTORY/REVISION	BY	CHK.	DATE

LACO
EUREKA • UKIAH • SANTA ROSA
1-800-515-5054 www.lacoassociates.com

Date: 1/22/2013 Time: 10:26:52 AM
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APPENDIX 4

April 30, 2013 Property Owner Outreach Meeting Deliverables Packet

LACO

May 2, 2013

7591.00

Humboldt Bay Harbor, Recreation & Conservation District
Post Office Box 1030
Eureka, California 95502

Attention: Jack Crider, Chief Executive Officer

Subject: HBHRCD Samoa Industrial Waterfront Transportation Access Plan
April 30, 2013 Second Stakeholder Meeting Project Deliverables

Dear Jack:

LACO Associates (LACO) is pleased to provide you this deliverable for Task 3002 – Second Stakeholder Meeting (SHM), for the Samoa Industrial Waterfront Transportation Access Plan. On April 30, 2013, LACO and the Humboldt Bay Harbor, Recreation & Conservation District (HBHRCD) hosted the SHM at the HBHRCD Conference Room on Woodley Island. As our intention for the meeting was to only invite property owners and major property users along the Preferred Alternative Route, our initial invite list was limited to twelve individuals and businesses. The meeting was attended by five property owners or their representatives; despite a relatively low turnout a productive discussion was had.

This deliverables packet includes:

1. SHM invitation letter
2. SHM invitation and field survey access request letter
3. Meeting agenda and notes
4. PowerPoint Slides
5. Update Preferred Alternative Route map
6. SHM minutes
7. SHM sign-in sheet

Copies of items 3-7 will be provided to each SHM invitee. We will follow-up with invitees that were not able to make the SHM to ensure that they receive the information presented at the SHM and to incorporate their input into the development of the Samoa Industrial Waterfront Transportation Access Plan.

Please let me know if you have any questions. We look forward to completion of our field surveys and development of preliminary engineered designs, and the preparation of the Samoa Industrial Waterfront Transportation Access Plan in cooperation with HBHRCD.

Sincerely,
LACO Associates

TS Kelly

T. Scott Kelly
Project Manager

21 W. 4th Street, Eureka, California 95501 707 443-5054 Fax 707 443-0553
311 S. Main Street, Ukiah, California 95482 707 462-0222 Fax 707 462-0223
3450 Regional Parkway, Suite B2, Santa Rosa, California 95403 707 525-1222

Toll Free 800 515-5054 www.lacoassociates.com

LACO

April 1, 2013

7591.00

[NAME]
[ADDRESS 1]
[ADDRESS 2]

Attention: [NAME, TITLE]

Subject: Samoa Industrial Waterfront Transportation Access Project
Joint Stakeholder Meeting, Tuesday April 30, 1:00 P.M.

Dear [NAME]:

The Humboldt Bay Harbor, Recreation & Conservation District (HBHRCD) and LACO Associates (LACO) have completed the initial tasks to identify a preferred route alternative for the Samoa Industrial Waterfront Transportation Access Plan. This is a multi-phase project to develop an improved transportation route from State Hwy. 255/New Navy Base Rd. to harbor-dependent properties on the Samoa Peninsula for commercial vehicles.

Based on the results of preliminary route analyses and input from stakeholders, HBHRCD has tentatively selected the Preferred Alternative Route as shown on the attached map.

The next phase of work will involve further corridor reviews and an additional meeting with property owners of affected properties to receive specific feedback on constraints and opportunities for developing the road segments.

We cordially invite you to attend and participate in our upcoming Joint Stakeholder Meeting, to be held on Tuesday, April 30, 2013, from 1:00 p.m. to 3:00 p.m. The meeting will be held at the HBHRCD Conference Room, 601 Startare Drive, Woodley Island, Eureka, CA, and will provide invited property owners an opportunity to see what work has been done to date and provide input on the further development of the Preferred Alternative Route.

If possible, please let us know if you will be able to participate in the Joint Stakeholders Meeting by emailing Ryan Wells at wellsr@lacoassociates.com. Please direct any questions to Mr. Wells, Associate Planner at LACO, at (707) 443-5054.

Please contact us if you have any questions or need additional information.

With regards,

Mike Nelson
Planning Director, LACO Associates

Cc: Jack Crider, CEO, HBHRCD
Scott Kelly, Project Manager

21 W. 4th Street, Eureka, California 95501 707 443-5054 Fax 707 443-0553
311 S. Main Street, Ukiah, California 95482 707 462-0222 Fax 707 462-0223
3450 Regional Parkway, Suite B2, Santa Rosa, California 95403 707 525-1222

Toll Free 800 515-5054 www.lacoassociates.com

Samoa Industrial Waterfront Transportation Access Project
Joint Stakeholder Meeting, Tuesday, April 30, 1 PM

List of Invitees

California Redwoods Corporation, Inc.
DG Fairhaven Power, LLC.
FoxFarm Soil & Fertilizer Company
Freshwater Tissue Company
Humboldt Bay Harbor, Recreation, & Conservation District
Leroy Zerlang
North Coast Railroad Association
Pacific Gas & Electric Company
Planwest Partners, Inc.
Samoa Pacific Group, LLC
Sequoia Investments X, LLC
Taylor Mariculture, LLC
Timber Heritage Association

LACO

April 1, 2013

7591.00

[NAME]
[ADDRESS 1]
[ADDRESS 2]

Attention: [NAME, TITLE]

Subject: Samoa Industrial Waterfront Transportation Access Project
Joint Stakeholder Meeting, Tuesday April 30, 1:00 P.M.
Access Permission Request

Dear [NAME]:

The Humboldt Bay Harbor, Recreation & Conservation District (HBHRCD) and LACO Associates (LACO) have completed the initial tasks to identify a preferred route alternative for the Samoa Industrial Waterfront Transportation Access Plan. This is a multi-phase project to develop an improved transportation route from State Hwy. 255/New Navy Base Rd. to harbor-dependent properties on the Samoa Peninsula for commercial vehicles.

Based on the results of preliminary route analyses and input from stakeholders, HBHRCD has tentatively selected the Preferred Alternative Route as shown on the attached map.

The next phase of work will involve further corridor reviews and an additional meeting with property owners of affected properties to receive specific feedback on constraints and opportunities for developing the road segments.

We cordially invite you to attend and participate in our upcoming Joint Stakeholder Meeting, to be held on Tuesday, April 30, 2013, from 1:00 p.m. to 3:00 p.m. The meeting will be held at the HBHRCD Conference Room, 601 Startare Drive, Woodley Island, Eureka, CA, and will provide invited property owners an opportunity to see what work has been done to date and provide input on the further development of the Preferred Alternative Route.

If possible, please let us know if you will be able to participate in the Joint Stakeholders Meeting by emailing Ryan Wells at wellsr@lacoassociates.com. Please direct any questions to Mr. Wells, Associate Planner at LACO, at (707) 443-5054.

We also request permission to enter your property along the Preferred Alternative Route to document and photograph current conditions, and collect biological, topographic, geologic, and other information necessary to carry out the project on behalf of the HBHRCD. By signing below you grant LACO permission to enter the property for these purposes. No subsurface investigations will be performed as part of this work.

LACO shall notify you one week in advance of the date(s) of proposed property access.

Property Owner:____

AP Nos.: ____

Signature: ____

Date: ____

Address: ____

Phone No.: ____

LACO ASSOCIATES:

Signature: ____

Title: Scott Kelly, Project Manager

Please contact us if you have any questions or need additional information.

With regards,

Mike Nelson
Planning Director, LACO Associates

Cc: Jack Crider, CEO, HBHRCD
Scott Kelly, Project Manager

MEETING AGENDA

Samoa Industrial Waterfront Transportation Access Plan

Tuesday, April 30, 2013, 1:00 PM
Humboldt Bay Harbor, Recreation & Conservation District Conference Room

Invited Stakeholders:

California Redwood Company
DG Fairhaven Power, LLC.
FoxFarm Soil & Fertilizer Company
Freshwater Tissue Company
Humboldt Bay Harbor, Recreation, & Conservation District
LACO Associates
Leroy Zerlang
North Coast Railroad Association
Pacific Gas & Electric Company
Planwest Partners, Inc.
Samoa Pacific Group, LLC
Sequoia Investments X, LLC
Taylor Mariculture, LLC
Timber Heritage Association

Meeting purpose:

To provide a venue for candid discussion regarding the HBHRCD's Samoa Industrial Waterfront Transportation Access Plan, and to incorporate property owner input into continued project development.

Meeting goal:

To leave the meeting with confident property owner support of the project and a clear understanding of their individual and shared needs.

1. Current project status; Work to date
    a. Review of project goals and potential benefits to attendees
    b. Previous iterations of alternative routes discussed at first stakeholder meeting
    c. Reviewed comments from stakeholders from first meeting
    d. Field surveys completed for previous routes
    e. Meetings with HBHRCD, HCAOG, Caltrans
    f. Functional classification and highway designation efforts
    g. Changes to preferred alternative route per HBHRCD, multiple iterations

2. Field surveys; Opportunities and constraints
    a. Purpose is to help with road section prioritization
        i. Access to roadway requested, still need permission from some owners
    b. Right-of-Way and Easement information from O'Hern
    c. Biological
        i. Survey for sensitive biological and botanical species or habitats
        ii. Public disclosure concerns can be addressed
    d. Geologic

        i. No ground disturbance
        ii. Review of existing literature and ground-truthing
    e. Hydraulic Analysis
        i. Survey of existing drainage system
        ii. Assessment of system's functionality with upgraded road system
    f. Cultural Resources
        i. Information request from Northwest Information Center – no ground survey at this time
    g. Ground surveys for above items will likely be necessary before future construction

3. Preferred Alternative Route, stakeholder feedback
    a. HBHRCD and other stakeholder input has led to updates to preferred alternative route
    b. Consideration of existing operations
    c. Goal is to provide upgraded road access to waterfront properties, not necessarily waterfront
    d. Leaves flexibility for waterfront development
    e. Address rail concerns in future phases with roadway/crossing design; rail remains a viable transportation option in the Plan

4. Functional classification and National Highway System
    a. Goal is to upgrade functional classification of all segments of preferred route to Major Collector.
    b. Attempting to coordinate with Caltrans and County Public Works to apply for National Highway System status for all segments to improve opportunities for funding.

5. Projected cargo traffic, potential benefits to property owners
    a. For road design and National Highway System application we need to estimate traffic volumes, i.e. the number and size of trucks, or volume of cargo, and frequency.
    b. Best estimates now will improve our ability to design the roadway to be cost effective yet still accommodate all potential traffic.

6. Planning for railroad use
    a. Input from Rail representatives (NCRA, THA)

7. Railroad crossings
    a. Input from Rail representatives (NCRA, THA)

8. Security; Public access
    a. We'd like to hear of any specific security or public access concerns to be able to include them in our preliminary design and project cost estimates.

9. Next steps

Humboldt Bay Harbor, Recreation & Conservation District:

Samoa Industrial Waterfront Transportation Access Project

Second Joint Stakeholder Meeting

Tuesday, April 30, 2013, 1:00 PM

HBHRCD Conference Room, Woodley Island, CA

Samoa Industrial Waterfront Transportation Access Plan

Second Joint Stakeholder Meeting

Tuesday, April 30, 2013 : HBHRCD Conference Room

Meeting Agenda

1:00	Welcome, Introductions
1:10	Review of current project status
1:25	Field surveys; Opportunities and constraints
1:45	Preferred Alternative Route
2:00	Functional classification and National Highway System
2:15	Projected cargo traffic
2:25	Planning for railroad use; railroad crossings
2:40	Security, public access
2:50	Next steps
3:00	Close

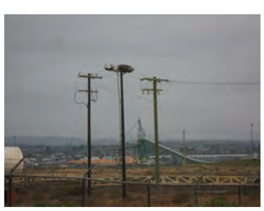
Current Project Status

- Route has undergone multiple iterations
- Individual stakeholder input
- Preliminary field surveys in some sections
- Meetings with HBHRCD, HCAOG, Caltrans
- Functional classification
- National Highway System

Field Surveys

- Biological
- Geologic
- Hydrology
- Utilities/Constraints
- Historic/Archaeological
  (public records search only)

- Second round of field surveys underway

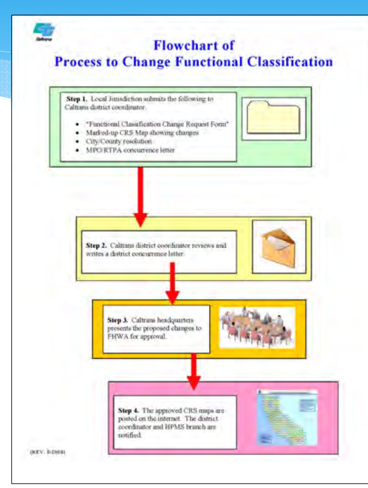


Preferred Alternative Route

Segment No.	Length (L.F.)	Roadway
1	13,154	**New Navy Base Road** - Bay Street to HWY 255
2	2,213	**Bay Street** - New Navy Base Road to Vance Ave
3	4,758	**Vance Ave** - Bay Street to LP Drive
4	1,592	**Vance Ave** - LP Drive to north spur
5	288	**LP Drive** - New Navy Base Road to Vance Ave
6	1,016	**North Spur** off Vance Avenue
7	1,683	**South Spur** off Vance Avenue

Functional Classification and National Highway System

- Upgrade FC to Major Collector
- NHS for all project segments
- Coordination with County, HCAOG, and Caltrans

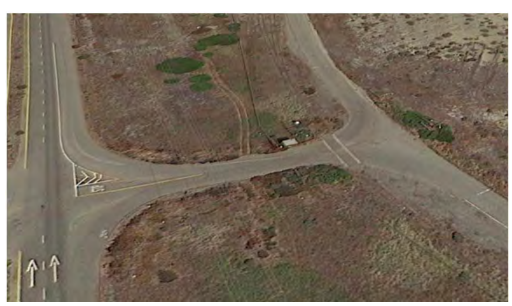


Projected Cargo Traffic

- Estimate traffic volumes
  - Number and size of trucks
  - Cargo volume
  - Frequency
- Contributes to roadway design

Railroad Use and Railroad Crossings

- One railroad crossing at LP Drive , additional crossings on Vance and Bay
- Retention of viable crossings a priority
- Route will minimize encroachment into rail ROW, to the degree possible
- NCRA and THA input

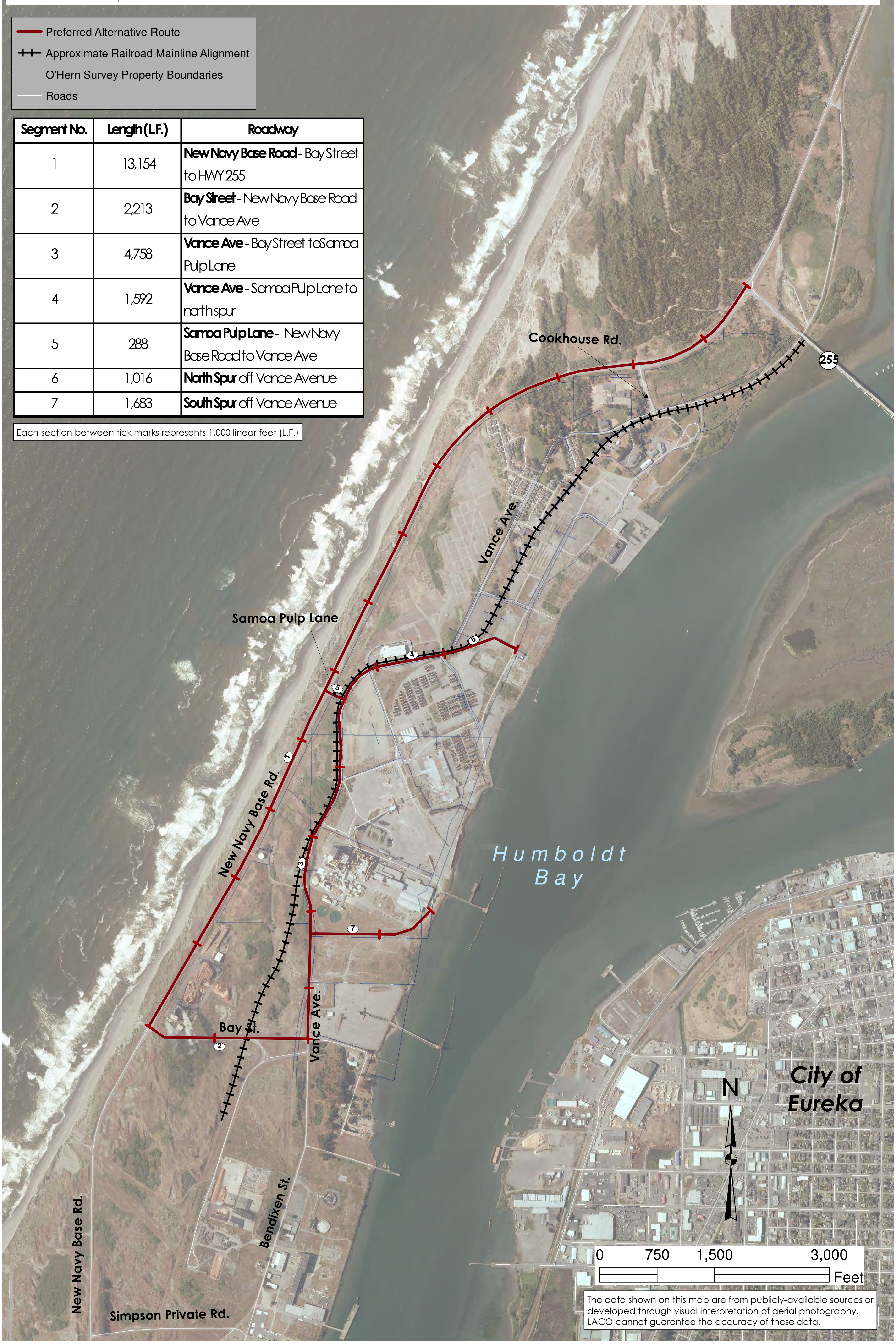


Security and Public Access

- Public access along preferred alternative route
- Controlled port access
- Discussion of barrier fences to protect private property

Next Steps

- Complete field surveys and analysis
- Functional classification and Federal Highway designation
- Stakeholder follow-up, including agencies
- Roadway geometrics
- Preliminary engineered designs
- Prepare Draft Samoa Industrial Waterfront Transportation Access Plan
- NEPA compliance



Segment No.	Length (L.F.)	Roadway
1	13,154	**New Navy Base Road** - Bay Street to HWY 255
2	2,213	**Bay Street** - New Navy Base Road to Vance Ave
3	4,758	**Vance Ave** - Bay Street to Samoa Pulp Lane
4	1,592	**Vance Ave** - Samoa Pulp Lane to north spur
5	288	**Samoa Pulp Lane** - New Navy Base Road to Vance Ave
6	1,016	**North Spur** off Vance Avenue
7	1,683	**South Spur** off Vance Avenue

Each section between tick marks represents 1,000 linear feet (L.F.)

The data shown on this map are from publicly-available sources or developed through visual interpretation of aerial photography. LACO cannot guarantee the accuracy of these data.

DRAWN	RAW/JB
CHECK	RAW
APPROVED	MDN
DATE	5/1/2013
JOB NO.	7591.00
SHEET	1

SAMOA INDUSTRIAL WATERFRONT
TRANSPORTATION ACCESS PLAN
HBHRCD PREFERRED ALTERNATIVE ROUTE
SEGMENTS AND SECTIONS IDENTIFIED

HUMBOLDT BAY HARBOR, RECREATION, & CONSERVATION DISTRICT

NO.	HISTORY/REVISION	BY	CHK.	DATE

LACO
EUREKA • UKIAH • SANTA ROSA
1-800-515-5054 www.lacoassociates.com

Date: 5/1/2013 Time: 10:21:17 AM
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LACO

MEETING MINUTES
TUESDAY, APRIL 30, 2013

Samoa Industrial Waterfront Transportation Access Plan
LACO Project No. 7591.00

Attendees:

Jack Crider, HBHRCD (JC)
George Williamson, PlanWest Partners (GW)
Tim Cherms, Danco (TC)
Bob Marino, DG Fairhaven Power (BM)
Doug McCorkle, North Coast Railroad Authority (DM)
Charles Benbow, Freshwater Tissue (CB)
Ryan Wells, LACO (RW)
Scott Kelly, LACO (SK)

Discussion Topics:

1. **Current project status; Work to date**
   Scott Kelly (SK) reviewed work performed to date and the current project status, including:
   a. Review of project goals and potential benefits to attendees
   b. Previous iterations of alternative routes discussed at first stakeholder meeting
   c. Review of comments from stakeholders from first meeting
   d. Field surveys completed for previous routes
   e. Meetings with HBHRCD, HCAOG, Caltrans, County
   f. Functional classification and National Highway System designation efforts
   g. Changes to preferred alternative route per HBHRCD, multiple iterations

2. **Field surveys; Opportunities and constraints**
   Ryan Wells (RW) reviewed the field surveys the project team has completed, and presented a summary of some of the constraints, including biological, geological, and utilities. He emphasized that the project team still needs some access permissions to complete our preliminary surveys of the preferred route.

3. **Preferred Alternative Route**
   RW described how the Preferred Alternative Route was selected by the Harbor District based on stakeholder input, a consideration of existing operations, and field surveys (geologic, biologic, hydrologic, and cultural resources), with a goal to access waterfront properties. The Preferred Route's termini at the inland edge of waterfront parcels provide flexibility for waterfront development.

4. **Functional classification and National Highway System**
   SK reviewed the project goal to upgrade all segments of the Preferred Route to Major Collector functional classification, and to have all segments of the route added to the National Highway System to improve funding opportunities for roads and port facilities. SK stated that the project team is coordinating these tasks with Humboldt County Public Works, Humboldt County Association of Governments, and Caltrans.

5. **Projected cargo traffic**
   SK stated that the project team would like to collect traffic and cargo projections from property owners to help with the application for National Highway System status, and to

ensure the transportation facilities are designed to meet the anticipated usage. Specifically, SK asked property owners for existing or projected traffic volumes, number and size of trucks, volume of cargo, and frequency.

Bob Marino (BM) of DG Fairhaven Power said they currently import 370,000 tons of logs, wood chips, and ash to their co-generation facility per year. The chips come in 25 tons per truck. All full trucks come in via New Navy Base Road and Bay Street, and leave empty via a back route to New Navy Base Road directly.

6. **Planning for railroad use**
   SK stated a goal of the plan is to retain the viability of railroad facilities for future use. There was a discussion of railroad facilities throughout the peninsula. Charles Benbow (CB), Freshwater Tissue, pointed out that some of the rail spurs are private spurs, and not part of the NCRA. CB and Doug McCorkle (DM), NCRA, said the railroad ownership is mixed fee title and easements of various types.

   DM said he will relay the project information to Dave Anderson, the NCRA engineer. He said there is currently a project to update the California State Rail Plan, which should help document the NCRA facilities. He said the NCRA will help us to map their facilities in our project area if possible.

7. **Railroad crossings**
   SK said the number of railroad crossings will be minimized, but where necessary, the project team will request input from NCRA regarding the crossing standards and requirements. DM said they would provide the crossing standards to the project team.

8. **Security; Public access**
   SK said the project will, as much as the public funds allow, provide necessary security to harbor and port facilities and to private properties. This may include fencing, lighting, signage, and gates, where necessary and allowed. SK requested property owners provide any specific security requests along the Preferred Route, so they can be included in the planning level cost estimates.

9. **Next steps**
   SK described the next steps to complete the transportation planning document. These include, completing the field surveys of the Preferred Route, pursuing the functional classification upgrades and National Highway System status processes, stakeholder and resource agency follow-up, preliminary engineering, National Environmental Policy Act (NEPA) compliance, ranking of the project segments, and preparation of the Samoa Industrial Waterfront Transportation Access Plan. The Plan will then be used as a guiding document for phased completion of the transportation system, in coordination with the development of port and harbor facilities.

10. **Other Discussion**
    Tim Cherms (TC) described the current status of the Samoa Township project. SK described how the proposed North Spur (Segment 6 on the Preferred Route map) is currently shown on the south side (Samoa Properties side) of the property line between Samoa Pacific Group and Samoa Properties. There was a discussion of the possibility of moving the segment north—onto Samoa Pacific Group property—if there are significant utility conflicts at the currently-planned location. The project team will first try to map those utilities to determine if any conflicts exist.

BM said he will send SK and RW a copy of the DG Fairhaven Power site map with easements.

CB said he would like Caltrans to take over New Navy Base Road for two reasons. First, the County doesn't seem to have an efficient process to issue an Oversized Load permit. It would be more expedient for operators on the peninsula to just get one permit from Caltrans. And, second, Caltrans would likely maintain the road better if it were in their system. BM agreed with this second point, stating that New Navy Base Road has some maintenance problems.

p:\7500\7591 hbhrcd\7591.00 samoa waterfront\06 planning\stakeholder meeting\second stakeholder meeting\7591.00 meeting minutes 04302013.doc

HBHRCD Second Joint Stakeholder Meeting
Sign In Sheet
April 30, 2013

Name	Affiliation	Phone/Email
Jack Crider	Harbor District	707-834-1108/Jcrider@Humboldtbay.org
DOUG McCORKLE	NCRA	707-463-3280/NCRA.DMcCORKLE@SBCGLOBAL.NET
GEORGE WILLIAMSON	PLANWEST	707.825.8260-
BOB MARINO	DG FAIRHAVEN POWER	445.5434 marino.b@ewprc.com
TIM CHEEVERS.	DANCO.	(707) 825 1534 tcheevers@DANCO-GROUP.com
CHARLES BENBOW	FTC	(707) 845-7365 charlesbenbow@gmail.com

APPENDIX 5

September 25, 2012 HCAOG, Caltrans, and LACO Meeting Minutes

Meeting Summary

HCAOG & Caltrans Consultation

September 25, 2012, HCAOG office

Attendees: Marcella Clem, Executive Director, HCAOG
Suzi Theiss, District Local Assistance Engineer, Caltrans
Mike Nelson, Planning Director, LACO Associates
Ryan Wells, Associate Planner, LACO Associates

The following is a summary from the September 25 meeting between LACO Associates, HCAOG, and Caltrans, regarding functional classifications, highway designations, and funding programs for the Humboldt Bay Harbor District's Samoa Industrial Waterfront Transportation Access Plan ('Project').

- The Project has evolved from development, environmental analysis, and engineered design of a preferred alternative on HBHRCD property, to a more comprehensive transportation network on the Samoa Peninsula that involves existing and proposed routes on multiple private and public ownerships on and east of New Navy Base Rd. HBHRCD is interested in developing a package to deliver to funders for improvements of these selected roadways to develop an efficient waterfront transportation network on the Samoa Peninsula. An updated map of the HBHRCD preferred alternative is included with this summary.

- Map 21 is a new Federal program that funds surface transportation programs for FY 2013 and -14. The program becomes active October 1, 2012.
- It includes re-designation of current interstate, expressway, and principal arterials into the National Highway System (NHS). It also removes urban and rural modifiers to the road classification system. In Eureka, H St., I St., Harris St., and Henderson St. will be added to the NHS
- The Federal government is still finalizing and disseminating guidance documents on their website and to affected agencies (see http://www.fhwa.dot.gov/map21/guidance/index.cfm)
- The states have 18 months in which to develop their guidelines for implementation of MAP-21.
- The North State Super Region Meeting for MAP-21 is on October 25th.

- MAP-21 contains significant freight transport provisions that must be the focus of our funding strategy. The meeting of harbor shipping, rail, and road-based transport may increase our competitiveness.
- The application needs to include annual traffic estimates for the existing and proposed roads (anticipating some specific level of build-out for the future). This would likely be an engineer's estimate rather than existing traffic counts, since it will be a projection of future use.

- Based on existing funding standards, collector and arterial roads are eligible for most of the federal, state, and local programs. For Federal grant programs' standards, there is no distinction between arterial and collector.
- Funding is typically competitive within the region. HCAOG is the conduit for major funding. The HCAOG Technical Advisory Committee guides and gives recommendations to the HCAOG board for funding. Marcella mentioned that the previous HBHRCD CEO was on the TAC, and recommended that Jack Crider join.
- The applicant for any funding is the owner of the road; owner must be an agency (which might include HBHRCD). This can be a difficult and expensive process.
- Controlled access (security issues) will close eligibility for most Federal funding.

- New Navy Base Road is currently classified as a major collector. State Hwy. 255 is a minor arterial. Both eligible for Federal funding.
- To change the functional classification of a road, the county must recommend the change, then HCAOG and Caltrans concur with the recommendation. The final step is with the Federal Highway Administration.
- It is unlikely that New Navy Base Rd. or State Hwy. 255 would be eligible for classification to the NHS.
- We might pursue minor collector status for "tributary" roads to New Navy Base (connectors to docks)
    - Cookhouse Rd.
    - LP Drive
    - Bay St.
    - Simpson Private Rd.
    - Lincoln Ave.

Funding programs include:

- Environmental Enhancement and Mitigation Program, which uses funds to provide mitigation from another project (that exceeds required mitigation) on a site. good for restoration. Up to $350,000
- Bridge safety programs – currently highly competitive.
- Access to Federal Lands (discretionary grants).
- Safe routes to schools.
- TA/Transportation Alternatives – for bike and pedestrian routes
- MAP-21 funding still needs to be determined – keep emphasis on freight programs.

Next Steps

- Discuss road ownership and maintenance with County Public Works.
- Keep documentation of project alternatives in case it's needed for environmental review.
- HCAOG is updating the Regional Transportation Plan; Oona Smith is project lead. Follow up with her.
- Gather historic data on traffic counts and accidents on New Navy Base Rd.
- Contact John Hummer, DOT No. CA/Hawaii Gateway Office (lead on Shipping/Freight for CA MAP-21 policy)

    - 415-744-2924
    - 242-631-0841
    - john.hummer@dot.ca.gov
- Discuss MAP-21 with local and state Caltrans reps (see above)

REUSE OF DOCUMENTS: This document and the ideas and design incorporated herein, as an instrument of professional service, is the property of LACO Associates and shall not be reused in whole or part for any other project without LACO Associates express written authorization.

The data shown on this map are from publicly-available sources or developed through visual interpretation of aerial photography. LACO cannot guarantee the accuracy of these data.

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APPROVED	MDN
DATE	09/25/2012
JOB NO.	7591.00
SHEET	1

SAMOA INDUSTRIAL WATERFRONT
TRANSPORTATION ACCESS PLAN
HBHRCD PREFERRED ALTERNATIVE ROUTE

HUMBOLDT BAY HARBOR, RECREATION, & CONSERVATION DISTRICT

NO.	HISTORY/REVISION	BY	CHK.	DATE

LACO
EUREKA • UKIAH • SANTA ROSA
1-800-515-5054 www.lacoassociates.com

Date: 10/4/2012 Time: 4:45:29 PM
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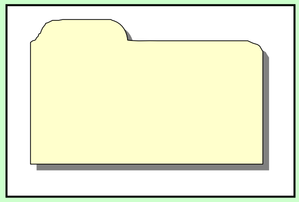
Flowchart of
Process to Change Functional Classification

Step 1. Local Jurisdiction submits the following to Caltrans district coordinator.

- "Functional Classification Change Request Form"
- Marked-up CRS Map showing changes
- City/County resolution
- MPO/RTPA concurrence letter



Step 2. Caltrans district coordinator reviews and writes a district concurrence letter.

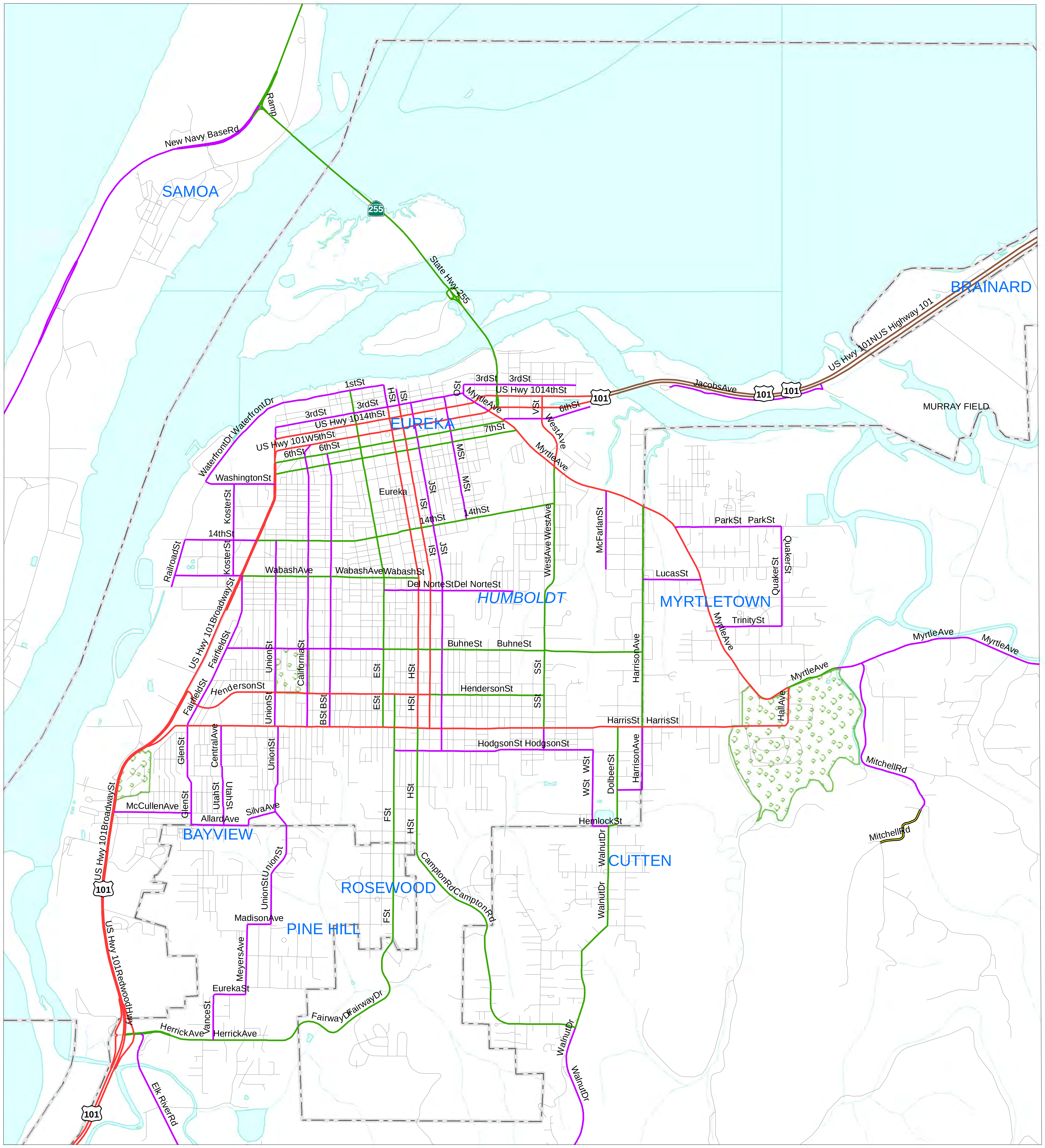
Step 3. Caltrans headquarters presents the proposed changes to FHWA for approval.

Step 4. The approved CRS maps are posted on the internet. The district coordinator and HPMS branch are notified.

(REV. 8/2008)

SEE MAP 1C54

SEE MAP 1D



SEE MAP 1D15

SEE MAP 1D24

APPROVED Date 8/5/11
FEDERAL HIGHWAY ADMINISTRATION

FOR: VINCENT P. MAMMANO
DIVISION ADMINISTRATOR

0 0.25 0.5 0.75 1 Mile
0 1,000 2,000 3,000 4,000 5,000 Feet

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
In Cooperation With The
FEDERAL HIGHWAY ADMINISTRATION
AND LOCAL AGENCIES

N

Caltrans

COUNTY BOUNDARY
CITY BOUNDARY
RAILROAD

SIGN ROUTES
5 INTERSTATE
3 U.S.
1 STATE
D2 COUNTY

FUNCTIONAL CLASSIFICATION SYSTEM

INTERSTATE	1	
OTHER FWY OR EXPWY	2	
OTHER PRINCIPAL ARTERIAL	3	
MINOR ARTERIAL	4	
MAJOR COLLECTOR	5	
MINOR COLLECTOR	6	
LOCAL	7	

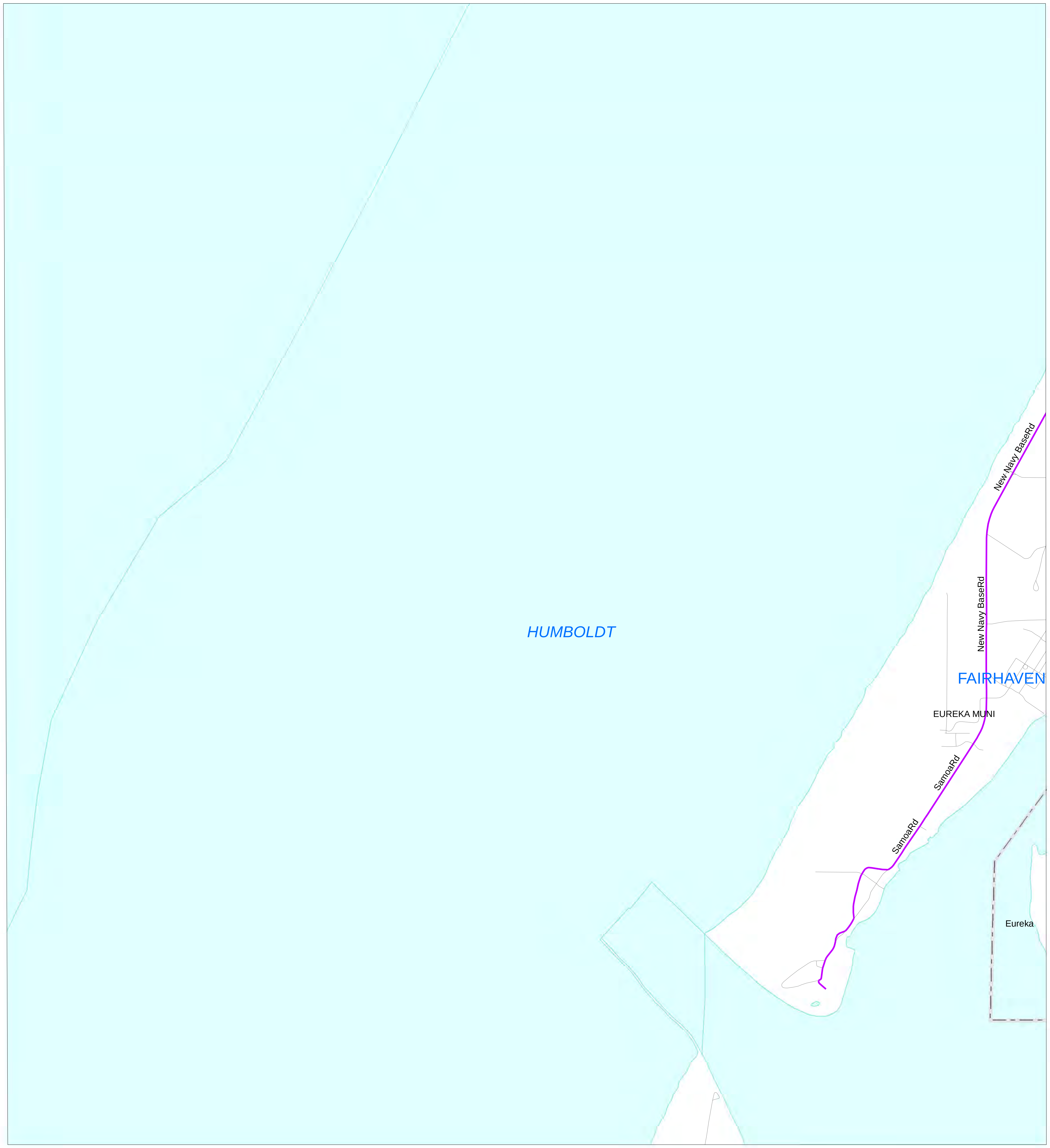
Humboldt

MAP 1D14

A B C D E F G H J K

SEE MAP 1C

SEE MAP 1D



SEE MAP 1D14

1 2 3 4 5 6 7 8 9 10

SEE MAP 1D23

APPROVED Date 8/5/11
FEDERAL HIGHWAY ADMINISTRATION

FOR: VINCENT P. MAMMANO
DIVISION ADMINISTRATOR

0 0.25 0.5 0.75 1 Mile

0 1,000 2,000 3,000 4,000 5,000 Feet

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
In Cooperation With The
FEDERAL HIGHWAY ADMINISTRATION
AND LOCAL AGENCIES

N

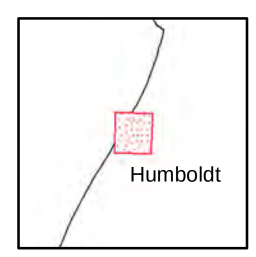
Caltrans

COUNTY BOUNDARY
CITY BOUNDARY
RAILROAD

SIGN ROUTES
5 INTERSTATE
3 U.S.
1 STATE
D2 COUNTY

FUNCTIONAL CLASSIFICATION SYSTEM

INTERSTATE	1
OTHER FWY OR EXPWY	2
OTHER PRINCIPAL ARTERIAL	3
MINOR ARTERIAL	4
MAJOR COLLECTOR	5
MINOR COLLECTOR	6
LOCAL	7



MAP 1D13

A B C D E F G H J K

APPENDIX 6

June 4, 2013 THPO Informal Consultation Request Letter

LACO

June 4, 2013

7591.00

Blue Lake Rancheria Tribe of Indians
Post Office Box 428 (428 Chartin Road)
Blue Lake, California 95525-0428

Attention: Janet P. Eidsness, THPO

Subject: Samoa Industrial Waterfront Transportation Access Plan, near Eureka, Humboldt County, California; Project Update

Dear Ms. Eidsness:

In early August 2012, LACO Associates (LACO) sent an informational correspondence to you regarding the Humboldt Bay Harbor, Recreation and Conservation District's (HBHRCD) Samoa Industrial Waterfront Transportation Access Plan, which is a planning-level document aimed at identifying a preferred alternative route to provide commercial and industrial truck access to waterfront properties on the Samoa Peninsula.

At the time of our earlier correspondence, the optional alternative routes were focused on HBHRCD-owned parcels on the eastern shore of the Samoa Peninsula, just south of the SR 255/New Navy Base Road intersection. Now that we are considering a realigned Preferred Alternative Route, we are requesting your input on the route and potential cultural resources impacts associated with the project. Please note that this project is currently in the preliminary planning stage, and this letter does not constitute a Section 106 consultation or engagement request. Instead, the intention of this letter is to engage the Tribe in the early planning stages of this project to ensure that this project does not impact Wiyot cultural resources. We anticipate future formal Section 106 consultation requests for each project segment under future funding allocations.

Most notably, the current Preferred Alternative Route primarily utilizes existing roadways rather than identifying new corridors for road construction, and spans multiple private and public ownerships on the Samoa Peninsula. We anticipate that this will reduce the potential for detrimental impacts to many resources within the project area, including those of a cultural and archaeological nature. Please see the attached Figure 1 for an updated Area of Potential Effects (APE) map. Following additional field surveys for biological, geologic, and hydrologic characteristics, LACO will incorporate information provided by the Northwest Information Center (see NWIC records search response letter, dated May 8, 2013), stakeholders, and other resources, into the Samoa Industrial Waterfront Transportation Access Plan. The Plan will 1) divide the preferred alternative route into seven project segments which will be prioritized; 2) lay out a plan for easement and fee title acquisitions, as necessary, and 3) provide a project construction plan.

On behalf of HBHRCD, we are respectfully requesting your input on the Samoa Industrial Waterfront Transportation Access Plan, in particular on the implications that the Preferred Alternative Route, as shown in attached Figure 2, may have on the cultural landscape.

If you have any questions, please do not hesitate to contact me.

Sincerely,
LACO Associates

Ryan Wells
Associate Planner

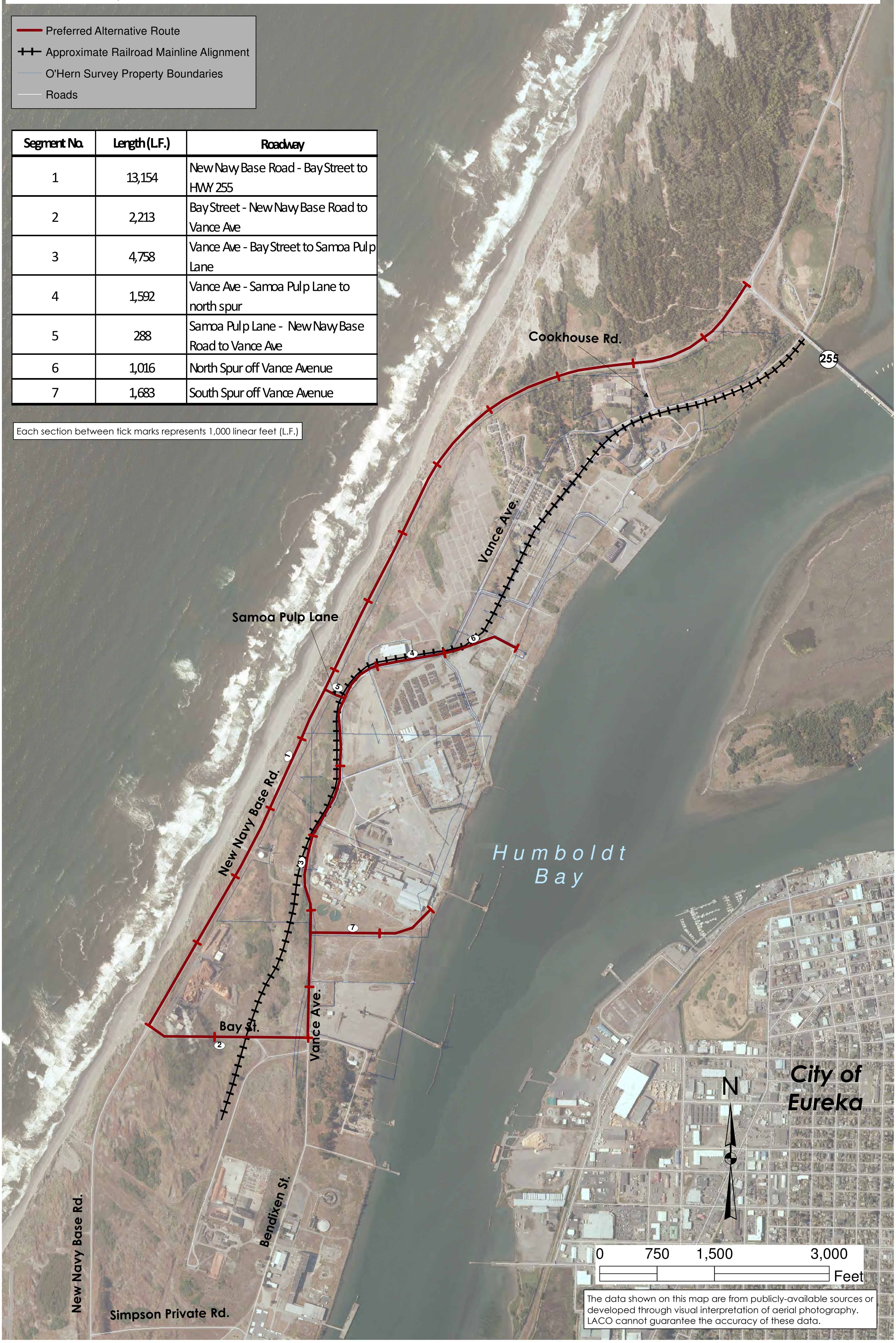
RAW:gg

cc: T. Scott Kelly, Project Manager
Tim Keefe, Caltrans District 1 Heritage Resources Coordinator

Attachments:
Figure 1: APE Map
Figure 2: Preferred Alternative Route Map
NWIC Records Search Request response letter, dated May 8, 2013

Figure 1: APE Map

REUSE OF DOCUMENTS: This document and the ideas and design incorporated herein, as an instrument of professional service, is the property of LACO Associates and shall not be reused in whole or part for any other project without LACO Associates express written authorization.



Segment No.	Length (L.F.)	Roadway
1	13,154	New Navy Base Road - Bay Street to HWY 255
2	2,213	Bay Street - New Navy Base Road to Vance Ave
3	4,758	Vance Ave - Bay Street to Samoa Pulp Lane
4	1,592	Vance Ave - Samoa Pulp Lane to north spur
5	288	Samoa Pulp Lane - New Navy Base Road to Vance Ave
6	1,016	North Spur off Vance Avenue
7	1,683	South Spur off Vance Avenue

DRAWN	RAW/JB
CHECK	RAW
APPROVED	MDN
DATE	5/1/2013
JOB NO.	7591.00
SHEET	1

SAMOA INDUSTRIAL WATERFRONT
TRANSPORTATION ACCESS PLAN
HBHRCD PREFERRED ALTERNATIVE ROUTE
ROAD SEGMENTS

HUMBOLDT BAY HARBOR, RECREATION, & CONSERVATION DISTRICT

NO.	HISTORY/REVISION	BY	CHK.	DATE

LACO
EUREKA • UKIAH • SANTA ROSA
1-800-515-5054 www.lacoassociates.com

Date: 5/23/2013 Time: 12:21:10 PM
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Northwest Information Center
Sonoma State University
150 Professional Center Drive, Suite E
Rohnert Park, California 94928-3609
Tel: 707.588.8455
nwic@sonoma.edu
http://www.sonoma.edu/nwic

May 8, 2013 NWIC File No.: 12-1176

Ryan Wells
LACO
P.O. Box 1023
Eureka, CA 95502

Re: Record search results for the proposed Samoa Industrial Waterfront Transportation Access Plan, Samoa, Humboldt County, CA.

Dear Mr. Wells:

Per your request received by our office on 11 April 2013, a records search was conducted for the above referenced project by reviewing pertinent Northwest Information Center (NWIC) base maps that reference cultural resources records and reports, historic-period maps, and literature for Humboldt County. Please note that use of the term cultural resources includes both archaeological resources and historical buildings and/or structures.

Review of this information indicates there are three cultural resources studies that combine to cover approximately 15% of the proposed Area of Potential Effect (APE) that was depicted on the maps provided. See table below for more information:

Report Number	Authors	Year	Title
S-000132	David A. Fredrickson, Sonia Tamez, and Pamela R. Roberts	1975	An Archaeological Survey of the Proposed McKinleyville Sewage Collection and Treatment Facility Treatment Facility
S-000928	Richard A. Stradford	1978	An Archaeological Survey Within the Louisiana Pacific Complex, Somoa, Humboldt County, California. County, California
S-006093	George Kalisik	1983	A Cultural Resource Investigation, Wright-Schuchart Harbor Project, Samoa Peninsula Humboldt County, California

There are five recorded archaeological sites within the APE, all of which consist of Native American habitation sites identified by Loud (1918). See table below for more information:

Primary Number	Trinomial	Resource Name
P-12-000077	CA-HUM-19	Loud 19, *Tserketsok*
P-12-000078	CA-HUM-20	Loud 20
P-12-000079	CA-HUM-21	Loud 21
P-12-000080	CA-HUM-22	Loud 22, *Djo'mak*
P-12-000081	CA-HUM-23	Loud 23, *Digawethatkil-Tekewethatkl*

The State Office of Historic Preservation Historic Property Directory (OHP HPD) (which includes listings of the California Register of Historical Resources, California State Historical Landmarks, California State Points of Historical Interest, and the National Register of Historic Places) includes no recorded buildings or structures within the proposed project area. In addition to these inventories, the NWIC base maps show no recorded buildings or structures within the proposed project area.

At the time of Euro American contact, the Native Americans that lived in the area were speakers of a Wiyot language, part of the Algic language stock (Elsasser 1978:155). In addition to the multitude of named landscape features and resource collection areas named by the Wiyot in this area, several significant ethnographic villages and camps are known to have been located within the APE. One of the villages, such as *Tserketsok* was occupied in 1850; while others, such as *Djo'mak and Digawethatkil-Tekewethatkl*, were not known to have been occupied in modern times (Loud 1918).

Based on an evaluation of the environmental setting and features associated with known sites, Native American resources in this part of Humboldt County have been found along the coastal margins, near trending ridgelines and midslope terraces, near the mouths of rivers, near sources of water (including perennial and intermittent streams and springs), and near ecotones or other productive resource environments. The APE is located on the north spit of Humboldt Bay and totals approximately 440 acres. Given the similarity of these environmental factors, coupled with the ethnographic sensitivity and presence of recorded archaeological resources, there is a high potential of identifying Native American resources in the proposed project area.

Review of historical literature and maps indicated the possibility of historic-period archaeological resources within the proposed project area. The 1855 and the 1890 T5N/R1W General Land Office plat maps depict “Robertson’s house” and another unnamed house within the APE. The area was originally used for dairy ranching, and later the lumber town of Samoa was founded in early 1890s by John Vance. The 1933 and 1951 Eureka 15-minute USGS topographic quadrangles depict numerous buildings, structures, and railroad spurs that are not present on the 1972 photo-revision of the 1958 7.5-minute USGS topographic quadrangle. With this in mind, there is a high potential of identifying historic-period archaeological resources in the proposed project area.

RECOMMENDATIONS:

1) There is a high possibility of identifying Native American archaeological resources and a high possibility of identifying historic-period archaeological resources in the APE. Due to the passage of time since the previous surveys (Fredrickson et al. 1975, Stradford 1978, and Kalisik 1983) and the changes in archaeological theory and method since that time, we recommend a qualified archaeologist conduct further archival and field study for the entire APE to identify cultural resources. Field study may include, but is not limited to, pedestrian survey, hand auger sampling, shovel test units, or geoarchaeological analyses as well as other common methods used to identify the presence of archaeological resources. Please refer to the list of consultants who meet the Secretary of Interior's Standards at http://www.chrisinfo.org.

2) If the proposed project area contains buildings or structures that meet the minimum age requirement of 45 years or older, it is recommended that prior to commencement of project activities, these buildings or structures be assessed by a professional familiar with the architecture and history of Humboldt County. Please refer to the list of consultants who meet the Secretary of Interior's Standards at http://www.chrisinfo.org.

3) Review for possible historic-period buildings or structures has included only those sources listed in the attached bibliography and should not be considered comprehensive.

4) If archaeological resources are encountered **during construction,** work should be temporarily halted in the vicinity of the discovered materials and workers should avoid altering the materials and their context until a qualified professional archaeologist has evaluated the situation and provided appropriate recommendations. Project personnel should not collect cultural resources. Native American resources include chert or obsidian flakes, projectile points, mortars, and pestles; and dark friable soil containing shell and bone dietary debris, heat-affected rock, or human burials. Historic-period resources include stone or adobe foundations or walls; structures and remains with square nails; and refuse deposits or bottle dumps, often located in old wells or privies.

5) It is recommended that any identified cultural resources be recorded on DPR 523 historic resource recordation forms, available online from the Office of Historic Preservation's website: http://ohp.parks.ca.gov/default.asp?page_id=1069

Thank you for using our services. Please contact this office if you have any questions, (707) 588-8455.

Sincerely,

Bryan Much
Assistant Coordinator

LITERATURE REVIEWED

In addition to archaeological maps and site records on file at the Northwest Information Center of the Historical Resources Information System, the following literature was reviewed:

Baumhoff, Martin A.
1958 *California Athabaskan Groups*. University of California Publications, Anthropological Records 16(5):157-237. University of California Press, Berkeley and Los Angeles. (1976 Reprint by Kraus Reprint Corporation, New York).

Cook, S.F.
1956 *The Aboriginal Population of the North Coast of California*. University of California Anthropological Records 16(3):81-130. Berkeley and Los Angeles.

Elsasser, Albert B.
1978 Wiyot. In *California*, edited by Robert F. Heizer, pp. 155-163. Handbook of North American Indians, vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Fickewirth, Alvin A.
1992 *California Railroads*. Golden West Books, San Marino, CA.

Fredrickson, David , Sonia Tamez, and Pamela R. Roberts
1975 *An Archaeological Survey of the Proposed McKinleyville Sewage Collection and Treatment Facility Treatment Facility.* S-132. Report on file at the Northwest Information Center, Rohnert Park.

General Land Office
1855 Survey Plat for Township 5 North/Range 1 West
1890 Survey Plat for Township 5 North/Range 1 West

Gudde, Erwin G.
1969 *California Place Names*. Third Edition. University of California Press, Berkeley and Los Angeles.

Hart, James D.
1987 *A Companion to California*. University of California Press, Berkeley and Los Angeles.

Hoover, Mildred Brooke, Hero Eugene Rensch, and Ethel Rensch, revised by William N.Abeloe
1966 *Historic Spots in California*. Third Edition. Stanford University Press, Stanford, CA.

Hoover, Mildred Brooke, Hero Eugene Rensch, and Ethel Rensch, William N. Abeloe, revised by Douglas E. Kyle
1990 *Historic Spots in California*. Fourth Edition. Stanford University Press, Stanford, CA.

Hope, Andrew
2005 *Caltrans Statewide Historic Bridge Inventory Update*. Caltrans, Division of Environmental Analysis, Sacramento, CA.

Kalisik, George
1983 *A Cultural Resource Investigation, Wright-Schuchart Harbor Project, Samoa Peninsula Humboldt County, California.* S-6093. Report on file at the Northwest Information Center, Rohnert Park.

Kroeber, A.L.
1925 *Handbook of the Indians of California*. Bureau of American Ethnology, Bulletin 78, Smithsonian Institution, Washington, D.C. (Reprint by Dover Publications, Inc., New York, 1976)

Loud, Llewellyn L.
1918 *Ethnogeography and Archaeology of the Wiyot Territory*. University of California Publications in American Archaeology and Ethnology 14(3):221-436. University of California Press, Berkeley. (Reprint by Kraus Reprint Corp., New York, 1965.)

Myers, William A. (editor)
1977 *Historic Civil Engineering Landmarks of San Francisco and Northern California*. Prepared by The History and Heritage Committee, San Francisco Section, American Society of Civil Engineers. Pacific Gas and Electric Company, San Francisco, CA.

Nomland, Gladys A. and Alfred L. Kroeber
1936 *Wiyot Towns*. University of California Publications in American Archaeology and Ethnology 35(5):39-48. University of California Press, Berkeley. (Reprint by Kraus Reprint Corp., New York, 1965.)

Pilling, Arnold R.
1978 Yurok. In *California*, edited by Robert F. Heizer, pp. 137-154. Handbook of North American Indians, vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Roberts, George, and Jan Roberts
1988 *Discover Historic California*. Gem Guides Book Co., Pico Rivera, California.

State of California Department of Parks and Recreation
1976 *California Inventory of Historic Resources.* State of California Department of Parks and Recreation, Sacramento.

State of California Department of Parks and Recreation and Office of Historic Preservation
1988 *Five Views: An Ethnic Sites Survey for California*. State of California Department of Parks and Recreation and Office of Historic Preservation, Sacramento.

State of California Office of Historic Preservation **
2012 *Historic Properties Directory*. Listing by City (April 2012). State of California Office of Historic Preservation, Sacramento.

Stradford, Richard
1978 *An Archaeological Survey Within the Louisiana Pacific Complex, Samoa, Humboldt County, California. County, California.* S-928. Report on file at the Northwest Information Center, Rohnert Park.

Williams, James C.
1997 *Energy and the Making of Modern California*. The University of Akron Press, Akron, OH.

Woodbridge, Sally B.
1988 *California Architecture: Historic American Buildings Survey*. Chronicle Books, San Francisco, CA.

Works Progress Administration
1984 *The WPA Guide to California*. Reprint by Pantheon Books, New York. (Originally published as California: A Guide to the Golden State in 1939 by Books, Inc., distributed by Hastings House Publishers, New York).

******Note that the Office of Historic Preservation's *Historic Properties Directory* includes National Register, State Registered Landmarks, California Points of Historical Interest, and the California Register of Historical Resources as well as Certified Local Government surveys that have undergone Section 106 review.

APPENDIX 7

June 26, 2013 Meeting Follow-up Letter from LACO and THPO Responses

LACO

June 28, 2013

7591.00

Blue Lake Rancheria Tribe of Indians
PO Box 428 (428 Chartin Road)
Blue Lake, California 95525-0428

Attention: Janet Eidsness, THPO

Subject: Samoa Industrial Waterfront Preliminary Transportation Access Plan
June 26, 2013 Meeting Follow-up

Dear Ms. Eidsness:

Thank you for making the time to meet with me on June 26, 2013 to discuss potential cultural and historic resource issues related to the Samoa Industrial Waterfront Preliminary Transportation Access Plan (Plan). As we discussed at our meeting, I am providing a brief summary of our discussion to confirm our understanding and to provide an opportunity for clarification if needed.

At the beginning of our meeting we discussed the absence of reference to the relatively recent Cultural Resources Survey of the Samoa Town Master Plan Site, which was prepared in 2004 by the staff of the Cultural Resources Facility, Center for Indian Community Development, Humboldt State University. As discussed in our meeting I have requested a copy for LACO's records in relation to the Plan. Ms. Eidsness requested a copy for filing with the California Historical Resources Information System (CHRIS).

A question was also asked about retention of the rail system within the project site, which is eligible for the historic registry. As discussed, the retention of the potential future viability of the rail system is a goal of the Plan, and that measures would be identified in the planning process to avoid detrimental impact to the existing rail infrastructure.

The THPOs confirmed the location of Loud sites 21, 22, and 23 (from *Ethnogeography and Archaeology of the Wiyot Territory*, L. Loud, 1918), from the original NCIC report, dated July 25, 2012. Additional Loud sites (19 and 20) were identified within the expanded APE associated with the current Preferred Alternative Route (PAR). Based on visual interpretation of the PAR and its vicinity to documented Loud sites, there did not appear to be any obvious potential for disruption of known cultural resource sites. However, the potential remains that site disturbance may result in discovery of to-date unknown cultural resource sites. Because the indigenous Wiyot people that inhabited the Samoa Peninsula made most of their habitations and camp sites along the Humboldt Bay margin, the excavation of the footprint for the North Spur (road segment 6) and the South Spur (road segment 7) have the greatest potential for discovery of artifacts or other archaeological evidence. This consideration would also affect any future plans to construct roadways along the Humboldt Bay waterfront on the Samoa Peninsula.

The THPOs made four initial recommendations for this stage of the Plan:

1. Prepare a map identifying areas of highly disturbed ground and areas of minimal disturbance along the PAR. This will identify areas where more recent activity may have disrupted evidence of historic activity, and therefore reduced the benefit and necessity of

cultural resources field surveys. In areas where minimal ground disturbance has occurred, a recommendation for a cultural resources field survey prior to road construction will be more probable.

2. Include the THPOs during the pre-field survey site inspections to have the opportunity to work with the cultural resources consultant to develop the field survey strategy. Based on Tribal knowledge (some of which may be confidential) and specific site conditions, the THPOs can assist with designing a field survey strategy that efficiently utilizes limited resources while attaining the greatest benefit and strategic coverage.
3. Related to No. 2, ensure Tribal monitor presence during the field surveys.
4. Due to the potential for inadvertent discovery of human remains during road segment construction, prepare an "Inadvertent Discovery Action Plan," which would be distributed to the construction contractor.

Please let me know if you have any additional comments or corrections to this meeting summary. I will incorporate your preliminary recommendations, as stated above, into our administrative draft Plan; any appropriate written correspondence will be included as appendices to the Plan. I would appreciate your response by Monday, July 15, to allow time for updates to the administrative draft Plan prior to submittal to the HBHRCD.

Sincerely,
LACO Associates

Ryan Wells
Associate Planner

cc: Jack Crider, CEO, HBHRCD

P:\7500\7591 HBHRCD\7591.00 Samoa Waterfront\06 Planning\Cultural Resources\7591.00 June 26 meeting follow up letter 20130628.docx

Blue Lake Rancheria THPO Response to LACO's June 26, 2013 THPO meeting Follow-up Letter

(sent via email on Wednesday, July 3, 2013)

Dear Ryan:

Thanks much for your 6/28/13 summarizing our meeting at LACO on 6/26/13 about the subject project (not yet a project in formal sense).

I truly appreciate the opportunity for truly advance planning and trial coordination to avoid significant impacts to known Wiyot cultural places.

A couple notes on your meeting summary…

1. Para 3: I am unsure of status of prior studies of potential historic significance of the railroad in APE (not sure if it "is eligible for the historic registry" (para. 3). A focused study by a professional knowledgeable about historic railroads is needed to record it, evaluate its significance (per National Register criteria for a Sec 106 project) and assess effects of undertaking if found to be eligible.
2. Para. 4: I also shared with you excerpts from the Co. Humboldt Samoa Town Master Plan Draft Master EIR (Section 2.1 Cultural Resources) that provided verbal descriptions of 4 additional prehistoric archaeological sites in the Samoa townsite area, which are NOT included in the NWIC letter report. There are nine prehistoric/Wiyot sites reported for the project vicinity. Except for those four sites in the Samoa Town Site (since recently recorded), we are unsure as to EXACT locations of the four of the five Wiyot villages described and mapped in 1913 by Loud (1918) (19-23); we know where HUM-23 is generally. The Loud sites likely have/had burials. Major Wiyot villages (habitation sites) were focused along bay margin in this area, likely had burial grounds; more temporary ephemeral Wiyot "fish camps" were more focused just inside the dunes near the ocean strand (less likely to have burials). Loud site 20 (HUM-20) may be in footprint of "south spur" (#7) per my mapping; Erika's location for 20 was further out, but do not know for sure.
3. Para 5, #1: Suggest that map identifying areas of highly disturbed land reference agent & age (mill operations, ca. 1950s), depth, type/nature of disturbance (e.g., bay dredge fill to 10-ft) – not just "highly disturbed" as this is unclear. ANY opportunity to get a view into the ground within the APE – existing soils data or new soil studies that produce stratigraphic profiles or corings that can be field inspected or reviewed by a tribal/archaeological monitor would be helpful. HIGHLY recommend as this project moves to a "project," that an archaeologist or the Tribes are contacted to provide a monitor for ANY new soil studies if needed – as such have potential to disturb sites and geologists/soils folks do not always key into the archaeology.
4. Since we met, I have been working to track down the "final" report on Samoa Town (Heald et al.) that was adopted by the County as the final – its at HSU Humboldt Room and I have yet to get over there and made a copy. How's it going on your end? We need your client the Harbor District to be aware there are invaluable archival records on Samoa and the old mills on file at the Humboldt Room, in addition to the report.

Thanks again for your time.

Happy 4th

Janet P. Eidsness, M.A.
Tribal Heritage Preservation Officer (THPO)
Blue Lake Rancheria
P.O. Box 428 (428 Chartin Road)
Blue Lake, CA 95525
Office (707) 668-5101 ext. 1037
Fax (707) 668-4272
jeidsness@bluelakerancheria-nsn.gov
cell (530) 623-0663 jpeidsness@yahoo.com

APPENDIX 8

June 24, 2013 Preliminary Agency Consultation Request Letter and California Coastal Commission Response

LACO

June 24, 2013

7591.00

California Department of Fish & Wildlife
619 Second Street
Eureka, California 95501

Attention: Michael Van Hattem, Environmental Scientist

Subject: Samoa Industrial Waterfront Preliminary Transportation Access Plan
Project Introduction and Request for Informal Response

Dear Mr. Van Hattem:

In June 2012 the Humboldt Bay Harbor, Recreation & Conservation District (HBHRCD) retained LACO Associates (LACO) to prepare the Samoa Industrial Waterfront Preliminary Transportation Access Plan (hereafter, Plan). Funded by the Federal Highway Administration (FHwA), the Plan is a planning-level site reconnaissance, outreach, and report preparation effort to identify a Preferred Alternative Route for a future enhanced commercial and industrial transportation route between waterfront properties and infrastructure on the Samoa Peninsula in Humboldt County, California, and major inland transportation networks including the National Highway System (NHS). Historically a hub of industrial activity associated with local timber and maritime operations, the Samoa Peninsula has undergone significant decline in utility and prominence as a key transportation node for North Coast industrial commerce. The goal of the Plan is to prepare a "road map" for future public funding solicitations to support the development of a road (and potentially rail) system to better accommodate Samoa Peninsula/Humboldt Bay waterfront facilities.

Development of the Plan, to date, has involved coordinating outreach events for property owners and local, state, and federal transportation agencies; holding meetings with individual property owners; conducting field surveys to evaluate existing conditions relating to biological resources, geology, hydrology, utilities systems, and transportation infrastructure; and requesting a records search for cultural and historic resources from outside agencies. The resulting Plan will identify the Preferred Alternative Route (hereafter Route; see attached Figure 1). Each of the seven distinct road segments of the Route will be described and reviewed individually as a potential distinct project for future development. Based on the existing site conditions, projected road improvement and construction costs, HBHRCD priorities, and property owner interests, among other factors, the seven segments will be prioritized for future funding opportunities. Potential future construction for each road segment would undergo independent site review, project-specific field surveys, and compliance with permitting and NEPA and CEQA requirements.

HBHRCD's vision of an enhanced transportation network on the Samoa Peninsula involves the establishment of an FHwA-standard roadway system along the Route that will accommodate freight traffic to and from existing and future terminals on Humboldt Bay. Implementation of the Plan may involve:

- procurement of permanent access easements or fee title acquisition of roadways
- construction of new road "spurs" from existing roads to waterfront parcels
- widening and resurfacing of existing roads, such as Vance Avenue
- improvement and installation of safety features at key intersections

- installation of security features to protect private property and sensitive port facilities
- potential relocation of above-ground utilities to underground conduits

The intent of this letter is to request informal consultation from the California Department of Fish & Wildlife that may provide additional information to supplement the preliminary field surveys identified above. Of particular interest are areas of biological significance, regulatory considerations or constraints based on the location and nature of the Plan, agency permitting requirements, and other considerations that may provide opportunities or obstacles to future construction of the proposed enhanced road system. Your feedback will assist with our completion of the Plan, aid in road segment prioritization, and prepare HBHRCD for regulatory considerations as individual road segments are proposed for future funding and construction.

As stated above, the Plan is a preliminary, planning-level evaluation of potential access routes and their opportunities and constraints to improving access to and from the Humboldt Bay/Samoa Peninsula Waterfront. CEQA defines a "project" as an activity which may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, and which is either undertaken by a public agency, paid for through public funding, or subject to discretionary approval by a public agency. NEPA's procedural requirements apply to a Federal agency's decisions for actions, including financing, assisting, conducting, or approving projects or programs; agency rules, regulations, plans, policies, or procedures; and legislative proposals. As such, the preparation of the Plan does not constitute a "project" under CEQA, and adoption of a Categorical Exclusion has satisfied NEPA requirements. In future phases of the project leading to road segment-specific design, permitting, and construction, HBHRCD will conduct formal agency consultations for each road segment as part of the permitting and environmental compliance (CEQA/NEPA) process.

The Plan is a major step to supporting growth of our local economy while recognizing the unique coastal and marine ecology on the Samoa Peninsula and in Humboldt Bay. We appreciate your input and welcome your questions. Please feel free to contact Ryan Wells, Associate Planner at LACO Associates, by phone at (707) 443-5054 or by e-mail at wellsr@lacoassociates.com with any comments or questions.

Sincerely,
LACO Associates

TS Kelly

T. Scott Kelly, PE
Project Manager

RAW:gg

cc: Jack Crider, CEO, HBHRCD

Segment No.	Length (L.F.)	Roadway
1	13,154	New Navy Base Road - Bay Street to HWY 255
2	2,213	Bay Street - New Navy Base Road to Vance Ave
3	4,758	Vance Ave - Bay Street to Samoa Pulp Lane
4	1,592	Vance Ave - Samoa Pulp Lane to north spur
5	288	Samoa Pulp Lane - New Navy Base Road to Vance Ave
6	1,016	North Spur off Vance Avenue
7	1,683	South Spur off Vance Avenue

The data shown on this map are from publicly-available sources or developed through visual interpretation of aerial photography. LACO cannot guarantee the accuracy of these data.

DRAWN	RAW/JB
CHECK	RAW
APPROVED	MDN
DATE	5/1/2013
JOB NO.	7591.00
SHEET	1

SAMOA INDUSTRIAL WATERFRONT
TRANSPORTATION ACCESS PLAN
HBHRCD PREFERRED ALTERNATIVE ROUTE
ROAD SEGMENTS

HUMBOLDT BAY HARBOR, RECREATION, & CONSERVATION DISTRICT

NO.	HISTORY/REVISION	BY	CHK.	DATE

LACO
EUREKA • UKIAH • SANTA ROSA
1-800-515-5054 www.lacoassociates.com

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California Coastal Commission response to LACO's June 24, 2013 Preliminary Agency Consultation Request Letter

(sent via email on July 9, 2013)

Hi Ryan,

Thanks for your recent letter on this topic giving a general overview of the concept and requesting Coastal Commission staff input on the idea. We received the letter on June 25, and I just got back in town from a two week vacation this week. But I had the opportunity to briefly discuss it with Bob and try to pin down some dates that we'd be available to meet with you and Harbor District to discuss the ideas and provide feedback. Unfortunately our summer is pretty booked with already-scheduled meetings and looming deadlines for upcoming hearing items for our Commission's August and September agendas. Our first opportunity to meet would be Labor Day week, either Tuesday September 3 or Friday the 6th. If either of those dates work for you all, let me know and we can decide on a time and place. If neither of those dates work, feel free to toss out others for consideration.

Thanks again for your letter. We really appreciate the opportunity for early involvement and coordination.

Melissa

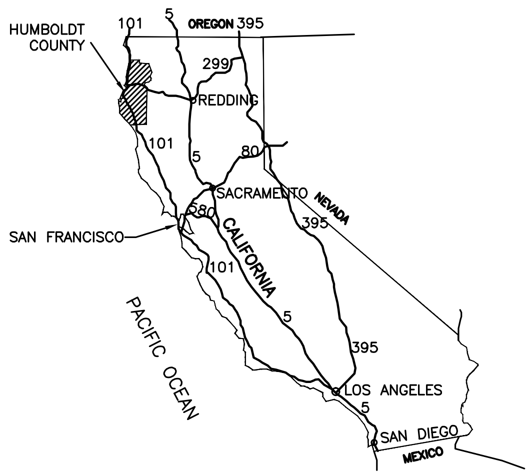
Melissa B. Kraemer
California Coastal Commission
North Coast District
1385 Eighth Street, Suite 130
Arcata, CA 95521
Ph: 707/826-8950 ext. 5
F: 707/826-8960
www.coastal.ca.gov

APPENDIX 9

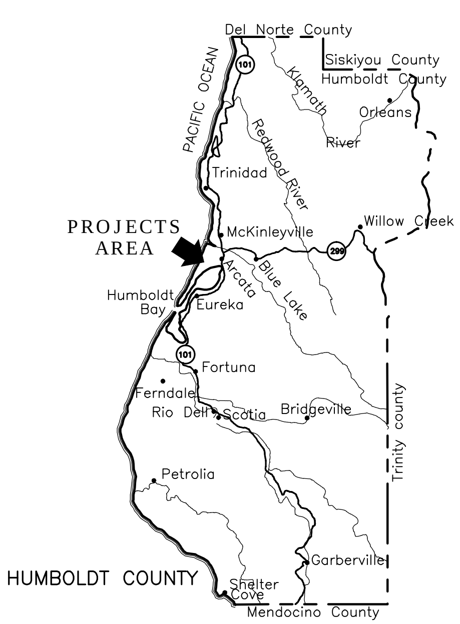
10% Engineered Design Plan Set

HUMBOLDT BAY HARBOR, RECREATION & CONSERVATION DISTRICT SAMOA INDUSTRIAL WATERFRONT PRELIMINARY TRANSPORTATION ACCESS PLAN 10% DESIGN

SAMOA, CALIFORNIA



LOCATION MAP
N.T.S.



AREA MAP
N.T.S.

VICINITY MAP
1"=2000'

1"
GRAPHIC SCALE MEASURES 1 INCH ON FULL-SIZE PLANS.

SHEET INDEX

NOTES:

1. THESE PLANS ARE NOT FOR CONSTRUCTION.
2. NO TOPOGRAPHY OR BOUNDARY SURVEY WAS CONDUCTED TO PREPARE THESE PLANS.
3. A DETAILED TOPOGRAPHIC SURVEY SHOULD BE COMPLETED BEFORE PREPARING CONSTRUCTION DOCUMENTS FOR THIS PROJECT.

APPROVALS:

HUMBOLDT BAY HARBOR, RECREATION & CONSERVATION DISTRICT

PG&E

PRELIMINARY NOT FOR CONSTRUCTION

REGISTERED PROFESSIONAL ENGINEER KHA T FU No. 75428 Exp. 12/31/13 CIVIL STATE OF CALIFORNIA DRAFT

LACO
EUREKA • UKIAH • SANTA ROSA
1-800-515-5054 www.lacoassociates.com

NO.	HISTORY / REVISION	BY	CHK.	DATE

SAMOA INDUSTRIAL WATERFRONT PRELIMINARY TRANSPORTATION ACCESS PLAN
TITLE SHEET
HUMBOLDT BAY HARBOR, RECREATION & CONSERVATION DISTRICT

DRAWN	JDB
CHECK	NBK
APPROVED	TSK
DATE	7/26/13
JOB NUMBER	7591.00
SHEET	G1.0

Jul 24,2013-3:23pm T:\Cadfiles\7500\7591.00 Samoa Transpo Access\DWG\7591.00 CIV G1.dwg

ABBREVIATIONS

A

AB – AGGREGATE BASE
ABON – ABANDONED
AC – ASPHALT CONCRETE
ACP – ASBESTOS CEMENT PIPE
ACI – AMERICAN CONCRETE INSTITUTE
AG – AGGREGATE
APPROX – APPROXIMATELY
ASTM – AMERICAN SOCIETY FOR TESTING & MATERIALS
@ – AT

B

BC – BEGIN CURVE
BCR – BEGIN CURB RETURN
BF – BLIND FLANGE
BFV – BUTTERFLY VALVE
BLDG – BUILDING
BM – BENCH MARK
BOT – BOTTOM
BRG – BEARING
BTWN – BETWEEN
BVC – BEGINNING OF VERTICAL CURVE
BW – BOTTOM OF WALL

C

CATV – CABLE TELEVISION
CB – CATCH BASIN
CEIL – CEILING
CFM – CUBIC FEET PER MINUTE
CI – CAST IRON
CIP – CAST IRON PIPE
C.I.P. – CAST–IN–PLACE
CJ – CONSTRUCTION JOINT
CL,℄ – CENTERLINE
CLR – CLEAR
CMP – CORRUGATED METAL PIPE
CMU – CONCRETE MASONRY UNIT
CO – CLEANOUT
CONC – CONCRETE
CONT – CONTINUOUS
COORD – COORDINATE
CPLG – COUPLING
CTR – CENTER
CU FT – CUBIC FEET
CV – CHECK VALVE
CW – COLD WATER
CY – CUBIC YARD

D

° – DEGREE (ANGLE)
d – PENNY (NAIL SIZE)
DBL – DOUBLE
DI – DRAINAGE INLET
DIA – DIAMETER
DIAG – DIAGONAL
DIM – DIMENSION
DIP – DUCTILE IRON PIPE
DRWY – DRIVEWAY
DWG – DRAWING

E

<E> – EXISTING
EA – EACH
EC – END CURVE
ECR – END CURB RETURN
EF – EACH FACE
EL – ELBOW
ELEC – ELECTRIC OR ELECTRICAL
ELEV – ELEVATION
ENGR – ENGINEER
EP – EDGE OF PAVEMENT
EQ – EQUAL
EQUIP – EQUIPMENT
EVC – END OF VERTICAL CURVE
EW – EACH WAY
EXC – EXCAVATE
EXP JT – EXPANSION JOINT
EXT – EXTERIOR

F

FC – FACE OF CURB
FF – FINISHED FLOOR
FG – FINISHED GRADE
FH – FIRE HYDRANT
FIN – FINISH
FL,℄ – FLOW LINE
FLG – FLANGE
FLR – FLOOR
FS – FINISHED SURFACE
FT – FOOT
FT^2 – SQUARE FEET
FT^3 – CUBIC FEET
FTG – FOOTING

G

G – GAS
GALV – GALVANIZED
GIP – GALVANIZED IRON PIPE
GPM – GALLONS PER MINUTE
GRD – GRADE
GSP – GALVANIZED STEEL PIPE
GV – GATE VALVE

H

HB – HOSE BIBB
HDR – HEADER
HP – HORSEPOWER
HORIZ – HORIZONTAL
HT – HEIGHT
HW – HOT WATER

I

ID – INSIDE DIAMETER
IN – INCH
INT – INTERIOR
INV – INVERT

J

JT – JOINT
JP – JOINT POLE

K

KIP – THOUSAND POUNDS
KW – KILOWATT

L

∠ – ANGLE (DEGREES)
LB – POUND
LF – LINEAR FEET
LG – LONG
LT – LEFT

M

MATL – MATERIAL
MAX – MAXIMUM
MECH – MECHANICAL
MFR – MANUFACTURER
MH – MANHOLE
MIN – MINIMUM
MISC – MISCELLANEOUS
MJ – MECHANICAL JOINT
MTL – METAL

N

<N> – NEW
NC – NORMALLY CLOSED
NIC – NOT IN CONTRACT
NO. – NUMBER
NO – NORMALLY OPEN
NPT – NATIONAL PIPE THREAD
NTS – NOT TO SCALE
– NUMBER

O

OC – ON CENTER
OD – OUTSIDE DIAMETER
OG – ORIGINAL GROUND
OHE – OVERHEAD ELECTRIC
OZ – OUNCE
OVHD – OVERHEAD

P

PB – PULL BOX
PCC – POINT OF COMPOUND CURVATURE
PCF – POUNDS PER CUBIC FOOT
PE – PLAIN END
PERF – PERFORATED
PEP – POLYETHYLENE PIPE
PL,♇ – PROPERTY LINE
PLYWD – PLYWOOD
POC – POINT ON CURVE
PP – POWER POLE
PRC – POINT OF REVERSE CURVATURE
PREFAB – PREFABRICATED
PSF – POUNDS PER SQUARE FOOT
PSI – POUNDS PER SQUARE INCH
PSIG – POUNDS PER SQUARE INCH GAUGE
PV – PLUG VALVE
PVC – POLYVINYL CHLORIDE PLASTIC
PVI – POINT OF VERTICAL INTERSECTION
PVMT – PAVEMENT
PVT – PRIVATE

Q

QTY – QUANTITY

R

R – RADIUS
RC – RELATIVE COMPACTION
RCP – REINFORCED CONCRETE PIPE
RD – ROAD
RDCR – REDUCER
RDWD – REDWOOD
REQD – REQUIRED
RM – ROOM
RSP – ROCK SLOPE PROTECTION
RT – RIGHT
R/W – RIGHT–OF–WAY

S

SL – SLOPE
SCHED – SCHEDULE
SD – STORM DRAIN
SDMH – STORM DRAIN MAN HOLE
SECT – SECTION
SHT – SHEET
SIM – SIMILAR
SPEC – SPECIFICATIONS
SQ – SQUARE
SQ FT – SQUARE FOOT
SQ IN – SQUARE INCH
SS – SANITARY SEWER
SSMH – SEWER SYSTEM MAN HOLE
STA – STATION
STD – STANDARD
STL – STEEL
SW – SIDEWALK
SYMM – SYMMETRICAL

T

T – TELEPHONE
TAN – TANGENT
T&B – TOP AND BOTTOM
T&G – TONGUE AND GROOVE
TBM – TEMPORARY BENCH MARK
TC – TOP OF CURB
TELEM – TELEMETRY
TEMP – TEMPERATURE OR TEMPORARY
THD – THREAD
TOC – TOP OF CONCRETE
TOG – TOP OF GRATE
TOF – TOP OF FOOTING
TOW – TOP OF WALL
TP – TOP OF PAVEMENT OR TELEPHONE POLE
<TYP> – TYPICAL

U

UBC – UNIFORM BUILDING CODE
UOS – UNLESS OTHERWISE SPECIFIED
UG – UNDERGROUND
UTIL – UTILITY
UP – UTILITY POLE

V

V – VOLT
VC – VERTICAL CURVE
VCP – VITRIFIED CLAY PIPE
VERT – VERTICAL
VPI – VERTICAL POINT OF INTERSECTION

W

WM – WATER METER
WV – WATER VALVE

X

XFMR – TRANSFORMER

Y

YD – YARD
YD^2 – SQUARE YARD
YD^3 – CUBIC YARD

NOTES:

1. CONTACT THE ENGINEER FOR SYMBOLS NOT LISTED.
2. THIS IS A STANDARD SHEET, THEREFORE SOME SYMBOLS OR ABBREVIATIONS MAY APPEAR ON THIS SHEET WHICH DO NOT APPEAR ON THE PLANS.
3. SITE AND UTILITY SYMBOLS SHOWN ON THIS SHEET ARE NOT INTENDED TO REPRESENT THE PHYSICAL SCALE OR SHAPE OF ANY ITEMS. WHERE LARGE–SCALE PLANS ARE PRESENTED, THE SYMBOLS SHOWN HEREON MAY BE REPLACED BY DETAILS MORE SUITED TO THE DRAWING SCALE.

UTILITIES LEGEND

PROPOSED	EXISTING	
		GATE VALVE
	PV	PLUG VALVE
	BV	BALL VALVE
	BFV	BUTTERFLY VALVE
P	P	AUTOMATICALLY OPERATED VALVE (P= PNEUMATIC, E= ELECTRIC, S= SOLENOID, H=HYDRAULIC. D= DIAPHRAGM ACTUATOR)
		3–WAY VALVE
		GLOBE VALVE
		ANGLE VALVE
		PRESSURE REGULATING VALVE
		PRESSURE RELIEF VALVE
		CHECK VALVE
		AIR OR VACUUM RELEASE VALVE
AV	AV	AIR AND VACUUM VALVE
CA	CA	COMBINATION AIR VALVE
		FLOW METER
	NF	HOSE BIBB (NF=NON–FREEZE)
		REDUCER
		FIRE HYDRANT
		DROP INLET
MH	MH	MANHOLE
		CLEANOUT
UG E	UG E	UNDERGROUND ELECTRICAL
OH E	OH E	OVERHEAD ELECTRICAL
TV	TV	CABLE TELEVISION
J	J	JOINT UTILITIES
TM	TM	UNDERGROUND TELEMETRY LINE
OH TM	OH TM	OVERHEAD TELEMETRY LINE
T	T	UNDERGROUND TELEPHONE LINE
OH T	OH T	OVERHEAD TELEPHONE LINE
W	W	WATER LINE
SS	SS	SANITARY SEWER LINE
SD	SD	STORM DRAIN LINE
G	G	GAS LINE
FM	FM	FORCE MAIN AND DIRECTION OF FLOW
		CULVERT
		POLE MOUNTED STREETLIGHT
	NOT USED	ITEM TO BE REMOVED
	NOT USED	ITEM TO BE ABANDONED IN PLACE
WM	WM	WATER METER
PB	PB	PULL BOX AND DESIGNATION
R4–4		SIGN AND DESIGNATION
MB	MB	MAIL BOX

SIZE AND MATERIAL OF EXISTING PIPING MAY BE SHOWN WHEN KNOWN.

SIZE AND MATERIAL OF NEW PIPING MAY BE SHOWN ON PLAN OR IN PROFILE.

LINE DESIGNATION

2.0 – INDICATES LINE DESIGNATION
12 – INDICATES SHEET WHERE CONTINUATION OCCURS (REPLACED BY A LINE IF OCCURS ON SAME SHEET)

CURVE DATA

R (RADIUS)
L (LENGTH)
Δ (DELTA)
T (TANGENT)

TOPOGRAPHIC LEGEND

PROPOSED	EXISTING	
		P.V.I. (POINT OF VERTICAL INTERSECTION)
NOT USED		TEMPORARY BENCH MARK
NOT USED		BENCH MARK
47.55	NOT USED	FINISH GRADE ELEVATION
NOT USED	42.6	ELEVATION OF ORIGINAL GROUND
		RADIUS POINT
		FLOW LINE AND DIRECTION
		TOP OF CUT
		TOP OF FILL
		TOE OF CUT OR FILL
200	180	CONTOUR LINE
		CONCRETE
		PAVEMENT
NOT USED		ROCKS
NOT USED		STUMPS
		TREES
		ROADS
JP	JP	UTILITY POLE (PP=POWER POLE, TP= TEL POLE, JP=JOINT POLE, LP=LIGHT POLE)
		GUY WIRE
X	X	FENCE
♇	♇	BOUNDARY LIMITS, W/DESIGNATION
		EASEMENT LINE
		CENTERLINE
NOT USED		MARSH
		LAWN
NOT USED		SPRING
TP–4	TP–4	TEST PIT AND DESIGNATION
		EXPLORATION BORE HOLE
		PROPERTY CORNER
		SURVEY MONUMENT
		CONTROL POINT
		DRIVEWAY
NOT USED		RAIL ROAD TRACKS

DETAIL AND SECTION DESIGNATION

SECTION (LETTER) OR DETAIL (NUMERAL) DESIGNATION – A

INDICATES SECTION OR DETAIL TAKEN AND SHOWN ON SAME SHEET – 15

ON DRAWING WHERE SECTION OR DETAIL IS TAKEN;
SHEET NUMBER WHERE SHOWN

ON DRAWING WHERE SECTION OR DETAIL IS SHOWN;
SHEET NUMBER WHERE TAKEN

STANDARD DETAIL NUMBER (DETAIL MAY BE SHOWN ON ANY SHEET WITHIN THE DRAWING SET) – 006

PRELIMINARY NOT FOR CONSTRUCTION

LACO
EUREKA • UKIAH • SANTA ROSA
1-800-515-5054 www.lacoassociates.com

REGISTERED PROFESSIONAL ENGINEER No. 75428 Exp. 12/31/13 CIVIL STATE OF CALIFORNIA

NO.	HISTORY / REVISION	BY	CHK.	DATE

SAMOA INDUSTRIAL WATERFRONT
PRELIMINARY TRANSPORTATION ACCESS PLAN
ABBREVIATION AND LEGEND

HUMBOLDT BAY HARBOR, RECREATION & CONSERVATION DISTRICT

DRAWN	JDB
CHECK	NBK
APPROVED	TSK
DATE	7/26/13
JOB NUMBER	7591.00
SHEET	G2.0

Jul 24,2013-3:23pm
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GENERAL NOTES:

OWNER: HBHRCD

ENGINEER: LACO ASSOCIATES

1. ALL CONSTRUCTION SHALL CONFORM TO THESE PLANS AND THE FOLLOWING STANDARDS:
   - A. COUNTY OF HUMBOLDT IMPROVEMENT STANDARDS AND SPECIFICATIONS (LATEST REVISION)
   - B. CALIFORNIA BUILDING CODE (CBC) (LATEST REVISION)
   - C. AMERICAN PUBLIC WORKS ASSOCIATION (APWA) "STANDARD SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION (GREEN BOOK)", (LATEST REVISION)
   - D. CALIFORNIA STATE DEPARTMENT OF TRANSPORTATION (CALTRANS) STANDARD SPECIFICATIONS AND STANDARD PLANS (LATEST REVISION)
2. THE ENGINEER PREPARING THESE PLANS SHALL NOT BE RESPONSIBLE NOR LIABLE FOR ANY UNAUTHORIZED CHANGES TO, OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.
3. THE CONTRACTOR SHALL AGREE TO DEFEND, INDEMNIFY, AND HOLD THE DESIGN PROFESSIONALS 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.
4. LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES SHOWN HEREON ARE FROM RECORD INFORMATION ONLY AND ARE SHOWN FOR INFORMATION ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES PRIOR TO EXCAVATION AND CONSTRUCTION IN ANY AREA. CONTRACTOR SHALL CONTACT UNDERGROUND SERVICE ALERT (USA) AT 1-800-227-2600 A MINIMUM OF 48 HOURS IN ADVANCE OF ANY EXCAVATION. CONTRACTOR SHALL IMMEDIATELY REPORT ANY DISCREPANCIES IN RECORD INFORMATION TO THE ENGINEER OF RECORD PRIOR TO CONSTRUCTION OF ANY WORK.
5. THE CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR THE JOB SITE CONDITIONS DURING THE COURSE OF PROJECT CONSTRUCTION, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND IS NOT LIMITED TO NORMAL WORKING HOURS.
6. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COMPLY WITH THE PERTINENT SECTIONS OF THE "CONSTRUCTION SAFETY ORDERS", MOST CURRENT REVISION, ISSUED BY THE STATE OF CALIFORNIA, AND ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJECT. THE DESIGN, ADEQUACY AND SAFETY OF ERECTION BRACING, SHORING, TEMPORARY SUPPORTS ETC., IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR, AND HAS NOT BEEN CONSIDERED BY THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATE DESIGN AND CONSTRUCTION OF ALL FORMS AND SHORING REQUIRED.

8. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS.
9. CONTRACTOR SHALL PROTECT ALL EXISTING IMPROVEMENTS ON OR ADJACENT TO PROJECT SITE. CONTRACTOR SHALL REPAIR OR REPLACE ALL DAMAGE TO EXISTING IMPROVEMENTS TO THE SATISFACTION OF THE ENGINEER.
10. CONTRACTOR SHALL VERIFY CONDITIONS AND DIMENSIONS AT THE SITE BEFORE STARTING WORK AND IMMEDIATELY NOTIFY THE ENGINEER IF ANY CONDITIONS OR DIMENSIONS ARE UNUSUAL OR NOT AS SHOWN ON THESE PLANS.
11. DO NOT USE SCALED DIMENSIONS, USE WRITTEN DIMENSIONS. WHERE NO DIMENSIONS ARE SHOWN, CONSULT ENGINEER FOR CLARIFICATION BEFORE PROCEEDING WITH THE WORK.
12. DETAILS OF CONSTRUCTION NOT FULLY SHOWN SHALL BE OF THE SAME NATURE AS SHOWN FOR SIMILAR CONDITIONS.
13. CONTRACTOR SHALL PROVIDE MARKED UP DRAWINGS SHOWING "AS-BUILT" CONDITIONS FOR ALL DEVIATIONS FROM THE PLANS AS SHOWN HEREON, UPON COMPLETION OF CONSTRUCTION, AND PRIOR TO RELEASE OF FINAL PAYMENT.
14. UTILITIES REQUIRED FOR CONSTRUCTION WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
15. CONTRACTOR SHALL COORDINATE WITH ENGINEER FOR SETTING CURB AND HORIZONTAL AND VERTICAL CONTROL STAKES. THE ENGINEER WILL PROVIDE ONE SET OF STAKES. CONTRACTOR SHALL PROTECT ALL STAKES, ANY RESTAKING REQUIRED DUE TO LOST OR DAMAGED STAKES WILL BE AT THE EXPENSE OF THE CONTRACTOR.
16. CONTRACTOR SHALL REMOVE ALL DELETERIOUS MATERIAL FROM SITE GENERATED DURING CONSTRUCTION INCLUDING BUT NOT LIMITED TO BROKEN CONCRETE, STUMPS, ROCKS, DEBRIS, ASPHALT RUBBLE, AND GARBAGE, AND LEGALLY DISPOSE OF THE ABOVE.
17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATE DESIGN AND CONSTRUCTION OF ALL FORMS AND SHORING.
18. ALL UNDERGROUND UTILITIES SHALL BE INSTALLED PRIOR TO CONSTRUCTION OR REPAIR OF STREET STRUCTURAL SECTION.
19. TRENCH SHORING SHALL BE IN ACCORDANCE WITH THE CAL-OSHA CONSTRUCTION SAFETY ORDERS, LATEST REVISION, WHERE REQUIRED.
20. THESE PLANS SHALL NOT BE CHANGED OR REUSED WITHOUT WRITTEN APPROVAL BY THE ENGINEER.

GRADING NOTES:

1. INSPECTIONS AND TESTING:
   - A. ALL SITE GRADING, FILLING, AND BACKFILLING WILL BE INSPECTED BY THE ENGINEER'S PROJECT GEOLOGIST.
   - B. THE ENGINEER WILL MAKE ALL COMPACTION TESTS WHEN ADVISED BY THE CONTRACTOR THAT IN THE CONTRACTORS OPINION, SUFFICIENT DENSITIES HAVE BEEN ACHIEVED. THE CONTRACTOR SHALL FURNISH A BACKHOE AND OPERATOR UPON REQUEST, AT NO COST TO OWNER. THE CONTRACTOR SHALL GIVE THE ENGINEER AT LEAST 48 HOURS NOTICE THAT TESTS ARE REQUIRED. FAILURE TO GIVE ADEQUATE NOTICE CAN RESULT IN TESTING DELAYS WHICH WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
   - C. THE CONTRACTOR SHALL MAKE ALL NECESSARY EXCAVATIONS FOR COMPACTION TESTS. COSTS OF EXCAVATION, BACKFILLING, AND COMPACTING IN CONNECTION WITH COMPACTION TESTING SHALL BE BORNE BY THE CONTRACTOR.
   - D. A FAILING COMPACTION TEST INDICATES THAT THE REQUIRED COMPACTION STANDARDS HAVE NOT BEEN ACHIEVED. ANY FILL MATERIAL OR PORTION OF FILL MATERIAL THAT DOES NOT MEET THE SPECIFICATION REQUIREMENTS SHALL BE REMOVED AND RECOMPACTED UNTIL THE REQUIREMENTS ARE SATISFIED, AT NO ADDITIONAL COST TO THE OWNER.
   - E. EXCAVATIONS FOR COMPACTION TESTS SHALL BE BACKFILLED WITH MATERIAL SIMILAR TO THAT EXCAVATED AND COMPACTED TO THE SPECIFIED DENSITY BY THE CONTRACTOR.
   - F. ALL COSTS INVOLVED WITH ACHIEVING COMPACTION STANDARDS SHALL BE INCLUDED IN THE BID PRICES PAID FOR THE SPECIFIED BID ITEM INVOLVED AND THEREFOR NO ADDITIONAL COMPENSATION SHALL BE MADE.
2. PROTECTION
   - A. PROVIDE FOR SURFACE DRAINAGE DURING THE PERIOD OF CONSTRUCTION IN A MANNER THAT AVOIDS CREATING A NUISANCE TO ADJACENT AREA. KEEP ALL EXCAVATION FREE OF WATER DURING THE ENTIRE PROGRESS OF THE WORK, REGARDLESS OF THE CAUSE, SOURCE OR NATURE OF THE WATER. THE CONTRACTOR SHALL PREVENT EROSION OF FRESHLY GRADED AREAS DURING CONSTRUCTION UNTIL SUCH TIME AS PERMANENT DRAINAGE AND EROSION CONTROL MEASURES HAVE BEEN CONSTRUCTED.
   - B. WATERING: THE CONTRACTOR SHALL CONFORM TO CALTRANS STANDARD SPECIFICATION SECTION 17 AND WITH SECTION 1590(E) OF CAL OSHA, TITLE 8. WHERE DAMAGE OCCURS TO ADJACENT AREA OR OFFSITE PROPERTY, AS A RESULT OF DUST FROM THE WORK, THE CONTRACTOR SHALL PROMPTLY CORRECT, CLEAN OR OTHERWISE REPAIR SUCH DAMAGE AT NO ADDITIONAL COST, TO THE SATISFACTION OF THE OWNER.
   - C. BENCHMARKS, MONUMENTS, SIGNS, AND OTHER REFERENCE POINTS SHALL BE MAINTAINED BY THE CONTRACTOR, AS DIRECTED BY OWNER, AT NO ADDITIONAL COST TO THE OWNER.
3. COMPACTION – GENERAL
   - A. COMPACTION PER PROJECT GEOTECHNICAL REPORT PREPARED BY LACO ASSOCIATES.
   - B. IN PAVED AND SHOULDER AREAS, SUBGRADE WITHIN 30 INCHES OF FINAL GRADE SHALL BE COMPACTED TO 95% AND BACKFILLS AND FILLS MORE THAN 30 INCHES BELOW FINAL GRADE SHALL BE COMPACTED TO 90%.
   - C. IN NON-PAVED AREAS, BACKFILLS AND FILLS SHALL BE COMPACTED TO 90%.
   - D. PLACE BACKFILL AND FILL SOIL MATERIALS IN LOOSE LIFTS OF NOT MORE THAN 8 INCHES FOR MATERIAL COMPACTED BY HEAVY COMPACTION EQUIPMENT, AND NOT MORE THAN 6 INCHES FOR MATERIAL COMPACTED BY HAND-OPERATED TAMPERS.
   - E. THE GROUND SURFACE IN AREAS TO RECEIVE FILL SHALL BE PREPARED AS FOLLOWS:
     - a. ALL ORGANIC MATERIAL AND TOPSOIL SHALL BE REMOVED.
     - b. ON SLOPES GREATER THAN 1V:4H, HORIZONTAL BENCHES SHALL BE CUT INTO THE SOIL TO PROVIDE LEVEL BEARING SURFACE FOR THE FILL MATERIAL. THE MINIMUM WIDTH OF THE BENCHES SHALL BE FOUR FEET.
   - F. CUT SLOPES SHALL NOT EXCEED 1V:2H UNLESS OTHERWISE NOTED ON PLANS.

PAVING NOTES:

1. ALL ASPHALT CONCRETE SHALL BE INSTALLED IN ACCORDANCE WITH CALTRANS STANDARD SPECIFICATIONS SECTION 39.
2. EXISTING PAVEMENT TRANSITIONS TO NEW PAVING SHALL BE SAWCUT TO SMOOTH LINES.
3. APPLY TACK COAT TO CONTACT SURFACES OF CURBS, GUTTERS AND EXISTING PAVEMENT.
4. PLACE ASPHALT CONCRETE WITHIN 24 HOURS OF APPLYING PRIMER OR TACK COAT.
5. ASPHALT CONCRETE SHALL BE CALTRANS TYPE B; 1/2" MAXIMUM, MEDIUM; WITH AR 4000 GRADE BINDER OR EQUIVALENT WITH APPROVAL OF ENGINEER.
6. COMPACT PAVEMENT BY ROLLING TO A MINIMUM OF 95% OF MAXIMUM DENSITY. DO NOT DISPLACE OR EXTRUDE PAVEMENT FROM POSITION. HAND COMPACT IN AREAS INACCESSIBLE TO MECHANICAL ROLLING EQUIPMENT.
7. PERFORM ROLLING WITH CONSECUTIVE PASSES TO ACHIEVE EVEN AND SMOOTH FINISH WITHOUT ROLLER MARKS.
8. PAVEMENT MARKINGS: PERVO PLUS 7000 SERIES OR EQUIVALENT WITH ENGINEER'S APPROVAL. APPLY PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
9. AGGREGATE BASE SHALL BE COMPACTED PER ASTM D1557/D6938.
10. NATIVE MATERIAL SHALL BE COMPACTED PER ASTM D1557/D6938.

GENERAL WATER POLLUTION CONTROL NOTES:

1. THE EROSION AND SEDIMENT CONTROL PLAN ON SHEET C8 IS ACCURATE FOR STORM WATER POLLUTION CONTROL PURPOSES ONLY.
2. THE INFORMATION ON EROSION AND SEDIMENT CONTROL PLAN IS INTENDED TO BE USED AS A GUIDELINE FOR THE CONTRACTOR AND SUBCONTRACTORS TO COMPLY WITH THE LATEST REQUIREMENTS OF THE STATE WATER RESOURCES CONTROL BOARD.
3. USE IN CONJUNCTION WITH THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) PREPARED BY LACO ASSOCIATES, DATED 5/2011.

EROSION AND SEDIMENT CONTROL SCHEDULE:

RAINY SEASON DATES: OCTOBER 15 TO MAY 15

START IMPLEMENTATION OF TEMPORARY SOIL STABILIZATION AND SEDIMENT CONTROL BMP'S ON OCTOBER 10 OR 5 DAYS BEFORE START OF CONSTRUCTION, WHICHEVER IS EARLIER. COMPLETE IMPLEMENTATION OF TEMPORARY SOIL STABILIZATION AND SEDIMENT CONTROL BMP'S BY OCTOBER 15 OR START OF CONSTRUCTION, WHICHEVER IS LATER. NO CONSTRUCTION SHALL OCCUR AFTER OCTOBER 15 UNTIL APPROVED EROSION CONTROL MEASURES ARE IN PLACE.

EROSION AND SEDIMENT CONTROL NOTES:

1. ALL AREAS OF DISTURBED SOIL, EXCEPT ROAD SURFACE, SHALL BE MULCHED BY BROADCASTING STRAW BALES AND SEEDED BY BROADCASTING ANNUAL RYE SEED AT THE RATE OF 2lbs. PER 100 SQ. FT. HYDROSEEDING MAY BE USED TO BROADCAST SEED AT CONTRACTOR'S OPTION. SEED MUST BE NATIVE SPECIES.
2. DIVERT RUNOFF AWAY FROM STEEP, BARE SLOPES OR OTHER CRITICAL AREAS WITH BARRIERS, BERMS, DITCHES, OR OTHER FACILITIES.
3. LOCATE STOCKPILES IN AREAS THAT WILL NOT CONTRIBUTE TO OFFSITE SEDIMENT DISCHARGE. STOCKPILES SHALL BE PROTECTED BY PROMPT USE OF APPROPRIATE BMP'S.
4. INSPECTIONS SHALL BE CONDUCTED AS FOLLOWS:
   PRIOR TO A FORECAST STORM, AFTER A RAIN EVENT THAT CAUSES RUNOFF FROM THE CONSTRUCTION SITE, AT 24-HOUR INTERVALS DURING EXTENDED RAIN WEEKLY FROM OCTOBER 15 TO APRIL 15, AT OTHER INTERVALS OF TIME SPECIFIED IN THE CONTRACT DOCUMENTS.

ANY DEFICIENCIES SHALL BE PROMPTLY CORRECTED, SUCH AS:

- A. RE-SEED AND RE-MULCH AREAS WHICH DO NOT TAKE.
- B. CHECK AND ADJUST STRAW BALES, SAND BAGS AND SILT FENCES TO PREVENT SEDIMENT FROM DISCHARGING INTO SWALES OR UNGRADED AREAS. REMOVE SEDIMENT IF NECESSARY.

REGISTERED PROFESSIONAL ENGINEER No. 75428 Exp. 12/31/13 CIVIL STATE OF CALIFORNIA DRAFT

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NO.	HISTORY / REVISION	BY	CHK.	DATE

SAMOA INDUSTRIAL WATERFRONT
PRELIMINARY TRANSPORTATION ACCESS PLAN
GENERAL NOTES

HUMBOLDT BAY HARBOR, RECREATION & CONSERVATION DISTRICT

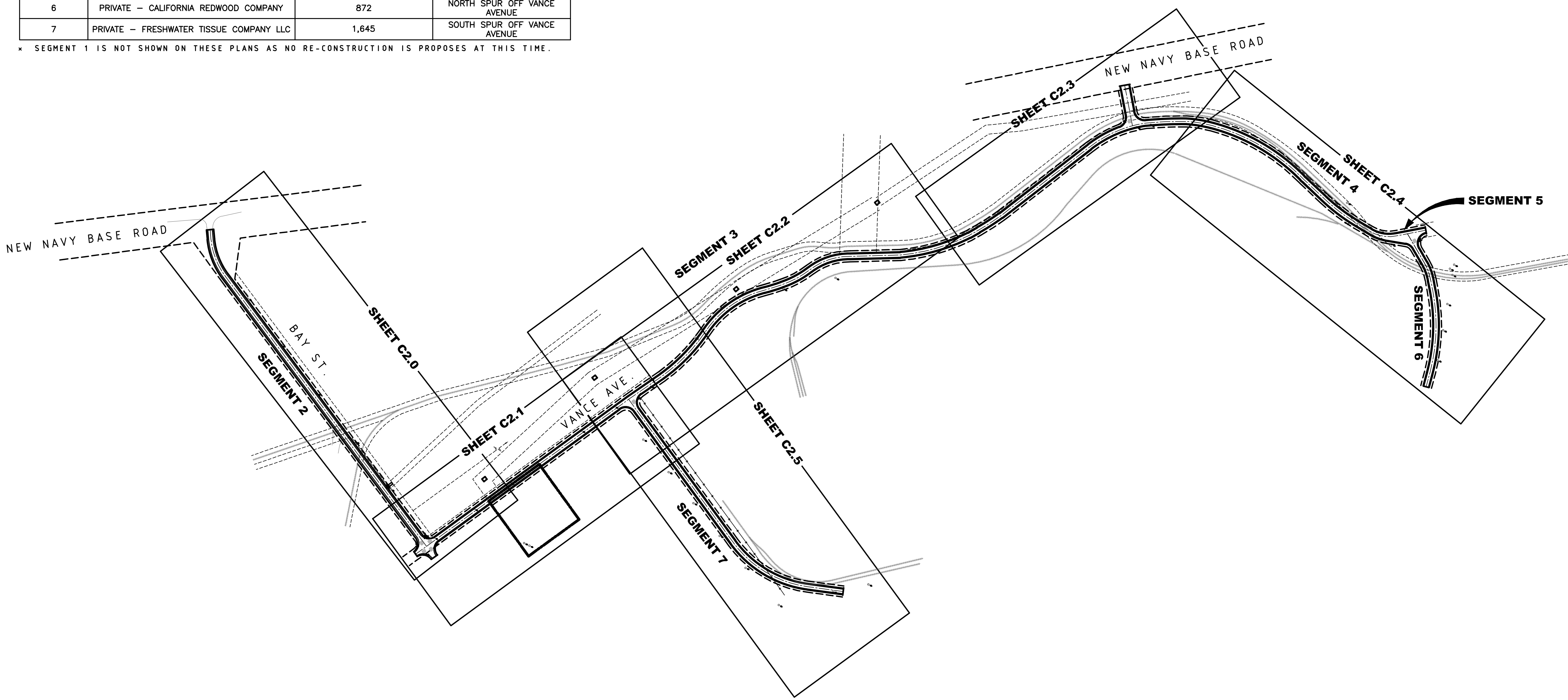
DRAWN	JDB
CHECK	NBK
APPROVED	TSK
DATE	7/26/13
JOB NUMBER	7591.00
SHEET	G3.0

Jul 24,2013-3:23pm
T:\Cadfiles\7500\7591.00 Samoa Transpo Access\DWG\7591.00 CIV G3.dwg

SEGMENT, OWNERSHIP, LENGTH & ROADWAY TABLE

SEGMENT	OWNERSHIP	LENGTH	ROADWAY
1*	HUMBOLDT COUNTY	13,176	NEW NAVY BASE ROAD – BAY STREET TO HWY 255
2	HUMBOLDT COUNTY	2,103	BAY STREET – NEW NAVY BASE ROAD TO VANCE AVENUE
3	PRIVATE (VARIOUS PARTIES)	4,612	VANCE AVENUE – BAY STREET TO SAMOA PULP LANE
4	PRIVATE (VARIOUS PARTIES)	1,788	VANCE AVENUE – SAMOA PULP LANE TO NORTH SPUR
5	HUMBOLDT COUNTY	224	SAMOA PULP LANE – NEW NAVY BASE ROAD TO VANCE AVENUE
6	PRIVATE – CALIFORNIA REDWOOD COMPANY	872	NORTH SPUR OFF VANCE AVENUE
7	PRIVATE – FRESHWATER TISSUE COMPANY LLC	1,645	SOUTH SPUR OFF VANCE AVENUE

* SEGMENT 1 IS NOT SHOWN ON THESE PLANS AS NO RE-CONSTRUCTION IS PROPOSES AT THIS TIME.



PLAN
SCALE: 1" = 300'

1"
GRAPHIC SCALE MEASURES 1 INCH ON FULL-SIZE PLANS.

PRELIMINARY NOT FOR CONSTRUCTION

REGISTERED PROFESSIONAL ENGINEER KIRA FRI... No. 75428 Exp. 12/31/13 CIVIL STATE OF CALIFORNIA

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NO.	HISTORY / REVISION	BY	CHK.	DATE

SAMOA INDUSTRIAL WATERFRONT
PRELIMINARY TRANSPORTATION ACCESS PLAN
INDEX SHEET

HUMBOLDT BAY HARBOR, RECREATION & CONSERVATION DISTRICT

DRAWN	JDB
CHECK	NBK
APPROVED	TSK
DATE	7/26/13
JOB NUMBER	7591.00
SHEET	C1.0

Jul 24,2013-3:23pm
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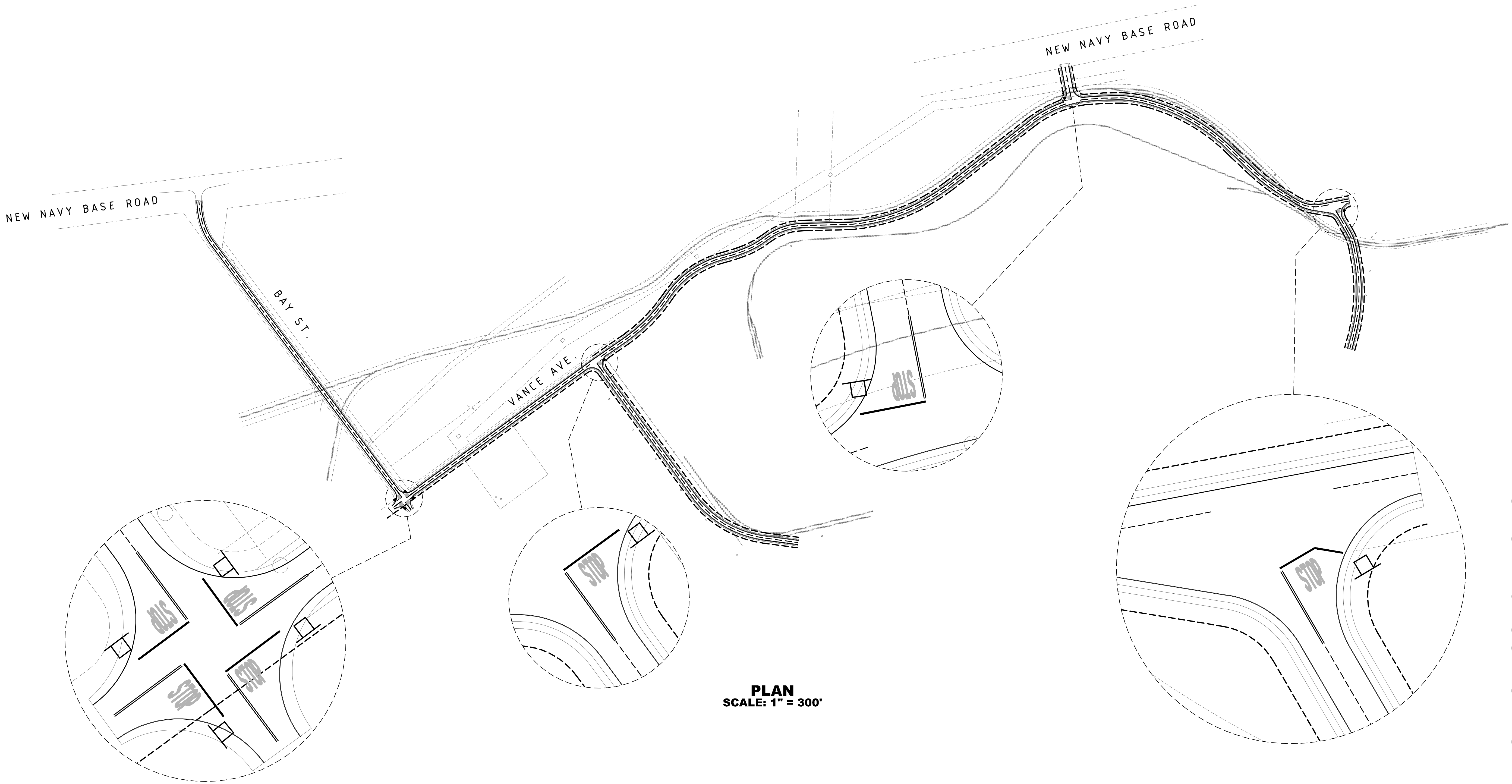


PLAN
SCALE: 1" = 300'

1"
GRAPHIC SCALE MEASURES 1 INCH ON FULL-SIZE PLANS.

PRELIMINARY NOT FOR CONSTRUCTION

REGISTERED PROFESSIONAL ENGINEER
No. 75428
Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

LACO
EUREKA • UKIAH • SANTA ROSA
1-800-515-5054 www.lacoassociates.com

NO.	HISTORY / REVISION	BY	CHK.	DATE

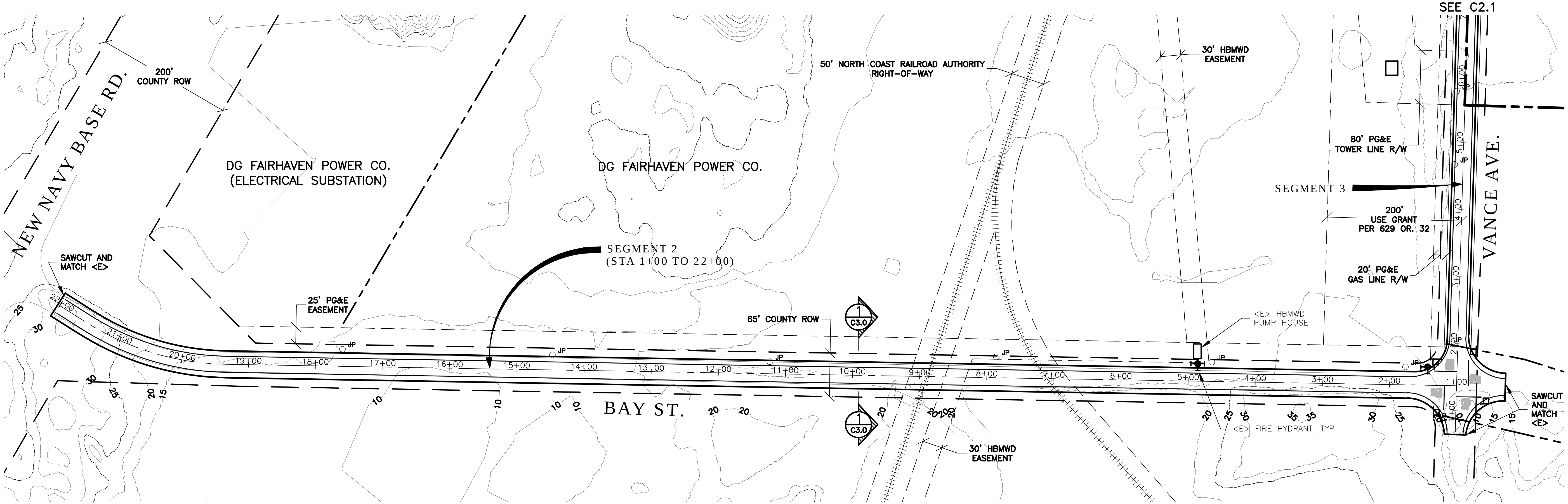
SAMOA INDUSTRIAL WATERFRONT
PRELIMINARY TRANSPORTATION ACCESS PLAN
STRIPING PLAN

HUMBOLDT BAY HARBOR,
RECREATION & CONSERVATION DISTRICT

DRAWN	JDB
CHECK	NBK
APPROVED	TSK
DATE	7/26/13
JOB NUMBER	7591.00
SHEET	C1.1

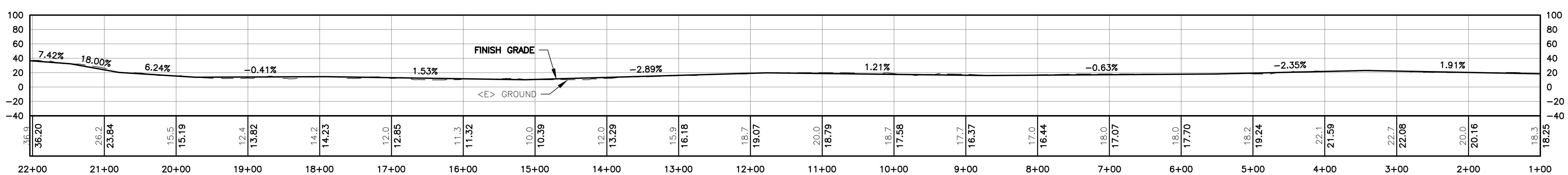
Jul 25,2013-8:07am
T:\Caddfiles\7500\7591.00 Samoa Transpo Access\DWG\7591.00 CIV C1.1.dwg

SEE C2.1



PLAN
SCALE: 1" = 80'

SEGMENT 2 PROFILE
STATION 1+00 TO 22+00
SCALE: 1" = 80' HORIZ AND VERT



	22+00	21+00	20+00	19+00	18+00	17+00	16+00	15+00	14+00	13+00	12+00	11+00	10+00	9+00	8+00	7+00	6+00	5+00	4+00	3+00	2+00	1+00
	36.9	26.2	15.5	12.4	14.2	12.0	11.3	10.0	12.0	15.9	18.7	20.0	18.7	17.7	17.0	18.0	18.0	18.2	22.1	22.7	20.0	18.3
	36.20	23.84	15.19	13.82	14.23	12.85	11.32	10.39	13.29	16.18	19.07	18.79	17.58	16.37	16.44	17.07	17.70	19.24	21.59	22.08	20.16	18.25

NOTES:

1. THE PROPERTY, EASEMENT AND RIGHT-OF-WAY LINES SHOWN HEREON ARE APPROXIMATE AND HAVE BEEN COMPILED FROM RECORD DOCUMENTS.
2. THE TOPOGRAPHIC INFORMATION SHOWN HEREON HAS NOT BEEN VERIFIED BY A FIELD SURVEY. A DETAILED TOPOGRAPHIC SURVEY SHOULD BE COMPLETED BEFORE PREPARING CONSTRUCTION DOCUMENTS FOR THIS PROJECT.
3. THE CONTOUR ELEVATIONS SHOWN HERE ARE FROM THE 2009-2011 COASTAL CONSERVANCY LIDAR PROJECT. THE CONTOURS ARE AT 5 FOOT INTERVALS.

1"

GRAPHIC SCALE MEASURES 1 INCH ON FULL-SIZE PLANS.

PRELIMINARY NOT FOR CONSTRUCTION

Jul 25,2013-12:35pm
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REGISTERED PROFESSIONAL ENGINEER KHATRI No. 75428 Exp. 12/31/13 CIVIL STATE OF CALIFORNIA

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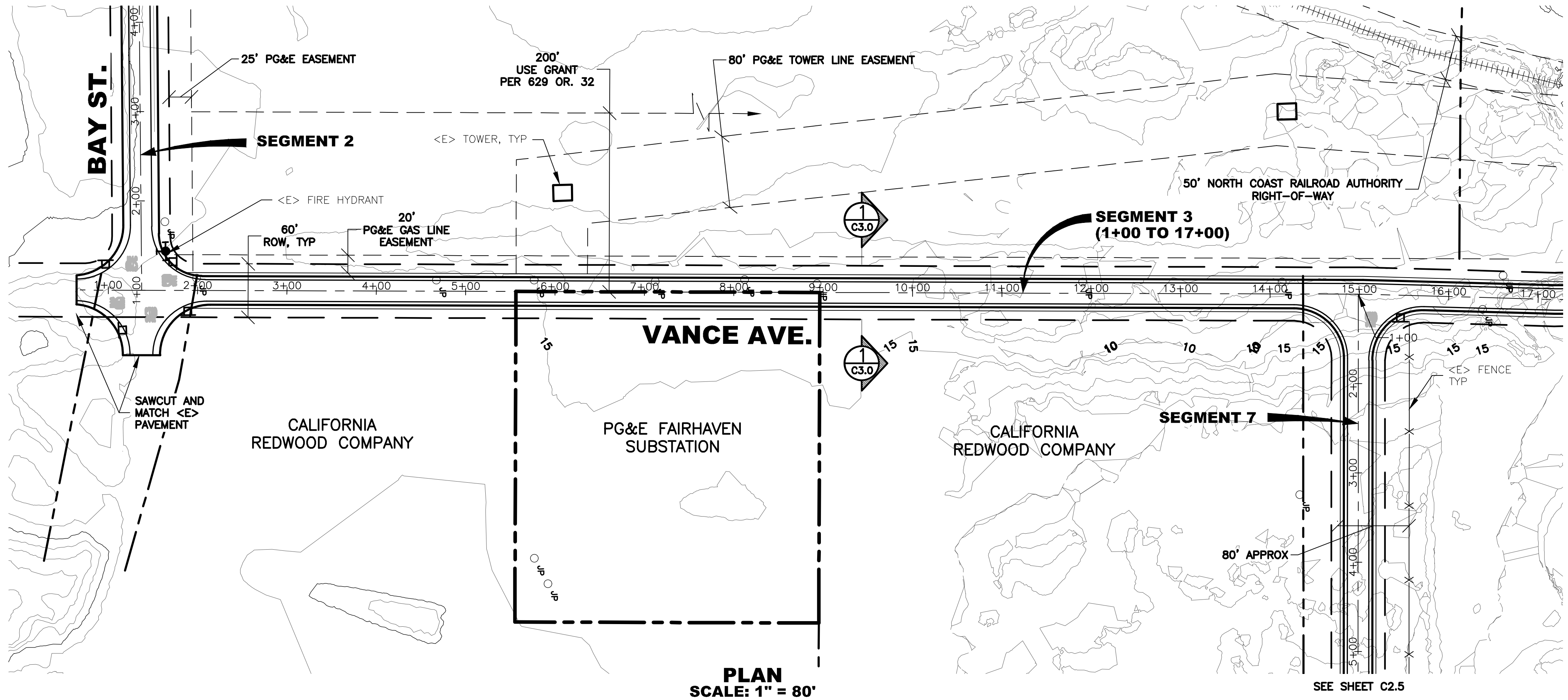
EUREKA • UKIAH • SANTA ROSA
1-800-515-5054 www.lacoassociates.com

NO.	HISTORY / REVISION	BY	CHK.	DATE

SAMOA INDUSTRIAL WATERFRONT
PRELIMINARY TRANSPORTATION ACCESS PLAN
PLAN AND PROFILE

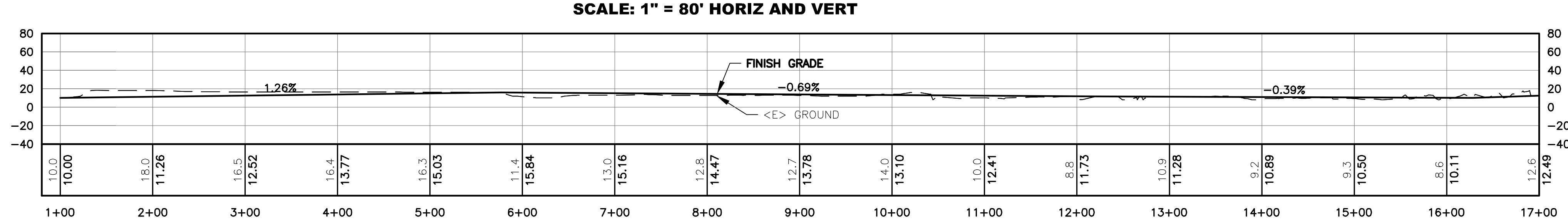
HUMBOLDT BAY HARBOR, RECREATION & CONSERVATION DISTRICT

DRAWN	JDB
CHECK	NBK
APPROVED	TSK
DATE	7/26/13
JOB NUMBER	7591.00
SHEET	C2.0



PLAN
SCALE: 1" = 80'

SEGMENT 3 PROFILE
STATION 1+00 TO 17+00
SCALE: 1" = 80' HORIZ AND VERT



NOTES:

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1"
GRAPHIC SCALE MEASURES 1 INCH ON FULL-SIZE PLANS.

PRELIMINARY NOT FOR CONSTRUCTION

REGISTERED PROFESSIONAL ENGINEER
No. 75428
Exp. 12/31/13
CIVIL
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NO.	HISTORY / REVISION	BY	CHK.	DATE

SAMOA INDUSTRIAL WATERFRONT
PRELIMINARY TRANSPORTATION ACCESS PLAN
PLAN AND PROFILE

HUMBOLDT BAY HARBOR, RECREATION & CONSERVATION DISTRICT

DRAWN	JDB
CHECK	NBK
APPROVED	TSK
DATE	7/26/13
JOB NUMBER	7591.00
SHEET	C2.1

Jul 25,2013-12:39pm
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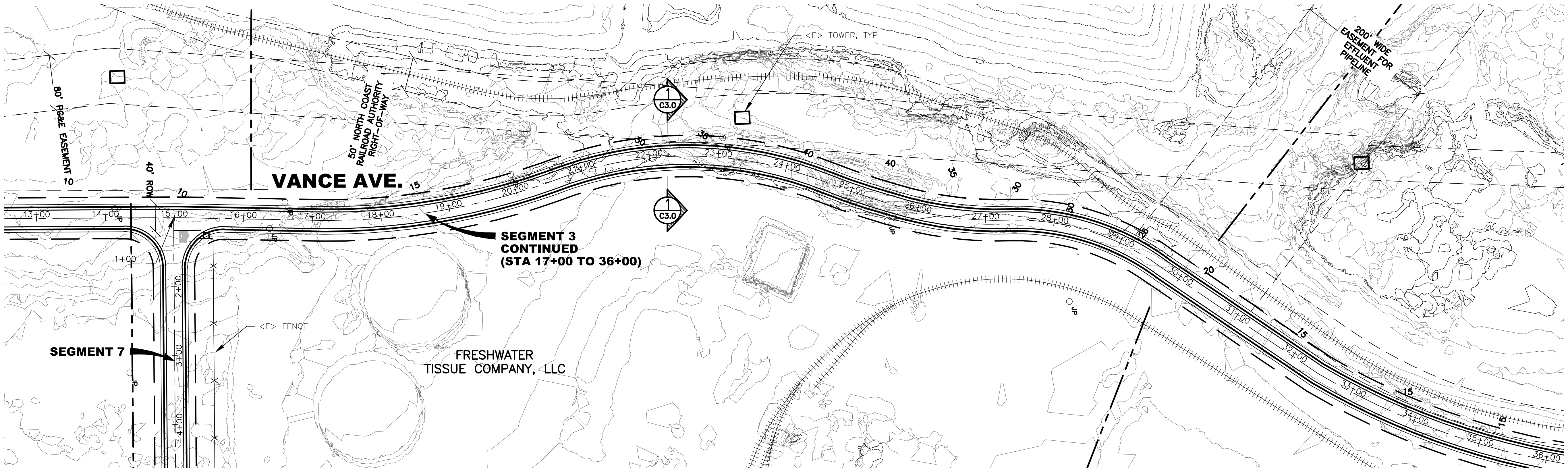
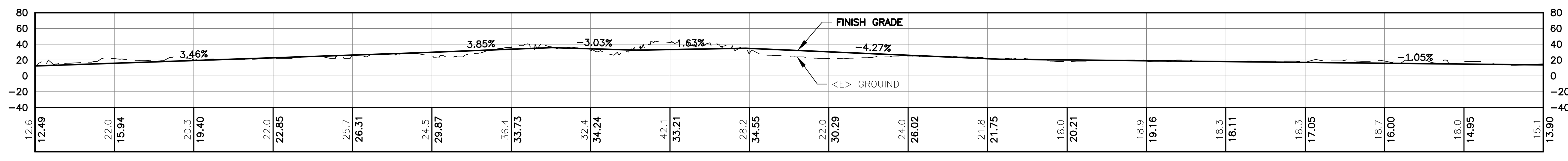


PLAN
SCALE: 1" = 80'

SEGMENT 3 PROFILE
STATION 17+00 TO 36+00
SCALE: 1" = 80' HORIZ AND VERT



PRELIMINARY NOT FOR CONSTRUCTION

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1"
GRAPHIC SCALE MEASURES 1 INCH ON FULL-SIZE PLANS.

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NO.	HISTORY / REVISION	BY	CHK.	DATE

SAMOA INDUSTRIAL WATERFRONT
PRELIMINARY TRANSPORTATION ACCESS PLAN
PLAN AND PROFILE

HUMBOLDT BAY HARBOR, RECREATION & CONSERVATION DISTRICT

DRAWN	JDB
CHECK	NBK
APPROVED	TSK
DATE	7/26/13
JOB NUMBER	7591.00
SHEET	C2.2

Jul 25,2013-12:44pm
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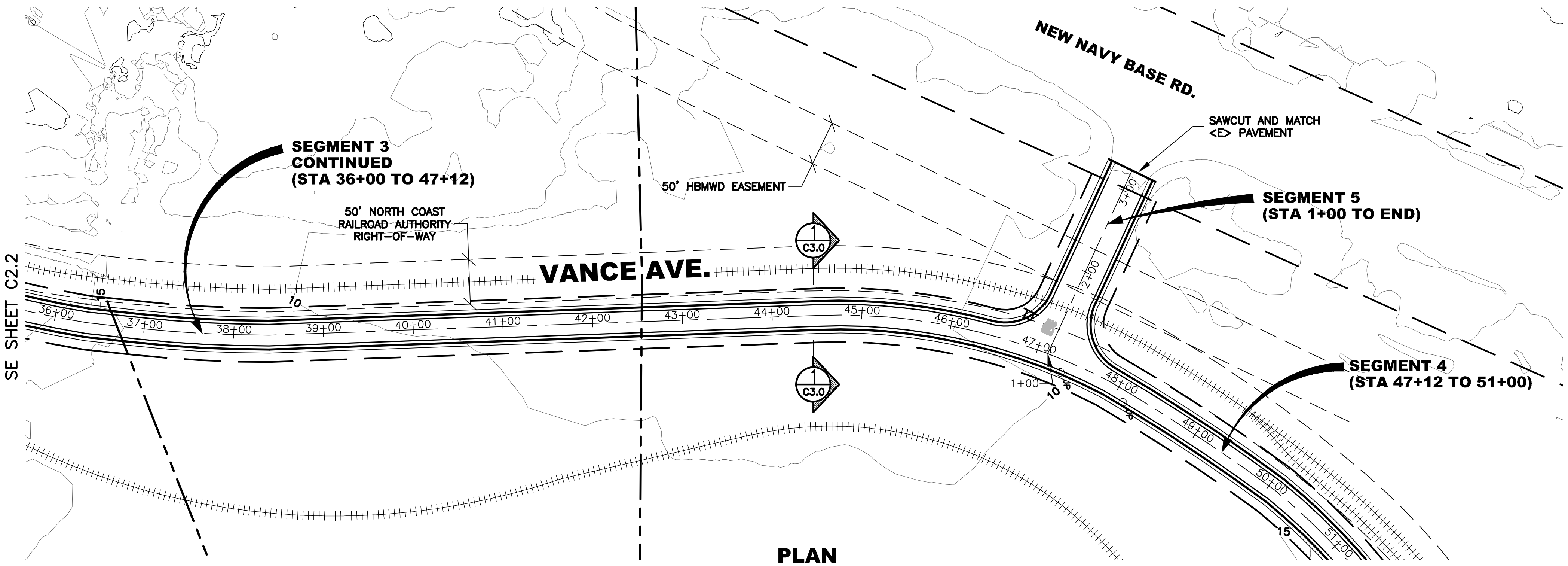
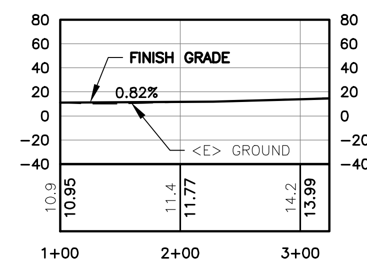


PLAN
SCALE: 1" = 80'

SEGMENT 5 PROFILE
STATION 1+00 TO END
SCALE: 1" = 80' HORIZ AND VERT



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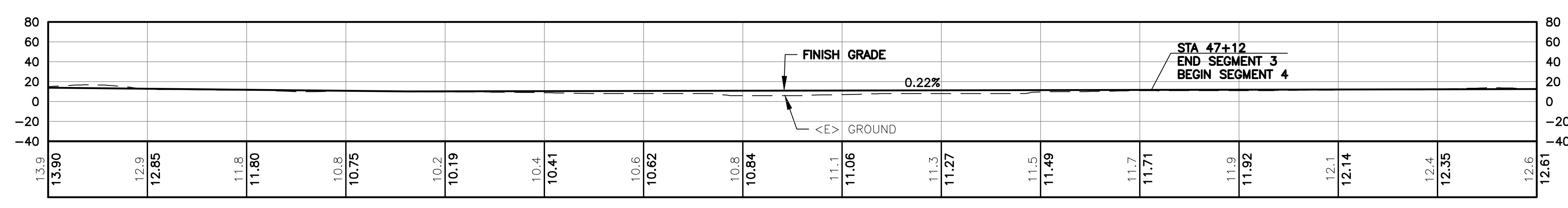
SEGMENTS 3 AND 4 PROFILE
STATION 36+00 TO 51+00
SCALE: 1" = 80' HORIZ AND VERT



1"
GRAPHIC SCALE MEASURES 1 INCH ON FULL-SIZE PLANS.

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SAMOA INDUSTRIAL WATERFRONT
PRELIMINARY TRANSPORTATION ACCESS PLAN
PLAN AND PROFILE

HUMBOLDT BAY HARBOR, RECREATION & CONSERVATION DISTRICT

DRAWN	JDB
CHECK	NBK
APPROVED	TSK
DATE	7/26/13
JOB NUMBER	7591.00
SHEET	C2.3

Jul 25,2013-12:49pm
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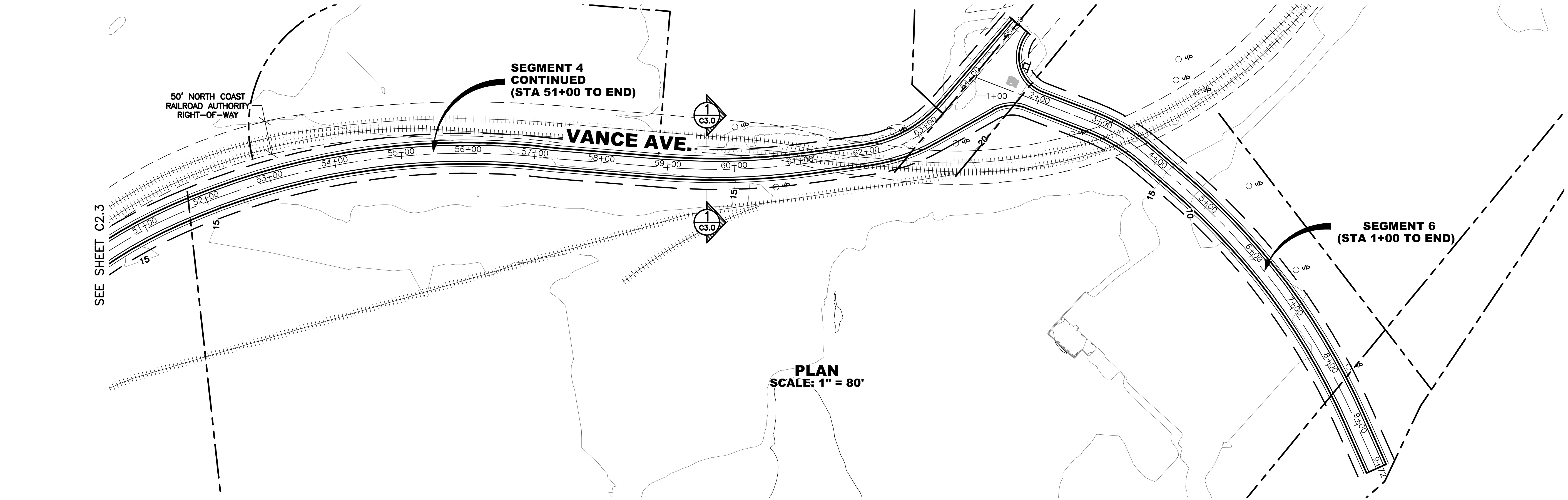
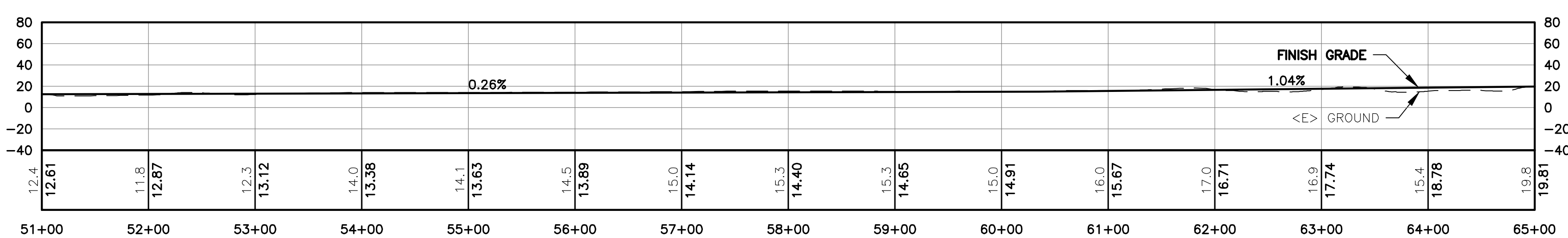
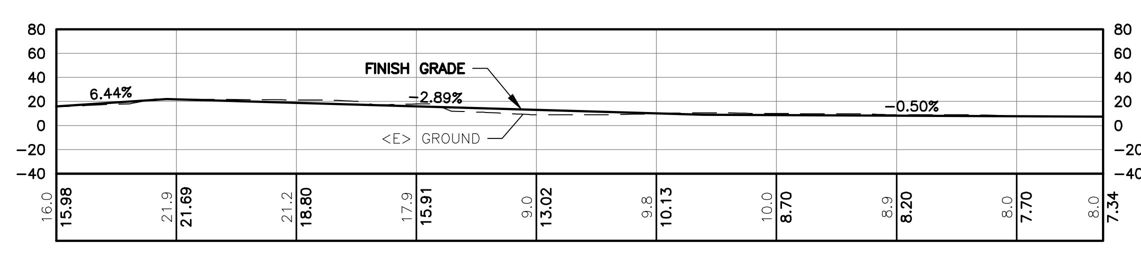


PLAN
SCALE: 1" = 80'

SEGMENT 4 PROFILE STATION 51+00 TO END
SCALE: 1" = 80' HORIZ AND VERT



SEGMENT 6 PROFILE STATION 1+00 TO END
SCALE: 1" = 80' HORIZ AND VERT



NOTES:

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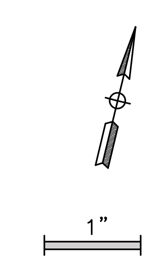
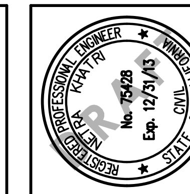


GRAPHIC SCALE MEASURES 1 INCH ON FULL-SIZE PLANS.

PRELIMINARY NOT FOR CONSTRUCTION



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NO.	HISTORY / REVISION	BY	CHK.	DATE

SAMOA INDUSTRIAL WATERFRONT
PRELIMINARY TRANSPORTATION ACCESS PLAN
PLAN AND PROFILE

HUMBOLDT BAY HARBOR, RECREATION & CONSERVATION DISTRICT

DRAWN	JDB
CHECK	NBK
APPROVED	TSK
DATE	7/26/13
JOB NUMBER	7591.00
SHEET	C2.4

Jul 25,2013-12:51pm
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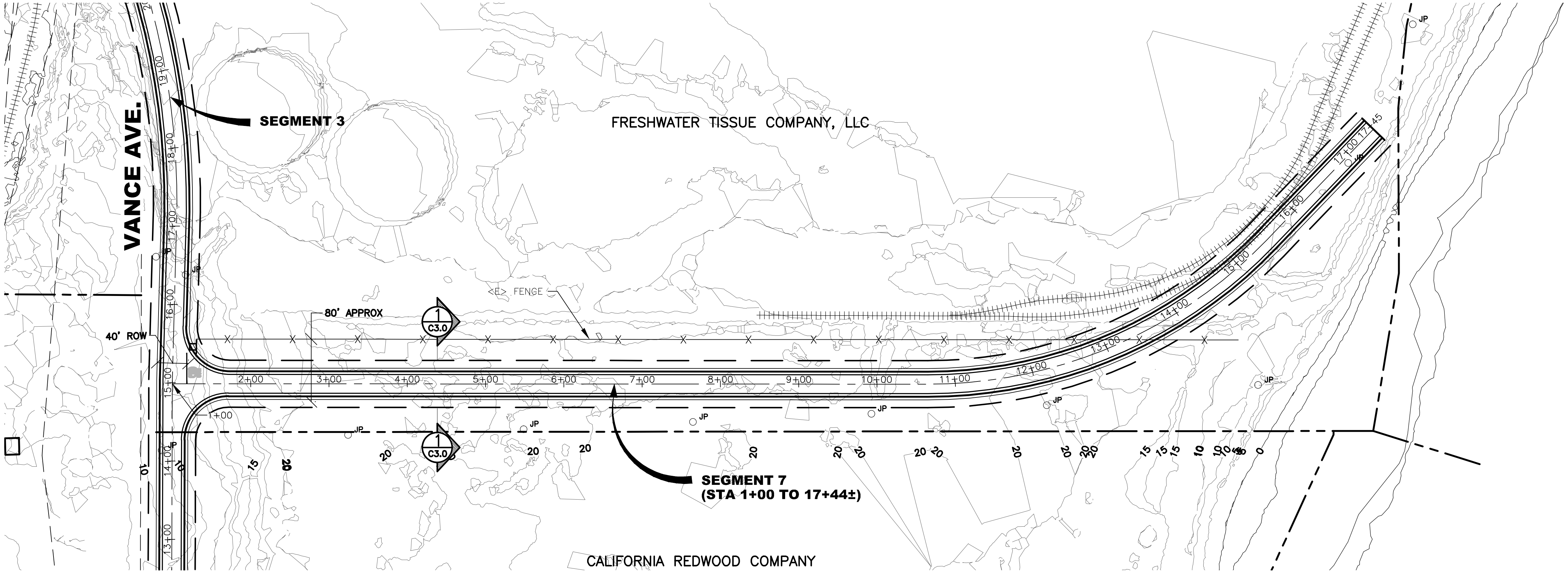
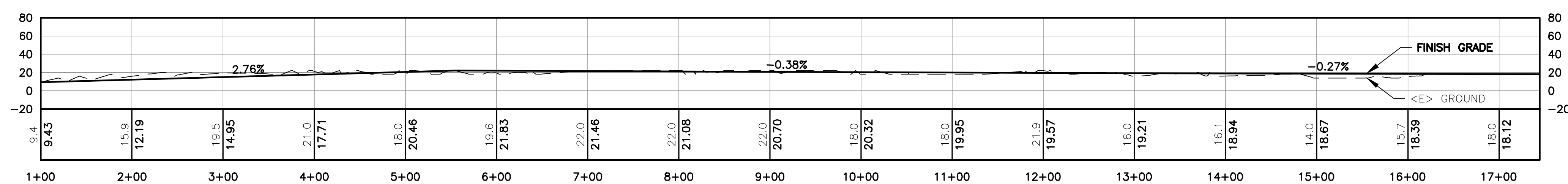


SEE SHEET C2.1

PLAN
SCALE: 1" = 80'

SEGMENT 7 PROFILE
STATION 1+00 TO END
SCALE: 1" = 80' HORIZ AND VERT



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1"
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PRELIMINARY NOT FOR CONSTRUCTION

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NO.	HISTORY / REVISION	BY	CHK.	DATE

SAMOA INDUSTRIAL WATERFRONT
PRELIMINARY TRANSPORTATION ACCESS PLAN
PLAN AND PROFILE

HUMBOLDT BAY HARBOR, RECREATION & CONSERVATION DISTRICT

DRAWN	JDB
CHECK	NBK
APPROVED	TSK
DATE	7/26/13
JOB NUMBER	7591.00
SHEET	C2.5

Jul 24,2013-3:27pm
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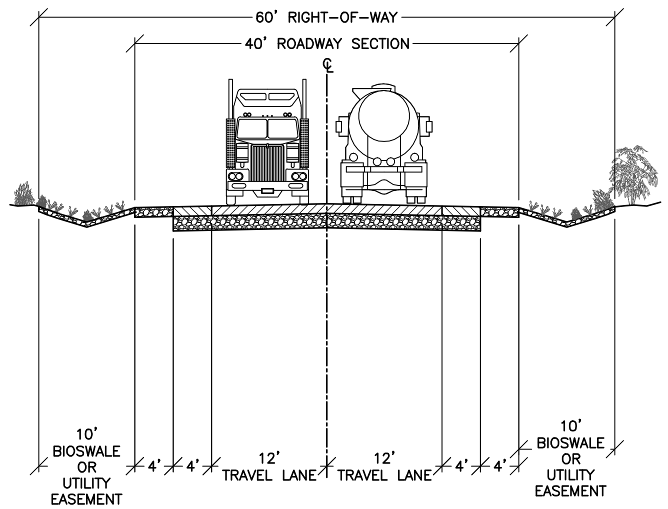

1 TYPICAL ROAD SECTION
C2.0–C2.5 N.T.S.

1"
GRAPHIC SCALE MEASURES 1 INCH ON FULL-SIZE PLANS.

PRELIMINARY NOT FOR CONSTRUCTION

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NO.	HISTORY / REVISION	BY	CHK.	DATE

SAMOA INDUSTRIAL WATERFRONT
PRELIMINARY TRANSPORTATION ACCESS PLAN
DETAILS

HUMBOLDT BAY HARBOR, RECREATION & CONSERVATION DISTRICT

DRAWN	JDB
CHECK	NBK
APPROVED	TSK
DATE	7/26/13
JOB NUMBER	7591.00
SHEET	C3.0

Jul 24,2013-3:27pm
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APPENDIX 10

CHP Accident Log Information for Preferred Alternative Route

DEPARTMENT OF CALIFORNIA HIGHWAY PATROL
Humboldt Area
255 E. Samoa Blvd.,
Arcata, CA 95521
707-822-5981
(800) 735-2929 (TT/TDD)
(800) 735-2922 (Voice)

July 9, 2013

File No.: 125.11809.13635

LACO ASSOCIATES
21 W. 4th Street/P.O. Box 1023
Eureka, CA 95502
Attn: Becky Dower

Dear Mrs. Dower:

Our office received your request for traffic collision data on New Navy Base Road between SR-255 and Lincoln Avenue, from 07/20/2010 to present date. The following is a summary of the number of traffic collisions, including injury and fatal traffic collisions: There have been a total of 5 documented traffic collisions; 5 property damage only, 0 injury collisions, and 0 fatalities.

If we can answer any questions you may have regarding this matter, you can contact Officer Chris Nelson at the Humboldt Area CHP office at (707) 822-5981.

Sincerely,

A. E. JAGER, Captain
Area Commander

Log Number	Date	Time	Officer	Status	Evidence #	Occured On	Cross Street
2012080012	08/04/12	1300	Steen C E (015610)	F		New Navy Base Road @	SR-255
2011070054	07/22/11	1300	Campbell M (016321)	F		New Navy Base Rd 5/oF	SR-255
2010040061	04/22/10	0815	Myers J D (016478)	F		New Navy Base Rd	Samoa Boat Ramp County Park
2010030048	03/23/10	1700	Steen C E (015610)	F	E20100068	New Navy Base Rd	Samoa Bridge
2010020026	02/07/10	0200	Dammann T P (011998)	F		New Navy Base Rd	Lincoln Ave
2009050018	05/07/09	1806	Barnes C (018172)	F		New Navy Base Rd	Cookhouse Rd
2007070065	07/21/07	1633	Stacy A W (016241)	F		New Navy Base Road	Samoa Pulp Lane
2006120052	12/16/06	1612	Nelson C M (014428)	F		New Navy Base Rd.	Sr-255
2006100091	10/25/06	2250	Kilcrease T W (012329)	F		New Navy Base Road	Samoa Pulp Lane
2006100047	10/17/06	1515	Fulkerson T P (012337)	F		New Navy Base Road	SR-255
2006100033	10/11/06	2000	Fulkerson T P (012337)	F		New Navy Base Road	SR-255
2006090056	09/20/06	1124	Josang D E (012320)	F		New Navy Base Road	Bay Street
2006060030	06/14/06	1910	Goodwin J M (015427)	F		New Navy Base Road	Lincoln Avenue
2006040075	04/30/06	1750	Cipriano M J (009916)	F		New Navy Base Rd	Cookhouse Rd
2006020063	02/21/06	1735	Kloss J R (011799)	F		New NAvy BAse Dr	SR 255
2006010068	01/22/06	2500	Cho A (013846)	F		New Navy Base Rd	Lincoln Ave
2003080059	08/22/03	0045	Jackson C P (015062)	F		New Navy Base Rd	Samoa Pulp Lane
2003040062	04/22/03	1930	Warner L S (013548)	F		New Navy Base Road	Cookhouse Road
2003030063	03/27/03	1040	Dammann T P (011998)	F		New Navy Base Road	Samoa Boat Ramp Parking Lot
2002100015	10/05/02	1630	Mari M L (009170)	F		New Navy Base Road	Bay Street
2002080053	08/10/02	1120	Josang D E (012320)	F		New Navy Base Road	Pulp Mill Lane
2002060040	06/19/02	0745	Smith K L (011653)	F		New Navy Base Road	Samoa Pulp Lane
2001090073	09/27/01	2200	Filler K R (011934)	F		New Navy Base Road	Lincoln Ave.
2001090013	09/05/01	0715	Dammann T P (011998)	F		New Navy Base Road	SR-255
2001070065	07/27/01	1005	Mari M L (009170)	F		New Navy Base Road	SR-255 Samoa Blvd.
2001010047	01/14/01	2220	Blood D A (012382)	F		New Navy Base Road	Jetty Road
2000120109	12/29/00	1855	Cornwell J N (011771)	F		New Navy Base Road	SR-255
2000100090	10/25/00	1550	Davis K D (008961)	F		New Navy Base Road	Cookhouse Road
2000100048	10/15/00	1850	Mills C J (009479)	F		New Navy Base Road	Lincoln Ave
2000090041	09/10/00	1530	Davis K D (008961)	F		New Navy Base Road	L. P. Drive
1999040050	04/20/99	1201	Dammann T P (011998)	F		New Navy Base Rd	Contractor Rd
1998120095	12/29/98	1955	Davis K D (008961)	F		New Navy Base Rd	Bay St

Log Number	Date	Time	Officer	Status	Evidence #	Occured On		Cross Street	
2013030064	03/22/13	2020	Barnes C (018172)	F	3 PDO's	SR-255	@	New Navy Base Road	
2013020035	02/13/13	1515	Skeen J (019076)	F		SR-255		New Navy Base Road	S/of 255
2012040003	04/02/12	1910	Craft P (018013)	F	E20120047	SR-255	@	New Navy Base Road	
2007100021	10/05/07	1320	Nelson C M (014428)	F		Sr-255		New Navy Base Rd	
2007070051	07/18/07	1909	Berry M J (013796)	F		SR-255		New Navy Base	
2005100019	10/08/05	1255	Cipriano M J (009916)	F		SR-255		New Navy Base Road	

APPENDIX 11

April 15, 2013 Kelly-O'Hern Road Ownership Memo and Map

Kelly—O'Hern Associates

PROFESSIONAL LAND SURVEYORS

3240 MOORE AVE. - EUREKA, CA 95501 PHONE & FAX 707-442-7283 EMAIL kellyohern@sbcglobal.net

SAMOA INDUSTRIAL WATERFRONT TRANSPORTATION ACCESS PLAN

PREFERRED ALTERNATIVE ROUTE SEGMENT EASEMENT INFORMATION

April 15, 2013

This information is provided for use by LACO Associates and Humboldt Bay Harbor, Recreation and Conservation District for the HBHRCD PREFERRED ALTERNATIVE ROUTE plan dated February 13, 2013. Segments are numbered to correspond to the plan, as follows:

1. NEW NAVY BASE ROAD – This is the existing County Road. Fee title was conveyed to the County of Humboldt. See Book 1160 O.R., Page 623 and Book 1373 O.R., Page 137. The right of way width varies from 150 feet to 240 feet.

2. BAY STREET – New Navy Base Road to Vance Avenue – This is the existing County Road.

   For the portion between New Navy Base Road and the west line of the NWP Railroad right of way, fee title was granted to the County of Humboldt. See Book 1012 O.R., Page 495 (Parcel 1). This is a 65 foot wide right of way.

   For the portion between the NWP RR right of way and Vance Avenue, an easement was granted to the County of Humboldt. See Book 1004 O.R., Page 105 (Parcel One). This is a 65 foot wide right of way.

   The railroad crossing is based on an agreement for a 60 foot wide easement between the County of Humboldt and the NWP RR, dated July 3, 1969.

3. VANCE AVENUE – Bay Street to LP Drive – This is the former County Road which was abandoned in 1971. See Book 1088 O.R., Page 454. This road crosses lands of Freshwater Tissue Company LLC, Pacific Gas and Electric Company, Samoa Properties, Inc. and Sequoia Investments X, LLC. An easement will be needed for the use of this road.

4. VANCE AVENUE –LP Drive to North Spur – This is the former County Road which was abandoned in 1971. See Book 1088 O.R., Page 454. This road crosses lands of Freshwater Tissue Company LLC and Samoa Properties, Inc. A portion of this road is included in a 50 foot wide easement for ingress granted to Humboldt Bay Harbor, Recreation and Conservation District. See Instrument No. 2004-32661-10. An easement will be needed for the use of the portion of the road outside of the easement area.

5. LP DRIVE – New Navy Base Road to Vance Avenue – This is an existing County road. The portion between New Navy Base Road and the west line of the NWP Railroad right of way, fee title was granted to the County of Humboldt. See Book 1160 O.R., Page 623 (Courses 37, 38 and 39). This is an 80 foot wide right of way. This road was accepted into the County Maintained Road System by the Board of Supervisors on April 23, 2002.

   The railroad crossing is based on an agreement for an 80 foot wide easement between the County of Humboldt and the NWP RR, dated July 3, 1969.

6. NORTH SPUR – Off Vance Avenue – This will be new construction over lands of Samoa Properties, Inc. An easement will be needed for this construction.

7. SOUTH SPUR – Off Vance Avenue – This route is partially over an existing road and partially over an area that will be new construction. This route is over lands of Freshwater Tissue Company, LLC. An easement will be needed for this construction and for the use of the existing road.

Date: 4/18/2013Time: 1:03:28 PM
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APPENDIX 12

July 26, 2013 *Geotechnical Memorandum*, prepared by LACO Associates

LACO

GEOTECHNICAL MEMORANDUM

Samoa Industrial Waterfront Preliminary Transportation Access Plan
Preferred Alternative Route Road Segments

Date:	July 26, 2013
Project No.:	7591.00
Prepared For:	Humboldt Bay Harbor, Recreation and Conservation District
Prepared By:	Bryan Dussell, CEG No. 2555
Reviewed By:	Richard Yahn, RGE No. 913
To:	Jack Crider, HBHRCD Director
Attachment 1:	ASFE Brochure

Richard E Yahn

INTRODUCTION

This Geotechnical Memorandum presents the results of the LACO Associates (LACO) geotechnical-related reconnaissance of the *Preferred Alternative Route Road Segments* for the Samoa Industrial Waterfront Preliminary Transportation Access Plan. The *Preferred Alternative Route Road Segments* reviewed for this memorandum consist of seven road segments depicted on Figure 10 of LACO 2013a. For the purpose of this memorandum, the seven segments are considered the "Project Area". This memorandum is intended to be used in conjunction with the *Samoa Industrial Waterfront Preliminary Transportation Access Plan* (Plan) prepared by LACO (LACO, 2013a). The Plan contains background information for the project.

The purpose of our geotechnical-related reconnaissance was to qualitatively identify potential geologic/geotechnical engineering constraints associated with development of the proposed road segments. With the exception of Segment 7 and portions of Segment 6, all of the proposed segments are located on existing roads. Segment 7 and the eastern end of Segment 6 will require new road construction.

Our Scope of Services associated with development of the proposed road segments included:

- Site reconnaissance to observe general Project Area conditions.
- Preparation and delivery of this Geotechnical Memorandum documenting potential geologic/geotechnical engineering constraints, and recommending further geotechnical exploration to support design and construction of the routes.

These services were performed in substantial accordance with the LACO Agreement for Professional Services dated June 15, 2012, and amended March 14, 2013.

FIELD RECONNAISSANCE AND DATA REVIEW

LACO's engineering geologist performed Project Area reconnaissance on May 9, 2013, to observe surface conditions and to identify potential geologic/geotechnical engineering constraints. A subsurface exploration was not performed for the current Scope of Services. However, we reviewed subsurface data from prior explorations by LACO and others in the Project Area vicinity (LACO, 2012a; LACO, 2012b; LACO, 2013b; SHN, 2005; SHN, 2009a; SHN, 2009b; SHN, 2009c; SHN, 2009d).

GEOLOGIC AND GEOMORPHIC SETTING

The Project Area is situated on a low gradient surface between the Pacific Ocean and the northwestern margin of Humboldt Bay. Multiple active faults, capable of producing strong seismic shaking, are located within the Project Area vicinity.

Based on our Project Area reconnaissance and a review of the published geologic maps (CDMG, 1980; McLaughlin et al, 2000), the Project Area is underlain by geologically young, unconsolidated Quaternary marine shoreline and eolian (dune) deposits. These soils are predicted to be susceptible to liquefaction (LACO, 2013; CDMG, 1995).

As recorded on the project base maps, elevations along the proposed segments are generally less than 10 feet Mean Sea Level (MSL). Federal Emergency Management Agency (FEMA) mapping indicates the Project Area is within an area of "minimal flooding" (FEMA, 1986). However, published tsunami inundation mapping by the State indicates that the entire Project Area is within a predicted tsunami inundation area (CGS, 2009).

OBSERVATIONS

Soils

Based on observations made during our Project Area reconnaissance and review of soil profile logs from prior subsurface explorations in the Project Area vicinity, shallow soils within the Project Area are anticipated to consist primarily of loose silty sands (SM on the Unified Soil Classification System) and loose, poorly-graded, fine sands (SP). Topsoils and organic rich soils are anticipated to be relatively thin (less than approximately 12 inches thick) or nonexistent.

Grading activities associated with historic land uses have resulted in modification of the ground surface throughout the Project Area. Dune fields have been leveled and slopes adjacent to Humboldt Bay have been reclaimed (filled). Ground disturbance throughout the Project Area is considered ubiquitous. Fill soils consisting of woody debris, building rubble, and mixed soils have been documented within the low-lying bay margin areas near the eastern end of Segment 6 (LACO, 2012b). Similar fill soils may be present near the eastern end of Segment 7. Additionally, soils exposed on the ground surface in the vicinity of Segment 7 contain abundant shell fragments and coarse sand resembling dredge spoils. LACO considers the fill soils within the Project Area as "undocumented" because the origin, composition, thickness, and compaction are unknown. As such, these fill soils (where present) are considered to have an unknown, but possible high settlement potential.

Groundwater

Emergent groundwater was not observed during our reconnaissance of the Project Area. To evaluate possible shallow groundwater conditions within the Project Area, we reviewed groundwater data from prior unpublished reports in the Project Area vicinity as well as published reports from the State Water Resource Control Board's Geotracker Database (http://geotracker.waterboards.ca.gov) for the former Evergreen Pulp Mill (Site SL0602377769). The reviewed groundwater data indicates that groundwater is generally located within 5 feet of the ground surface in low-lying portions of the Project Area.

Slope Instability/Landsliding

According to the Humboldt County Community Development Service (HCCDS), the Project Area is in an area of "Low Instability" (HCCDS, 2004). During our reconnaissance of the Project Area, we did not observe evidence of slope instability or landslides.

Liquefaction

As presented on Map S-1 of Special Publication 115 (CDMG, 1995), the Site is mapped as having a high liquefaction potential. Additionally, historic records of liquefaction and associated dynamic settlement and lateral spread have been recorded on the Samoa Peninsula near the Site (CDMG, 1980). Furthermore, our review of the results from previous quantitative liquefaction analyses by LACO (LACO, 2013) and SHN Consulting Engineers & Geologists, Inc (SHN, 2009) indicate that loose, granular soils generally underlie the Samoa Peninsula, and that these granular deposits are liquefiable.

Based on the high groundwater levels and seismically-active setting of the Site, along with the results from previous quantitative liquefaction analysis in the vicinity of the Site, we conclude that the liquefaction potential, along with the potential for dynamic settlement and lateral spread, of the Site is high.

GEOLOGIC/GEOTECHNICAL CONSTRAINTS

Based on observations made during our reconnaissance of the Project Area and a review of data from prior subsurface explorations in the Project Area vicinity, we have identified the following geologic/geotechnical engineering constraints that should be considered in design and construction of the proposed road segments:

- Undocumented fill soils, which will require excavation and re-compaction and/or replacement with imported structural fill. The undocumented fill soils are anticipated to be ubiquitous within the Project Area with the thickest and poorest quality fill anticipated beneath the eastern end of Segment 6 and along the entire length of Segment 7.
- Groundwater within 5 feet of the Project Area ground surface in low lying areas.
- Soft, saturated, fine-grain native subgrade soils with anticipated high compressibility (large settlement potential), low bearing capacity, and high liquefaction potential beneath the eastern end of Segments 6 and 7.
- Buried utilities throughout the Project Area.
- Remnants of old foundations in the vicinity of Segment 6 associated with prior development.

Providing an evaluation for the presence or absence of potentially contaminated soil and groundwater throughout the Project Area is not included in our Scope of Services for this project. However, previous environmental site assessments and subsurface exploration completed by LACO in the Project Area vicinity have identified environmental conditions which, if present within the Project Area, will require assessment and possible special handling and disposal, depending on the extent and type of soil and groundwater disturbance during planned road improvements.

In addition to the constraints listed above, elevated groundwater elevations, flooding, and coastal erosion due to rising sea level are potential future constraints which may affect the Project Area. The rate and effects of sea level rise on the Samoa Peninsula are debatable. Models by the Pacific Institute estimate approximately 4.5 feet of sea level rise by the year 2100 with resultant coastal erosion on the Pacific side of the peninsula extending to the western edge of and crossing Segment 1 in localized areas (Pacific Institute, 2009). Mapping by Laird and others (2013) indicates that sea level rise will result in overtopping of the shoreline along the bay which may affect the eastern ends of Segments 6 and 7.

RECOMMENDED FURTHER GEOTECHNICAL/ENVIRONMENTAL-RELATED WORK

- Subsurface exploration should be conducted along each road segment which will be improved to further characterize undocumented fill, native subgrade soils, and groundwater conditions, and to collect soil samples for laboratory testing such as Resistance (R-) value for pavement design recommendations, and compressibility for earthwork recommendations.
- Geophysical survey of the eastern end of Segment 6 and Segment 7 to help determine the probable location and depths of undocumented buried utilities, old foundations, and other debris (concrete/wood).
- Assessment and/or characterization of soil and groundwater within the Project Area and/or proposed road segments which will be improved as required by lenders and/or governing agencies. Potentially hazardous materials which are identified may require special handling and disposal during project construction.

LIMITATIONS

This memorandum has been prepared for the exclusive use of Humboldt Bay Harbor and Recreation District, their contractors and consultants, and appropriate public authorities for specific application to development of the Project Area. LACO has exercised a standard of care equal to that generated for this industry to ensure that the information contained in this memorandum is current and accurate. A brochure prepared by Association of Firms Practicing in the Geosciences (ASFE) has been included as Attachment 1 of this memorandum. We recommend that all individuals reading this memorandum also read this brochure.

Data generated for this memorandum represent information gathered at that time and at the indicated locations. Subsurface conditions may change with time and under anthropologic influences. As such, the recommendations included in this memorandum are based, in part, on assumptions about subsurface conditions that may only be observed and/or tested during subsequent project earthwork. Accordingly, the validity of these recommendations is contingent upon review of the subsurface conditions exposed during construction in order to check that they are consistent with those characterized in this memorandum. Upon request, LACO can discuss the extent of (and fee for) observations and tests required to check the validity of the recommendations presented herein.

LACO disclaims any and all liability for any errors, omissions, or inaccuracies in the information and data presented in this memorandum and/or any consequences arising therefrom, whether attributable to inadvertence or otherwise. LACO makes no representations or warranties of any kind including, but not limited to, any implied warranties with respect to the accuracy or interpretations of the data furnished. This memorandum is valid solely for the purpose, site, and project described in this document. Any alteration, unauthorized distribution, or deviation from this description will invalidate this Report. LACO assumes no responsibility for any third-party reliance on the data presented. Additionally, the data presented should not be utilized by any third-party to represent data for any other time or location.

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ATTACHMENT 1

ASFE Brochure

Important Information about Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

ASFE
THE BEST PEOPLE ON EARTH

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APPENDIX 13

July 23, 2013 *Technical Memorandum: Preliminary Biological Evaluation*, prepared by LACO Associates

TECHNICAL MEMORANDUM

Preliminary Biological Evaluation
Samoa Industrial Waterfront Preliminary Transportation Access Plan

Date:	July 23, 2013	
Project No.:	7591.00	
Prepared For:	Humboldt Bay Harbor, Recreation & Conservation District (HBHRCD)	
Prepared By:	Gary Lester, Sr. Environmental Scientist	Gary S. Lester
Reviewed By:	Ryan Wells, AICP, Associate Planner	
Attachments:	Appendix 1: Biological Evaluation Field Survey Route Map	
	Appendix 2: List of Plant Species Encountered	

INTRODUCTION

The Humboldt Bay Harbor, Recreation & Conservation District (HBHRCD) has requested professional services from LACO Associates (LACO) to conduct field surveys, stakeholder outreach, preliminary engineering, and report development for the Samoa Industrial Waterfront Preliminary Transportation Access Plan (Plan). The Plan is a planning-level effort to identify a Preferred Alternative Route for an enhanced commercial and industrial transportation route that will provide connectivity between waterfront properties and infrastructure on the Samoa Peninsula in Humboldt County, California, and major inland transportation networks including the roads with National Highway System designation. The goal of the Plan is to prepare a "road map" for future public funding solicitations to support the development of a road (and potentially rail) system that better accommodates shipping to and from the Samoa Peninsula/Humboldt Bay waterfront.

LACO's Senior Environmental Scientist, Gary Lester, conducted a biological survey on May 9, 2013, in order to characterize existing biological conditions; identify potential impacts to sensitive habitats resulting from implementation of the Plan; and locate rare, threatened, or endangered plant and wildlife species along the Preferred Alternative Route alignment. The survey was limited to 2.2 miles of the 4.7-mile Preferred Alternative Route, with the shoulders of New Navy Base Road excluded from the survey. Future work on New Navy Base Road associated with the Plan is not expected to impact biological areas outside the existing paved roadway. The entire remainder of the Preferred Alternative Route was surveyed for biological resources.

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The biological evaluation was conducted in conformance with the scope of services described in the agreement dated June 15, 2012, between HBHRCD and LACO, and the amendment dated March 14, 2013.

EXISTING DATA REVIEW

LACO reviewed U.S. Fish & Wildlife Service (USFWS) National Wetlands Inventory (USFWS, 2013a) mapping and the recent Samoa Master Plan wetlands determination (California Coastal Commission, 2011) for known wetland distribution in the project area. LACO also reviewed biological information currently on file with the HBHRCD. Topographic maps, aerial photography, California Department of Fish and Wildlife's California Natural Diversity Data Base (CNDDB) (http://www.dfg.ca.gov/biogeodata/cnddb/ [DFW, 2013a]), and the Eureka U.S. Geological Survey Quad species list from the Arcata Field Office of the USFWS (2013b) were reviewed prior to the field survey for the potential presence of sensitive species. Species ranked 1B, 2, 3, and 4 (herein referred to as sensitive species) in the California Native Plant Society's (CNPS, 2013) Inventory of Rare and Endangered Plants of California (http://www.rareplants.cnps.org/) were reviewed to determine potential presence in the vicinity of the project area. The CNPS inventory includes species currently listed as rare or endangered by the federal and state governments.

FIELD SURVEY

LACO's Senior Environmental Scientist, Gary Lester, conducted a pedestrian field survey of the Preferred Alternative Route on May 9, 2013, following protocol recommended by the California DFW (California Department of Fish and Game, 2009). The survey was high in coverage (95 to 100%), and was limited to 2.2 miles of the 4.7-mile Preferred Alternative Route. The survey area consisted of the paved roadway along the Preferred Alternative Route and approximately 15 feet of each road shoulder. Future work on New Navy Base Road associated with the Plan is not expected to impact biological areas outside the existing paved roadway, therefore the road shoulders along New Navy Base Road were not included in the pedestrian survey. In areas where new roadways are proposed as part of the Preferred Alternative Route (i.e. North and South Spur, see Appendix 1, Biological Evaluation Field Survey Route Map), the proposed footprint was surveyed, along with an approximate 20-foot buffer on each side of the proposed footprint.

Environmentally-sensitive habitat areas (ESHA), including coastal dune habitats and coastal wetlands, in the proposed footprint and a 20-foot buffer of the Preferred Alternative Route, were surveyed to determine potential impacts that may result from implementation of the Plan. Plants were identified to the taxonomic level (genus or species) necessary for rare plant identification. The scientific nomenclature followed the Jepson Manual (Baldwin, et. al., 2012).

ENVIRONMENTAL SETTING

The Samoa Industrial Waterfront Preliminary Transportation Access Plan project area covers approximately 580 acres on the Samoa Peninsula, west of the City of Eureka, in Humboldt County, California (see Appendix 1, Biological Evaluation Field Survey Route Map). Located partially in the unincorporated town site of Samoa, which consists of approximately 40 acres, the project area lies immediately west of Humboldt Bay and east of the Pacific Ocean. The elevations in the project area range between 6 and 10 feet above mean sea level. The project area features gently sloping ground (<5%), with remnant industrial features, including scattered buildings (some in various degrees of disrepair), graveled parking areas, asphalt log decks, paved roadways, widespread drainage infrastructure, fencing, and shoreline riprap.

Natural habitats include herbaceous ruderal (non-native annual and perennial forbs), seasonal freshwater marshes, dune hollows, beach grass dunes, and native dune mat (Duebendorfer, 1992). Soils appear to be primarily dune sands, bay dredge spoils, and imported fill. Most of the properties in the project area have been heavily used for industrial purposes, primarily timber products processing, for many decades.

SURVEY RESULTS

The dominant vegetation adjacent to Segments 2 through 6 of the Preferred Alternative Route is ruderal (weedy) herbaceous cover comprised of primarily non-native, annual and perennial flowering plants. The dense non-native shrub and herbaceous cover consists primarily of Himalaya blackberry (*Rubus armeniacus*) and wild radish (*Raphanus sativa*), with widely scattered non-native ground cover of velvet grass (*Holcus lanatus*), annual dogtail (*Cynosurus echinatus*), sweet vernal grass (*Anthoxanthum oderatum*), curly dock (*Rumex crispus*), quaking grass (*Briza maxima*), bird's-foot trefoil (*Lotus corniculatus*), and scores of other non-native species. Ground coverage ranges from 5% to 100%. A list of all plant species encountered during the field survey is attached as Appendix 2.

Scattered willow hollow habitats were found adjacent to the roadways located in the western third of Segment 2; at the south end and north end of Segment 3; and at the north end of Segment 4. The observed willow hollow habitat was dominated by mature Hooker's willow (*Salix hookeriana*), California myrtle (*Morella californica*), beach pine (*Pinus contorta*), and red alder (*Alnus rubra*), with associated native shrub and herbaceous cover of twinberry (*Lonicera involucrata*), California blackberry (*Rubus ursinus*), sword fern (*Polystichum munitum*), slough sedge (*Carex obnupta*), and California aster (*Symphyortrichum chilensis*). Canopy coverage ranges from 80% to 100%.

Seasonal freshwater wetland vegetation occurs scattered within the survey area, primarily in manmade roadway and log deck drainage features in scattered locations in Segment 6. Seasonal wetland vegetation is comprised of tall nut-sedge (*Cyperis eragrostis*), creeping bent-grass (*Agrostis stolonifera*), penny royal (*Mentha pulegium*), silverweed (*Potentilla anserina*), and a variety of other native and non-native herbs and grasses.

Beach grass habitats are scattered throughout the numerous road segments, including in small sections of Segment 2 and in major sections of Segment 7. The beach grass habitat is dominated by European beach grass (*Ammophila arenaria*), salt rush (*Juncus lesueurii*), annual vetch (*Vicia hirsuta*) and coyote brush (*Baccharis pilularis*).

Native dune mat vegetation occurs within and adjacent to the survey area, primarily in small scattered patches, especially in the western third of Segment 7, with smaller remnant mats found along Segments 2, 4 and 5. Dune mat vegetation is comprised of beach buckwheat (*Eriogonum latifolium*), beach strawberry (Fragaria chiloensis), dwarf lupine (*Lupinus bicolor*), and dark-eyed gilia (*Gilia millefoliata*).

Although not subject to the pedestrian field survey, past experience and records searches reveal that Segment 1 (New Navy Base Road) includes portions all of the above habitats plus coniferous forest and lupine scrub habitats. Also, known populations of sensitive plant species, such as Menzies' wallflower (*Erysimum menziesii*) and beach layia (*Layia carnosa*), have been documented along Segment 1. Table 1 provides a list of sensitive plants species encountered, known to occur or not expected along each raod segment:

Table 1 – Sensitive Plant Species for Each Road Segment

Segment	Findings	Recommendation
1	Menzies' wallflower, beach layia, dark-eyed gilia	Survey if necessary, no expected changes for County Road segment.
2	None observed	Near known populations of Menzies' wallflower and dark-eyed gilia, survey prior to construction.
3	None observed	Near known dark-eyed gilia population, survey prior to construction.
4	None observed	Little suitable habitat observed, survey prior to construction.
5	None observed	Near known populations of Menzies' wallflower, survey prior to construction.
6	None observed	Little suitable habitat observed, survey prior to construction.
7	Dark-eyed gilia	Survey prior to construction.

RECOMMENDATIONS

The dark-eyed gilia is recognized as a rare, threatened, or endangered species in California and elsewhere (DFW, 2013b), and will require seasonal appropriate surveys (see below for timing) prior to any proposed habitat disturbance in Segment 7. Additional sensitive plant species, such as Menzies' wallflower and beach layia, are known from nearby dune mat habitats. Since bloom time is typically earlier for those species, especially the wallflower, a seasonally-appropriate survey is recommended prior to ground-disturbing activities. Dune mat habitats, willow hollow habitats, and seasonal freshwater wetland habitats encountered in the field survey would likely be considered Environmentally Sensitive Habitat Areas (ESHA) by the County of Humboldt and the California Coastal Commission (CCC), the latter of which has primary or appeal jurisdiction over the project area, imposing requirements for adequate setbacks or mitigations for project-related impacts.

Because this field survey was only a preliminary evaluation to assess the general significance of existing biological resources along the Preferred Alternative Route, the data herein are appropriate for preliminary planning purposes only, and will likely not be sufficient for CEQA review or permitting related to future roadway construction. It is recommended that seasonally-appropriate biological surveys be conducted for each road segment as part of segment-specific project design, environmental compliance, and permitting processes. Surveys for Menzies' wallflower and beach layia should occur between mid-March to mid-April, and surveys for dark-eyed gilia should occur in early May.

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APPENDIX 1

Biological Evaluation Field Survey Route Map

Segment No.	Length (L.F.)	Roadway
1	13,154	New Navy Base Road - Bay Street to HWY 255
2	2,213	Bay Street - New Navy Base Road to Vance Ave
3	4,758	Vance Ave - Bay Street to Samoa Pulp Lane
4	1,592	Vance Ave - Samoa Pulp Lane to north spur
5	288	Samoa Pulp Lane - New Navy Base Road to Vance Ave
6	1,016	North Spur off Vance Avenue
7	1,683	South Spur off Vance Avenue

APPENDIX 2

List of Plant Species Encountered

Appendix 2 – List of Plant Species Encountered			
Species	**Common Name**	**Fed/State List**	**Native / Non-Native**
Alnus rubra	Red Alder	none	Native
Aira caryophyllea	Silver Hair Grass	none	Non-Native
Ammophila arenaria	European Beach Grass	none	Non-Native
Anthoxanthum odoratum	Sweet Vernal Grass	none	Non-Native
Atriplex patula	Spear Orach	none	Native
Avena barbata	Slender Oat Grass	none	Non-Native
Baccharus glutinosa	Marsh Baccharis	none	Non-Native
Baccharus pilularis	Coyote Brush	none	Non-Native
Briza major	Large Quaking Grass	none	Non-Native
Bromus diandrus	Ripgut Grass	none	Non-Native
Brassica rapa	Common Mustard	none	Non-Native
Calystegia soldenella	Beach Morning Glory	none	Non-Native
Carpobrotus chilensis	Sea Fig	none	Non-Native
Catkile maritima	Sea Rocket	none	Non-Native
Centaurium erythraea	European Centaury	none	Non-Native
Cerastium glomeratum	Common Chickweed	none	Non-Native
Cirsium vulgare	Bull Thistle	none	Non-Native
Cynosurus enchinatus	Annual Dogtail	none	Non-Native
Cyperus eragrostis	Tall flat Sedge	none	Native
Cytisus scoparius	Scotch Broom	none	Non-Native
Daucus carota	Queen Anne's Lace	none	Non-Native
Dactylis glomerata	Orchard Grass	none	Non-Native
Elymus mollis	American Beach Grass	none	Native
Erigeron canadensis	Horseweed	none	Native
Eriogonum latifolium	Beach Buckwheat	none	Native
Foeniculum vulgare	Fennel	none	Non-Native
Festuca arundinacea	Tall Reed Fescue	none	Non-Native
Festuca perenne	Perennial Ryegrass	none	Non-Native
Festuca rubra	Red Fescue	none	Native
Fragaria chiloensis	Beach Strawberry	none	Native
Gilia millefoliata	Dark-eyed Gilia	none	Native
Geranium molle	Wild Geranium	none	Non-Native
Gnaphilum sp.	Cudweed	none	Non-Native
Holcus lanatus	Velvet Grass	none	Non-Native
Hordeum brachyantherum	Meadow Barley	none	Native
Hypochaeris glabra	Annual Cat's Ear	none	Non-Native
Hypochaeris radicata	Perennial Cat's Ear	none	Non-Native
Juncus effusus	Soft Rush	none	Native
Juncus lesueurii	Salt Rush	none	Native
Linum bienne	Pale Flax	none	Non-Native
Lonicera involucrata	Twinberry	none	Native
Lotus corniculatus	Bird's Foot Tre-foil	none	Non-Native

Leucanthemum vulgare	Ox-eye Daisy	none	Non-Native
Lupinus arboreus	Yellow Beach Lupine	none	Non-Native
Lupinus bicolor	Annual Lupine	none	Native
Lupinus rivularis	Riverside Lupine	none	Native
Madia sativa	Coast Tarweed	none	Native
Medicago arabica	Spotted Burclover	none	Non-Native
Melilotus alba	White Sweet Clover	none	Non-Native
Melilotus officinalis	Yellow Sweet Clover	none	Non-Native
Mentha pulegium	Penny Royal	none	Non-Native
Morella californica	Wax-myrtle	none	Native
Parentucellia viscosa	Yellow Parentucellia	none	Non-Native
Pinus contorta	Shore Pine	none	Native
Plantago lanceolata	English Plantain	none	Non-Native
Plantago major	Common Plantain	none	Non-Native
Poa annua	Annual Bluegrass	none	Non-Native
Polypogon monspelianus	Rabbit's Foot Grass	none	Non-Native
Polystichum munitum	Sword Fern	none	Native
Potentilla anserina	Silverweed	none	Native
Prunella vulgaris	Self-heal	none	Non-Native
Raphanus sativa	Wild Radish	none	Non-Native
Rubus armeniacus	Himalaya Blackberry	none	Non-Native
Rubus ursinus	California Blackberry	none	Native
Rumex acetocella	Sheep Sorrel	none	Non-Native
Rumex crispus	Curly Dock	none	Non-Native
Salix hookeriana	Hooker's Willow	none	Native
Sonchus oleraceus	Sow Thistle	none	Non-Native
Symphyortrichum chilensis	California Aster	none	Native
Taraxacum officinale	Common Dandelion	none	Non-Native
Tanacetum camphoratum	Beach Tansy	none	Native
Vicia hirsuta	Annual Vetch	none	Non-Native
Vulpia bromoides	Smooth Brome	none	Native

APPENDIX 14

July 24, 2013 *Technical Memorandum: Preliminary Hydraulic Analysis*, prepared by LACO Associates

TECHNICAL MEMORANDUM

Preliminary Hydraulic Analysis for
Samoa Industrial Waterfront Preliminary Transportation Access Plan

Date:	July 24, 2013
Project No.:	7591.00
Prepared For:	Humboldt Bay Harbor, Recreation and Conservation District
Prepared By:	Netra B. Khatri, PE
Reviewed By:	T. Scott Kelly, PE

REGISTERED PROFESSIONAL ENGINEER
NETRA KHATRI
75428
EXP 12/31/13
CIVIL
STATE OF CALIFORNIA

Attachments:	Figure 1:	Project Location Map
	Figure 2:	Proposed Project Preferred Alternative Route Map
	Figure 3:	Bioswale Detail
	Appendix A:	Runoff Coefficients for Various Selected Lands/Surfaces
	Appendix B:	Intensity-Duration-Frequency Curves for Eureka

INTRODUCTION

The Humboldt Bay Harbor, Recreation & Conservation District (HBHRCD) and LACO Associates (LACO) have identified a Preferred Alternative Route to provide road access to coastal-dependent industrial properties on the Samoa Peninsula, Humboldt County, California. The project location is depicted on Figure 1 and the preferred route map is shown on Figure 2. The Samoa Industrial Waterfront Preliminary Transportation Access Plan provides a plan to acquire and develop these segments shown on Figure 2.

Presented herein is the preliminary hydraulic analysis for the proposed Preferred Alternative Route. The purpose of this analysis is to estimate the quantity and potential impacts of stormwater runoff before and after the proposed road improvements. This analysis estimates the amount of stormwater runoff from the project roadways before and after improvements, and estimates the detention volume required for the project to meet Humboldt County standards.

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PROJECT DRAINAGE

Most of the stormwater runoff from the project area flows to existing storm drains which discharge to Humboldt Bay. The size, location, and condition of existing drainage inlets, culverts, and outlets in the project area have not all been evaluated. Some existing drainage facilities are not fully functional, and may need to be removed, repaired, or replaced. A relatively small amount of stormwater runoff from the project area sheet flows over existing asphalt or concrete surfacing, through vegetation along the bay, to Humboldt Bay. As most of the proposed alternatives follow existing paved surfacing, it is anticipated that the proposed route will not significantly modify the existing drainage patterns, and will not result in significant changes in runoff flow rates.

DESIGN REQUIREMENTS AND DRAINAGE VOLUME CALCULATIONS

The Humboldt County Department of Public Works, Land Use Division (County) has developed standards which require that stormwater be retained within a new development such that peak runoff from the post-development 100-year frequency storm does not exceed peak runoff from the pre-development 2-year frequency storm. This standard has not yet been fully adopted for the entire County; however, it is widely used for new improvement projects within the County. We anticipate that this standard will be acceptable to the County for the proposed project.

The Preferred Alternative Route follows portions of existing roads or impermeable surfaces and open or permeable surfaces. The existing paved width of the Preferred Alternative Route segments varies from 0 to 30 feet. The roads will likely need to be constructed or improved to a 32-foot average width for future use. Summaries of the existing and proposed pavement lengths and widths of each segment are shown in Table 1.

Table 1 - Summary of pre-development and post-development paved surface widths for each segment of the Preferred Alternative Route

Roadway Segment	Length (ft)	Average Pre-Development Paved Width	Average Post-Development Paved Width
Bay Street - New Navy Base Road to Vance Ave	2,103	30.3	32
Vance Ave - Bay Street to Samoa Pulp Lane	4,612	20.6	32
Vance Ave - Samoa Pulp Lane to north spur	1,788	23	32
Samoa Pulp Lane - New Navy Base to Vance Ave	224	23.5	32
North Spur off Vance Avenue	872	24	32
South Spur off Vance Avenue	1,645	0	32
Full Project	**11,244**	**20.2***	**32**

* Average width of the road for the entire length of the Preferred Alternative Route (minus New Navy Base Road)

PROJECT RUNOFF AND DETENTION CALCULATION (RATIONAL METHOD)

LACO calculated peak runoff from the Preferred Alternative Route using the Rational Method, widely used for estimating the design storm peak runoff from areas less than 200 acres, which can be written as:

$$Q = C * i * A$$

Q: Peak rate of runoff in cubic feet per second
C: Coefficient of runoff
i: Average intensity of rainfall (inches per hour)
A: Drainage area (acres)

Runoff coefficients for various selected lands/surfaces are presented in Appendix A and appropriate coefficients used for this project are shown below. Intensity-Duration-Frequency curves for the city of Eureka, the nearest weather monitoring station, approximately 1-2 miles away, were used to estimate the rainfall intensity *i* (Appendix B). Because the drainage area of the project is small and most of the project area is paved, the typical methods of calculating the time of concentration yield very short rainfall durations, so we used the county standard minimum value of 10 minutes as a conservative value for the Time of Concentration.

Coefficient of runoff (C) = 0.90 (paved surface)
Time of Concentration, t_c (minimum) = 10 minutes (County Standard Minimum)
Intensity, i_2 (2-year storm) = 1.46 in/hr (IDF Curve, Eureka NWS)
Intensity, i_{100} (100-year storm) = 3.21 in/hr (IDF Curve, Eureka NWS)

Table 2 is the summary of existing paved road surface area and stormwater runoffs generated within the proposed project limits for the project alternatives.

Table 2 - Summary of calculated pre-development values within the proposed project limits

Description	Preferred Alternative Route
Total project road area (acres), A	5.22
Coefficient of runoff ($C_{existing}$)	0.90
i_2 (in/hr)	1.41
$Q_{2\ Pre}$ (Cu-ft/sec)	6.6
i_{100} (in/hr)	3.55
$Q_{100\ Pre}$ (Cu-ft/sec)	16.7

Table 3 is the summary of proposed paved road surface area and stormwater for the proposed Preferred Alternative Route.

Table 3 - Summary of calculated post-development values within the proposed project limits

Description	Preferred Alternative Route
Total project paved area (acre), A	8.26
Coefficient of runoff ($C_{proposed}$)	0.90
i_2 (in/hr)	1.41
$Q_{2\ Post}$ (Cu-ft/sec)	10.5
i_{100} (in/hr)	3.55
$Q_{100\ Post}$ (Cu-ft/sec)	26.4

Comparing Table 2 and Table 3, we conclude that the proposed route will increase stormwater runoff due to increase in paved area. The excess project runoff will be directed to road-adjacent bioswales and to the existing storm drain system. Bioswales along paved roads is considered a Low Impact Development (LID) technique to manage stormwater. This technique is preferred for stormwater management by the Regional Water Quality Control Board (RWQCB) and the California Department of Fish and Wildlife (DFW) over the more traditional, underground stormwater management techniques.

The project bioswales will be designed to detain a 100-year storm within the banks of the swale. A typical detail of a bioswale is shown in Figure 3. In addition to providing detention of peak flows, the bioswales will provide natural filtration to remove road oils, nutrients, grease, and sediment. Most of the runoff will infiltrate into the highly permeable native soils, and any filtered overflow from the bioswales will drain to the existing storm drainage system and to Humboldt Bay east of the project area at a peak flow rate no greater than pre-development levels.

The detention volume was calculated to store the difference in flow between the 100-year post construction storm and the 2-year pre construction storm. The volume of the water to be stored was calculated by using the triangular area under the theoretical hydrograph curve for a theoretical period of three times the time of concentration. Using a time of concentration of 10 minutes (600 seconds):

<u>Volume of stormwater to be detained for the project</u> = $[(Q_{100\ Post} - Q_{2\ Pre})*(3)*(600)]/2$.

Table 4 - Summary of detention volume required for each project alternative

Description	**Preferred Alternative Route**
$Q_{100\ Post}$ minus $Q_{2\ Pre}$ flow rate (Cu.-Ft/Sec)	19.8
Required Detention Volume (Cu-Ft)	17,788

Table 4 above depicts the detention volume required for the preferred route. The required detention volumes will be provided via bioswales. Check dams will be installed in the bioswales at 50- to 75-foot intervals, depending on slope, to reduce the velocity of the stormwater runoff and provide additional detention. At approximately 500- to 600-foot intervals, a control structure/junction box will be installed in each bioswale to collect and direct stormwater runoff to the existing storm drain system.

CONCLUSIONS AND RECOMMENDATIONS

The project preferred route will add approximately 3 acres of impermeable surface, and the resulting increase in stormwater runoff can be mitigated to County standards by LID features such as bioswales. We recommend that the proposed storm drain system for the project use a combination of bioswales, control structures, and rock check dams to attenuate peak flows from the proposed project. Based on our preliminary analysis, the site has the capacity to meet regulatory standards for managing stormwater runoff utilizing LID techniques.

During final design of each segment of the Preferred Alternative Route, the existing drainage system (inlets, culverts, and outlets) should be thoroughly evaluated and surveyed to determine whether repairs or replacements are required.

This project storm drain system (bioswales, control structures and check dams) will require annual maintenance and removal of accumulated sediment every 3 to 5 years. If the preferred route changes, or if the project site is developed with anything other than described in this preliminary hydraulic analysis, further drainage evaluation will be required.

NBK:kc

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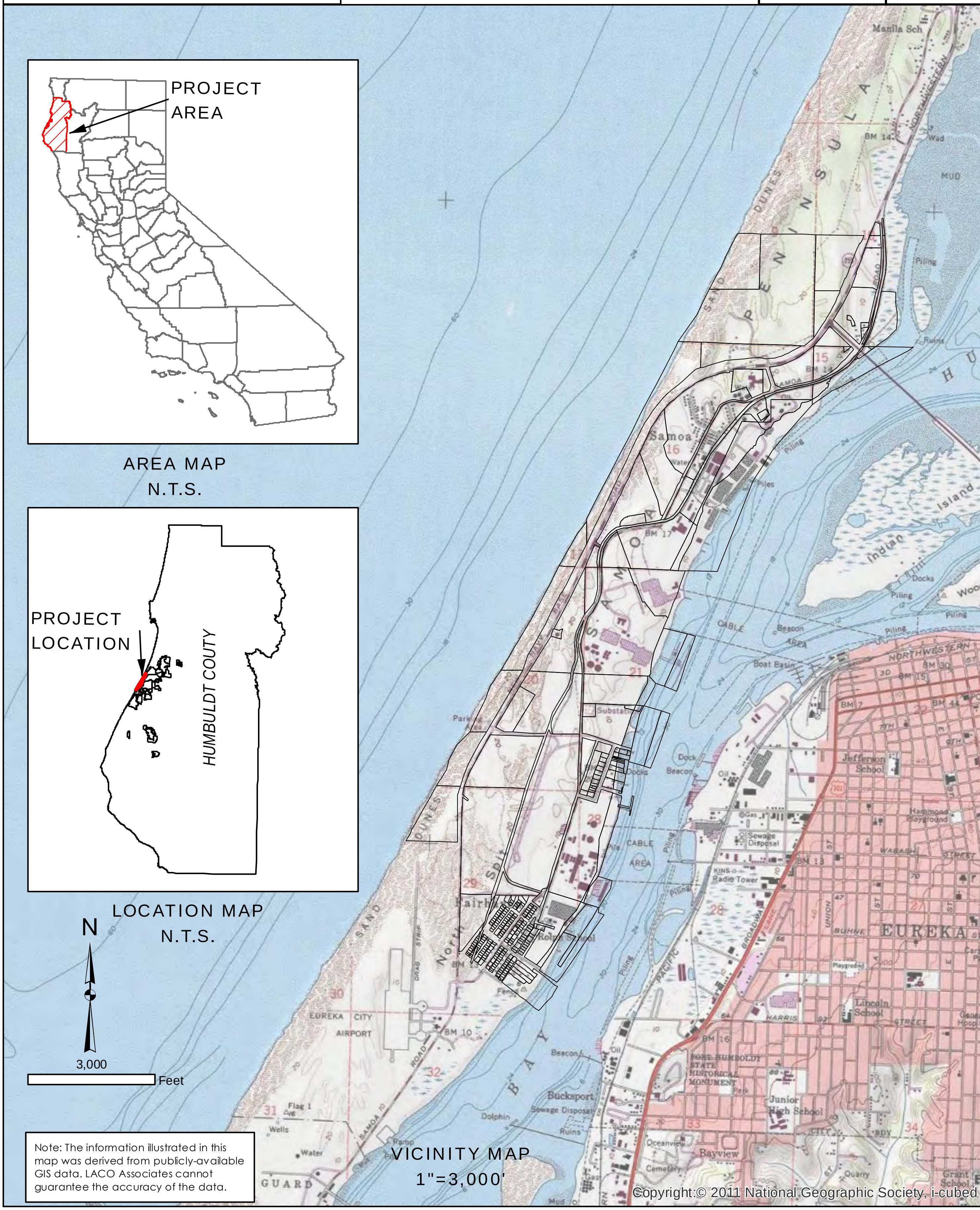
FIGURE 1

Project Location Map

LACO EUREKA • UKIAH • SANTA ROSA 1-800-515-5054 www.lacoassociates.com	PROJECT: PRELIMINARY HYDRAULIC ANALYSIS HBHRCD	BY: JB CHECK: NBK	FIGURE: 1
	CLIENT: SAMOA, CA.	DATE: 7/26/13	JOB NO. 7591.00
	LOCATION: LOCATION MAP		



Note: The information illustrated in this map was derived from publicly-available GIS data. LACO Associates cannot guarantee the accuracy of the data.

FIGURE 2

Proposed Project Preferred Alternative Route Map

LACO

Date: 7/25/2013 Time: 12:58:00 PM
Path: P:\7500\7591 HBHRCD\7591.00 Samoa Waterfront\12 Figures_Maps\GIS\7591 CIV HYDRO FIGURE 2.mxd

DRAWN	JB	PRELIMINARY HYDRAULIC ANALYSIS	NO.	HISTORY/REVISION	BY	CHK.	DATE
CHECK	NBK	PREFERRED ALTERNATIVE ROUTE INTERSECTION MAP					
APPROVED							
DATE	7/26/13						
JOB NO.	7591.00	HBHRCD					
FIGURE	2	SAMOA, CA.					

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EUREKA • UKIAH • SANTA ROSA
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FIGURE 3

Bioswale Detail

LACO

EUREKA • UKIAH • SANTA ROSA

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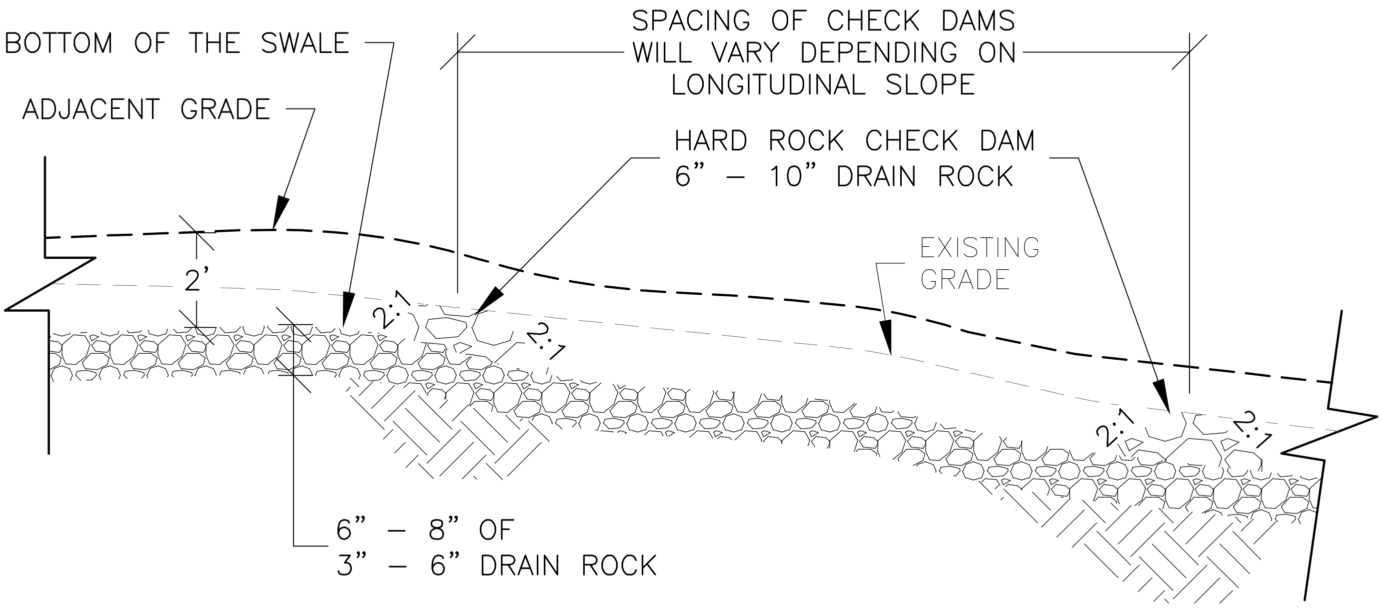
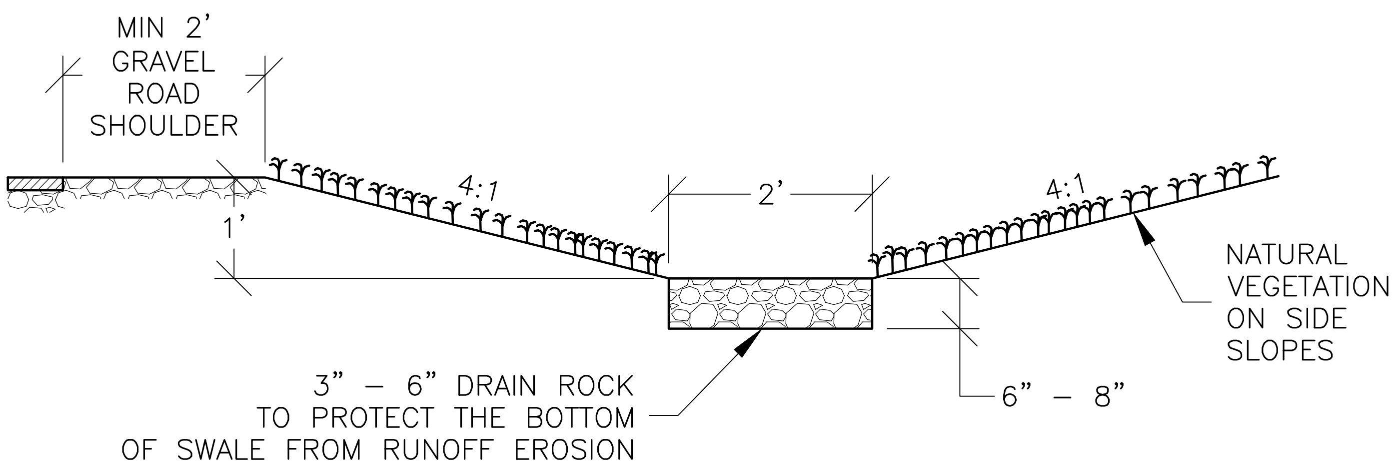
PROJECT HUMBOLDT BAY HARBOR RECREATION AND CONSERVATION DISTRICT	BY JDB	DATE 7/26/13	FIGURE 3
CLIENT HBHRCD	CHECK NBK		JOB NO. 7591.00
LOCATION EUREKA, CA	SCALE AS SHOWN		
BIOSWALE DETAIL			



LONGITUDINAL SECTION OF BIO-SWALE

N.T.S.



TYPICAL CROSS SECTION OF BIO-SWALE

N.T.S.

Jul 24,2013–3:22pm
T:\Cadfiles\7500\7591.00 Samoa Transpo Access\DWG\ 7591.00 CIV FIGURE 3.dwg

APPENDIX A

Runoff Coefficients for Various Selected Lands/Surfaces

APPENDIX A: RUN OFF COEFFICIENTS FOR VARIOUS SELECTED LAND/SURFACES

Description of Area	**Runoff Coefficients**
Business: Downtown areas	0.70 - 0.95
Neighborhood areas	0.50 - 0.70
Residential: Single family areas	0.30 - 0.50
Multi-family detached	0.40 - 0.60
Multi-family attached	0.60 - 0.75
Suburban	0.25 - 0.40
Residential (0.5 ha (1.2 ac) lots or more	0.30 - 0.45
Apartment dwelling areas	0.50 - 0.70
Industrial: Light areas	0.50 - 0.80
Heavy areas	0.60 - 0.90
Park, Cemeteries	0.10 - 0.25
Playgrounds	0.20 - 0.40
Railroad yard areas	0.20 - 0.40
Unimproved areas	0.10 - 0.30
Street : Asphalt	0.75 - 0.95
Concrete	0.80 - 0.95
Drives and walks	0.75 - 0.85
Roofs	0.75 - 0.95

APPENDIX B

Intensity-Duration-Frequency Curves for Eureka

NOAA Atlas 14, Volume 6, Version 2
Location name: Eureka, California, US*
Coordinates: 40.7341, -124.1768
Elevation: 30 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**1.56** (1.37-1.80)	**1.97** (1.72-2.27)	**2.53** (2.21-2.93)	**3.02** (2.62-3.53)	**3.73** (3.11-4.52)	**4.32** (3.50-5.36)	**4.94** (3.91-6.32)	**5.64** (4.31-7.44)	**6.64** (4.85-9.18)	**7.46** (5.24-10.7)
10-min	**1.12** (0.984-1.29)	**1.41** (1.24-1.63)	**1.81** (1.58-2.09)	**2.17** (1.87-2.53)	**2.68** (2.23-3.25)	**3.10** (2.51-3.85)	**3.55** (2.80-4.53)	**4.04** (3.09-5.33)	**4.75** (3.47-6.58)	**5.35** (3.76-7.69)
15-min	**0.904** (0.792-1.04)	**1.14** (0.996-1.31)	**1.46** (1.28-1.69)	**1.74** (1.51-2.04)	**2.16** (1.80-2.62)	**2.50** (2.03-3.10)	**2.86** (2.26-3.66)	**3.26** (2.49-4.30)	**3.83** (2.80-5.30)	**4.31** (3.03-6.20)
30-min	**0.614** (0.538-0.706)	**0.772** (0.676-0.890)	**0.994** (0.868-1.15)	**1.19** (1.03-1.38)	**1.47** (1.22-1.78)	**1.70** (1.38-2.11)	**1.94** (1.54-2.48)	**2.21** (1.69-2.92)	**2.60** (1.90-3.60)	**2.93** (2.06-4.21)
60-min	**0.431** (0.378-0.496)	**0.542** (0.475-0.625)	**0.698** (0.610-0.808)	**0.833** (0.721-0.973)	**1.03** (0.858-1.25)	**1.19** (0.969-1.48)	**1.37** (1.08-1.75)	**1.56** (1.19-2.05)	**1.83** (1.34-2.53)	**2.06** (1.45-2.96)
2-hr	**0.334** (0.294-0.385)	**0.411** (0.360-0.474)	**0.518** (0.452-0.599)	**0.610** (0.528-0.713)	**0.746** (0.621-0.904)	**0.856** (0.696-1.06)	**0.976** (0.772-1.25)	**1.11** (0.847-1.46)	**1.30** (0.946-1.79)	**1.45** (1.02-2.09)
3-hr	**0.287** (0.252-0.331)	**0.349** (0.306-0.403)	**0.436** (0.381-0.504)	**0.511** (0.442-0.597)	**0.620** (0.516-0.752)	**0.709** (0.576-0.881)	**0.805** (0.636-1.03)	**0.909** (0.696-1.20)	**1.06** (0.774-1.47)	**1.18** (0.831-1.70)
6-hr	**0.215** (0.188-0.247)	**0.259** (0.227-0.298)	**0.319** (0.279-0.369)	**0.371** (0.321-0.433)	**0.445** (0.370-0.540)	**0.505** (0.410-0.628)	**0.569** (0.450-0.727)	**0.638** (0.488-0.842)	**0.736** (0.538-1.02)	**0.817** (0.574-1.18)
12-hr	**0.155** (0.136-0.178)	**0.186** (0.163-0.215)	**0.229** (0.200-0.265)	**0.265** (0.229-0.309)	**0.315** (0.262-0.382)	**0.354** (0.288-0.441)	**0.396** (0.313-0.507)	**0.441** (0.337-0.581)	**0.503** (0.367-0.696)	**0.553** (0.388-0.795)
24-hr	**0.110** (0.098-0.125)	**0.133** (0.119-0.151)	**0.163** (0.145-0.186)	**0.188** (0.166-0.216)	**0.222** (0.191-0.263)	**0.249** (0.210-0.301)	**0.276** (0.228-0.341)	**0.305** (0.245-0.386)	**0.345** (0.267-0.454)	**0.376** (0.282-0.511)
2-day	**0.072** (0.064-0.082)	**0.087** (0.078-0.100)	**0.108** (0.096-0.123)	**0.124** (0.110-0.143)	**0.147** (0.126-0.174)	**0.164** (0.138-0.198)	**0.181** (0.150-0.224)	**0.199** (0.160-0.253)	**0.224** (0.173-0.294)	**0.243** (0.182-0.330)
3-day	**0.055** (0.049-0.063)	**0.067** (0.060-0.077)	**0.083** (0.074-0.095)	**0.096** (0.085-0.111)	**0.113** (0.097-0.134)	**0.126** (0.107-0.153)	**0.140** (0.115-0.173)	**0.153** (0.123-0.194)	**0.171** (0.133-0.226)	**0.186** (0.139-0.252)
4-day	**0.046** (0.041-0.052)	**0.056** (0.050-0.064)	**0.070** (0.062-0.080)	**0.081** (0.071-0.093)	**0.095** (0.082-0.113)	**0.106** (0.089-0.128)	**0.117** (0.097-0.145)	**0.128** (0.103-0.162)	**0.143** (0.111-0.188)	**0.154** (0.116-0.210)
7-day	**0.033** (0.030-0.038)	**0.041** (0.037-0.047)	**0.051** (0.045-0.058)	**0.059** (0.052-0.068)	**0.069** (0.060-0.082)	**0.077** (0.065-0.094)	**0.085** (0.070-0.105)	**0.093** (0.075-0.118)	**0.104** (0.080-0.136)	**0.112** (0.084-0.152)
10-day	**0.027** (0.024-0.031)	**0.034** (0.030-0.038)	**0.042** (0.037-0.048)	**0.048** (0.043-0.056)	**0.057** (0.049-0.067)	**0.063** (0.053-0.077)	**0.070** (0.057-0.086)	**0.076** (0.061-0.096)	**0.084** (0.065-0.111)	**0.091** (0.068-0.123)
20-day	**0.019** (0.017-0.021)	**0.023** (0.021-0.026)	**0.029** (0.026-0.033)	**0.033** (0.029-0.038)	**0.039** (0.033-0.046)	**0.043** (0.036-0.052)	**0.047** (0.039-0.058)	**0.051** (0.041-0.065)	**0.056** (0.044-0.074)	**0.060** (0.045-0.082)
30-day	**0.015** (0.014-0.018)	**0.019** (0.017-0.022)	**0.024** (0.021-0.027)	**0.027** (0.024-0.031)	**0.032** (0.027-0.038)	**0.035** (0.030-0.042)	**0.038** (0.031-0.047)	**0.041** (0.033-0.052)	**0.045** (0.035-0.059)	**0.048** (0.036-0.065)
45-day	**0.013** (0.012-0.015)	**0.016** (0.015-0.019)	**0.020** (0.018-0.023)	**0.023** (0.020-0.027)	**0.027** (0.023-0.032)	**0.029** (0.025-0.036)	**0.032** (0.026-0.039)	**0.034** (0.028-0.044)	**0.037** (0.029-0.049)	**0.040** (0.030-0.054)
60-day	**0.012** (0.011-0.014)	**0.015** (0.013-0.017)	**0.018** (0.016-0.020)	**0.020** (0.018-0.023)	**0.023** (0.020-0.028)	**0.026** (0.022-0.031)	**0.028** (0.023-0.034)	**0.030** (0.024-0.038)	**0.032** (0.025-0.042)	**0.034** (0.025-0.046)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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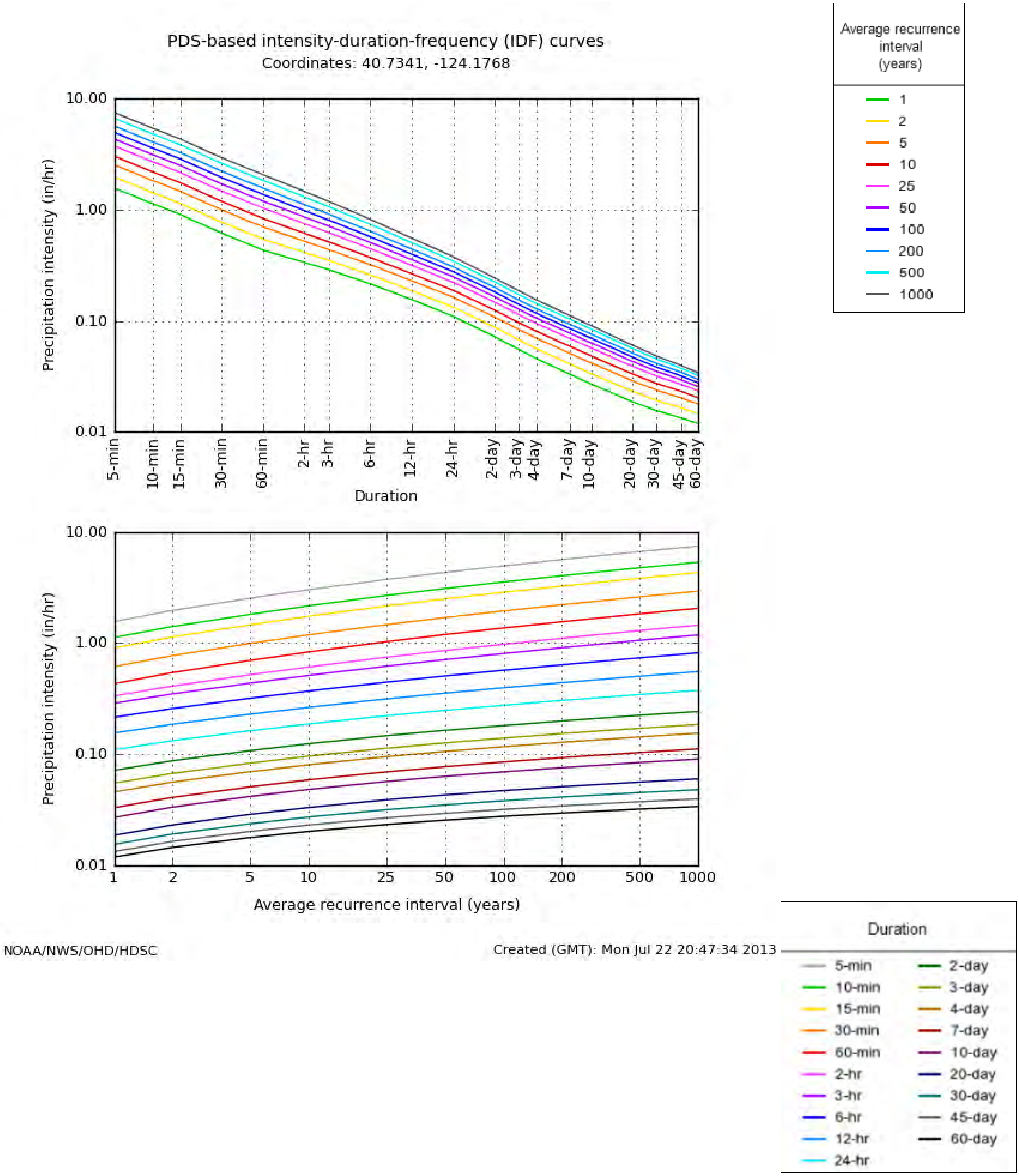
PF graphical



APPENDIX 15

April 8, 2013 LACO Records Search Request Letter to NWIC and May 8, 2013 NWIC Response Letter

LACO

April 8, 2013

7591.00

Northwest Information Center
Sonoma State University
Leigh Jordan, Coordinator
150 Professional Center Drive, Suite E
Rohnert Park, California 94928

Subject: Request for File Search, Samoa Industrial Waterfront Transportation Access Plan

Dear Ms. Jordan:

LACO Associates (LACO) has been engaged by the Humboldt Bay Harbor, Recreation, and Conservation District (HBHRCD) to make a request to NWIC for a cultural resources records search relating to a preferred alternative transportation route near the town of Samoa, California. This project is currently in the preliminary planning stage and does not include any ground disturbance or construction activities.

Pursuant to the National Historic Preservation Act (NHPA; P.L. 89-665), Preservation of Historic and Archaeological Data Act (P.L. 93-291), Executive Order 11593, and Protection and Enhancement of the Cultural Environment (36 CFR Part 800 or 801 as amended), agencies are to identify and take into account the adverse effect their proposed project may have on the historic and prehistoric resources in the Area of Potential Effect (APE). As a project funded by the Federal Highway Administration (FHWA), compliance with NHPA is required. Later, as the project progresses we will engage the SHPO/THPO in accordance with Section 106 of the NHPA.

The APE consists of approximately 440 acres owned by multiple entities within and around the unincorporated town of Samoa, on the north peninsula of Humboldt Bay. An APE map is attached. The APE contains all or portions of the following Assessor's Parcels:

401-021-06	401-031-36	401-031-56	401-112-17	401-122-08
401-021-10	401-031-38	401-031-58	401-112-21	401-122-09
401-021-17	401-031-39	401-031-59	401-112-22	401-122-10
401-021-20	401-031-40	401-031-61	401-121-07	401-122-11
401-021-22	401-031-41	401-031-65	401-121-08	401-161-02
401-021-25	401-031-44	401-031-67	401-121-10	401-162-01
401-021-29	401-031-45	401-031-68	401-121-11	401-171-12
401-031-14	401-031-46	401-111-05	401-121-12	401-171-32
401-031-16	401-031-48	401-111-06	401-122-04	401-171-33
401-031-23	401-031-50	401-112-03	401-122-05	401-301-09
401-031-25	401-031-54	401-112-11	401-122-06	
401-031-26	401-031-55	401-112-13	401-122-07	

In October 2008 the *Humboldt Bay Historic & Cultural Resource Characterization & Roundtable* report was produced for NOAA Coastal Services Center by Planwest Partners. The report contains a complete list of sites in the Humboldt Bay Area listed on the National Register of Historic Places. One site, Gunther Island Site 67 (4-HUM-67; Tolowot; CA-HUM-67; and Dulawo't) is located within 0.5 miles of the APE. There is no reference of a file search for the APE or vicinity in the report.

In July 2012 LACO Associates submitted a records search request for an area that makes up a portion of the APE identified in this letter. On July 25, 2012, Ms. Vicky Bates of the NCIC provided a report identifying sites within the APE; the report is attached to this letter for your reference.

We are respectfully requesting a file search be conducted, and would appreciate a response as quickly as possible. You may remit the invoice to the address listed on this letterhead.

Sincerely,
LACO Associates

Ryan Wells
Associate Planner

RAW:gg

Enclosures:
Figure 1: Area of Potential Effect (APE) Map
July 25, 2012 NCIC Report

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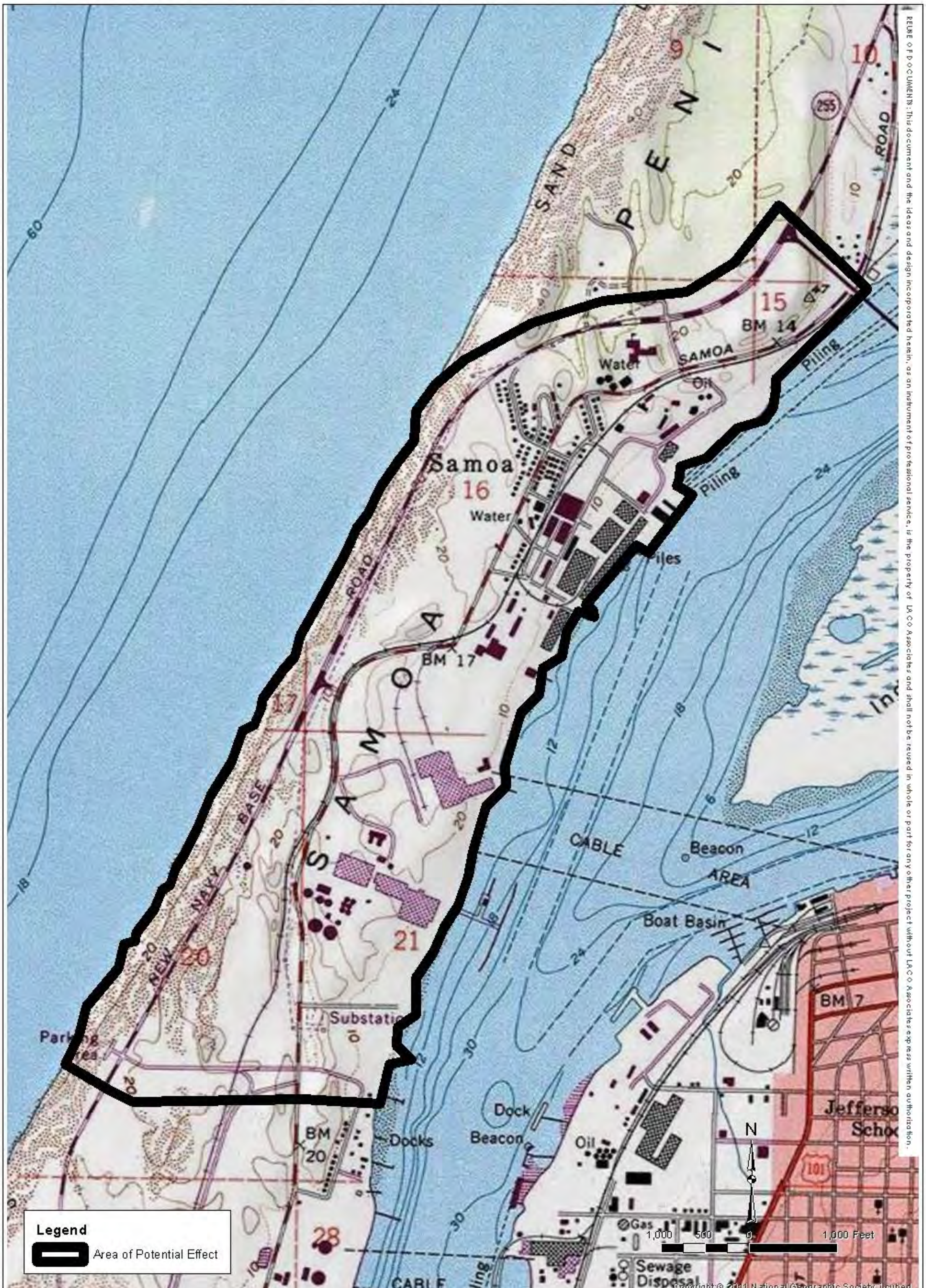

Samoa Industrial Waterfront Transportation Access Plan
Area of Potential Effects (APE) Map

Humboldt Bay Harbor, Recreation & Conservation District
601 Startare Ave., Eureka, CA 95501

DRAWN	CHECK	APPROVED	DATE	JOB NO.	FIGURE
RAW	TBK	TBK	4/8/13	7591.00	1

NO.	HISTORY/REVISION	BY	CHKD.	DATE

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nwic@sonoma.edu
http://www.sonoma.edu/nwic

May 8, 2013 NWIC File No.: 12-1176

Ryan Wells
LACO
P.O. Box 1023
Eureka, CA 95502

Re: Record search results for the proposed Samoa Industrial Waterfront Transportation Access Plan, Samoa, Humboldt County, CA.

Dear Mr. Wells:

Per your request received by our office on 11 April 2013, a records search was conducted for the above referenced project by reviewing pertinent Northwest Information Center (NWIC) base maps that reference cultural resources records and reports, historic-period maps, and literature for Humboldt County. Please note that use of the term cultural resources includes both archaeological resources and historical buildings and/or structures.

Review of this information indicates there are three cultural resources studies that combine to cover approximately 15% of the proposed Area of Potential Effect (APE) that was depicted on the maps provided. See table below for more information:

Report Number	Authors	Year	Title
S-000132	David A. Fredrickson, Sonia Tamez, and Pamela R. Roberts	1975	An Archaeological Survey of the Proposed McKinleyville Sewage Collection and Treatment Facility Treatment Facility
S-000928	Richard A. Stradford	1978	An Archaeological Survey Within the Louisiana Pacific Complex, Somoa, Humboldt County, California. County, California
S-006093	George Kalisik	1983	A Cultural Resource Investigation, Wright-Schuchart Harbor Project, Samoa Peninsula Humboldt County, California

There are five recorded archaeological sites within the APE, all of which consist of Native American habitation sites identified by Loud (1918). See table below for more information:

Primary Number	Trinomial	Resource Name
P-12-000077	CA-HUM-19	Loud 19, *Tserketsok*
P-12-000078	CA-HUM-20	Loud 20
P-12-000079	CA-HUM-21	Loud 21
P-12-000080	CA-HUM-22	Loud 22, *Djo'mak*
P-12-000081	CA-HUM-23	Loud 23, *Digawethatkil-Tekewethatkl*

The State Office of Historic Preservation Historic Property Directory (OHP HPD) (which includes listings of the California Register of Historical Resources, California State Historical Landmarks, California State Points of Historical Interest, and the National Register of Historic Places) includes no recorded buildings or structures within the proposed project area. In addition to these inventories, the NWIC base maps show no recorded buildings or structures within the proposed project area.

At the time of Euro American contact, the Native Americans that lived in the area were speakers of a Wiyot language, part of the Algic language stock (Elsasser 1978:155). In addition to the multitude of named landscape features and resource collection areas named by the Wiyot in this area, several significant ethnographic villages and camps are known to have been located within the APE. One of the villages, such as *Tserketsok* was occupied in 1850; while others, such as *Djo'mak and Digawethatkil-Tekewethatkl*, were not known to have been occupied in modern times (Loud 1918).

Based on an evaluation of the environmental setting and features associated with known sites, Native American resources in this part of Humboldt County have been found along the coastal margins, near trending ridgelines and midslope terraces, near the mouths of rivers, near sources of water (including perennial and intermittent streams and springs), and near ecotones or other productive resource environments. The APE is located on the north spit of Humboldt Bay and totals approximately 440 acres. Given the similarity of these environmental factors, coupled with the ethnographic sensitivity and presence of recorded archaeological resources, there is a high potential of identifying Native American resources in the proposed project area.

Review of historical literature and maps indicated the possibility of historic-period archaeological resources within the proposed project area. The 1855 and the 1890 T5N/R1W General Land Office plat maps depict “Robertson’s house” and another unnamed house within the APE. The area was originally used for dairy ranching, and later the lumber town of Samoa was founded in early 1890s by John Vance. The 1933 and 1951 Eureka 15-minute USGS topographic quadrangles depict numerous buildings, structures, and railroad spurs that are not present on the 1972 photo-revision of the 1958 7.5-minute USGS topographic quadrangle. With this in mind, there is a high potential of identifying historic-period archaeological resources in the proposed project area.

RECOMMENDATIONS:

1) There is a high possibility of identifying Native American archaeological resources and a high possibility of identifying historic-period archaeological resources in the APE. Due to the passage of time since the previous surveys (Fredrickson et al. 1975, Stradford 1978, and Kalisik 1983) and the changes in archaeological theory and method since that time, we recommend a qualified archaeologist conduct further archival and field study for the entire APE to identify cultural resources. Field study may include, but is not limited to, pedestrian survey, hand auger sampling, shovel test units, or geoarchaeological analyses as well as other common methods used to identify the presence of archaeological resources. Please refer to the list of consultants who meet the Secretary of Interior's Standards at http://www.chrisinfo.org.

2) If the proposed project area contains buildings or structures that meet the minimum age requirement of 45 years or older, it is recommended that prior to commencement of project activities, these buildings or structures be assessed by a professional familiar with the architecture and history of Humboldt County. Please refer to the list of consultants who meet the Secretary of Interior's Standards at http://www.chrisinfo.org.

3) Review for possible historic-period buildings or structures has included only those sources listed in the attached bibliography and should not be considered comprehensive.

4) If archaeological resources are encountered **during construction,** work should be temporarily halted in the vicinity of the discovered materials and workers should avoid altering the materials and their context until a qualified professional archaeologist has evaluated the situation and provided appropriate recommendations. Project personnel should not collect cultural resources. Native American resources include chert or obsidian flakes, projectile points, mortars, and pestles; and dark friable soil containing shell and bone dietary debris, heat-affected rock, or human burials. Historic-period resources include stone or adobe foundations or walls; structures and remains with square nails; and refuse deposits or bottle dumps, often located in old wells or privies.

5) It is recommended that any identified cultural resources be recorded on DPR 523 historic resource recordation forms, available online from the Office of Historic Preservation's website: http://ohp.parks.ca.gov/default.asp?page_id=1069

Thank you for using our services. Please contact this office if you have any questions, (707) 588-8455.

Sincerely,

Bryan Much
Assistant Coordinator

LITERATURE REVIEWED

In addition to archaeological maps and site records on file at the Northwest Information Center of the Historical Resources Information System, the following literature was reviewed:

Baumhoff, Martin A.
1958 *California Athabaskan Groups*. University of California Publications, Anthropological Records 16(5):157-237. University of California Press, Berkeley and Los Angeles. (1976 Reprint by Kraus Reprint Corporation, New York).

Cook, S.F.
1956 *The Aboriginal Population of the North Coast of California*. University of California Anthropological Records 16(3):81-130. Berkeley and Los Angeles.

Elsasser, Albert B.
1978 Wiyot. In *California*, edited by Robert F. Heizer, pp. 155-163. Handbook of North American Indians, vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Fickewirth, Alvin A.
1992 *California Railroads*. Golden West Books, San Marino, CA.

Fredrickson, David , Sonia Tamez, and Pamela R. Roberts
1975 *An Archaeological Survey of the Proposed McKinleyville Sewage Collection and Treatment Facility Treatment Facility.* S-132. Report on file at the Northwest Information Center, Rohnert Park.

General Land Office
1855 Survey Plat for Township 5 North/Range 1 West
1890 Survey Plat for Township 5 North/Range 1 West

Gudde, Erwin G.
1969 *California Place Names*. Third Edition. University of California Press, Berkeley and Los Angeles.

Hart, James D.
1987 *A Companion to California*. University of California Press, Berkeley and Los Angeles.

Hoover, Mildred Brooke, Hero Eugene Rensch, and Ethel Rensch, revised by William N.Abeloe
1966 *Historic Spots in California*. Third Edition. Stanford University Press, Stanford, CA.

Hoover, Mildred Brooke, Hero Eugene Rensch, and Ethel Rensch, William N. Abeloe, revised by Douglas E. Kyle
1990 *Historic Spots in California*. Fourth Edition. Stanford University Press, Stanford, CA.

Hope, Andrew
2005 *Caltrans Statewide Historic Bridge Inventory Update*. Caltrans, Division of Environmental Analysis, Sacramento, CA.

Kalisik, George
1983 *A Cultural Resource Investigation, Wright-Schuchart Harbor Project, Samoa Peninsula Humboldt County, California.* S-6093. Report on file at the Northwest Information Center, Rohnert Park.

Kroeber, A.L.
1925 *Handbook of the Indians of California*. Bureau of American Ethnology, Bulletin 78, Smithsonian Institution, Washington, D.C. (Reprint by Dover Publications, Inc., New York, 1976)

Loud, Llewellyn L.
1918 *Ethnogeography and Archaeology of the Wiyot Territory*. University of California Publications in American Archaeology and Ethnology 14(3):221-436. University of California Press, Berkeley. (Reprint by Kraus Reprint Corp., New York, 1965.)

Myers, William A. (editor)
1977 *Historic Civil Engineering Landmarks of San Francisco and Northern California*. Prepared by The History and Heritage Committee, San Francisco Section, American Society of Civil Engineers. Pacific Gas and Electric Company, San Francisco, CA.

Nomland, Gladys A. and Alfred L. Kroeber
1936 *Wiyot Towns*. University of California Publications in American Archaeology and Ethnology 35(5):39-48. University of California Press, Berkeley. (Reprint by Kraus Reprint Corp., New York, 1965.)

Pilling, Arnold R.
1978 Yurok. In *California*, edited by Robert F. Heizer, pp. 137-154. Handbook of North American Indians, vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Roberts, George, and Jan Roberts
1988 *Discover Historic California*. Gem Guides Book Co., Pico Rivera, California.

State of California Department of Parks and Recreation
1976 *California Inventory of Historic Resources.* State of California Department of Parks and Recreation, Sacramento.

State of California Department of Parks and Recreation and Office of Historic Preservation
1988 *Five Views: An Ethnic Sites Survey for California*. State of California Department of Parks and Recreation and Office of Historic Preservation, Sacramento.

State of California Office of Historic Preservation **
2012 *Historic Properties Directory*. Listing by City (April 2012). State of California Office of Historic Preservation, Sacramento.

Stradford, Richard
1978 *An Archaeological Survey Within the Louisiana Pacific Complex, Samoa, Humboldt County, California. County, California.* S-928. Report on file at the Northwest Information Center, Rohnert Park.

Williams, James C.
1997 *Energy and the Making of Modern California*. The University of Akron Press, Akron, OH.

Woodbridge, Sally B.
1988 *California Architecture: Historic American Buildings Survey*. Chronicle Books, San Francisco, CA.

Works Progress Administration
1984 *The WPA Guide to California*. Reprint by Pantheon Books, New York. (Originally published as California: A Guide to the Golden State in 1939 by Books, Inc., distributed by Hastings House Publishers, New York).

******Note that the Office of Historic Preservation's *Historic Properties Directory* includes National Register, State Registered Landmarks, California Points of Historical Interest, and the California Register of Historical Resources as well as Certified Local Government surveys that have undergone Section 106 review.

APPENDIX 16

July 19, 2013 W-Trans Memo: Samoa Industrial Waterfront Transportation Access Plan

memorandum

Date: July 19, 2013

To: **Mr. T. Scott Kelly, P.E.**
LACO Associates

From: Steve Weinberger

Project: HUX052

Whitlock & Weinberger Transportation, Inc.

490 Mendocino Avenue
Suite 201
Santa Rosa, CA 95401

voice (707) 542-9500
fax (707) 542-9590

website www.w-trans.com
email sweinberger@w-trans.com

Subject: Samoa Industrial Waterfront Transportation Access Plan

Introduction

This memo describes the potential traffic impacts which would be expected to be generated by development in the Samoa Industrial Waterfront area. The impacts at five study intersections were evaluated using base traffic data from the Samoa Town Master Plan EIR. The traffic projections included the full development potential of the Samoa Town Master Plan.

Study Area

This traffic evaluation included an assessment of intersections located at the interface of Samoa and the adjacent highway system as well as intersections in Eureka. Five existing intersections were identified as locations which may be impacted by development of the Samoa Industrial Waterfront area. These intersections include:

1. New Navy Base Road/Samoa Pulp Lane (formerly LP Drive)
2. New Navy Base Road/Cookhouse Road
3. New Navy Base Road/SR 255
4. SR 255/4th Street (City of Eureka)
5. SR 255/5th Street (City of Eureka)

Traffic Analysis Scenarios

The following scenarios were evaluated:

- Existing 2013
- Future 2033
- Existing plus Samoa Town Plan
- Existing plus Samoa Town Plan plus Industrial Waterfront Development
- Future plus Samoa Town Plan
- Future plus Samoa Town Plan plus Industrial Waterfront Development

Following is a description of each of these components:

Existing (2013) – Existing traffic volumes for the study intersections were acquired from the Samoa Town Master Plan EIR and were factored forward to reflect Year 2013 conditions. The growth factor was based on the Caltrans District 1 20-year growth factors. These resulting traffic volumes for the five study area intersections are shown in Figure 1.

Future (2033) – Future 20-year horizon traffic volumes were obtained by taking the new Existing (2013) traffic volumes for the study and applying the Caltrans District 1 20-year growth factors. For US 101, Caltrans has determined that traffic volumes would be expected to increase by a factor of 1.3 over the next 20-year period. For SR 255, traffic volumes are expected to increase by a factor of 1.20 over the next 20 years. These factors were therefore applied to the existing traffic volumes in order to obtain projected future volumes. These resulting traffic volumes for the study area are shown in Figure 2.

Samoa Town Plan Traffic Volumes – These traffic volumes, which reflect buildout conditions for the Samoa Town Plan area, were acquired from the Samoa Town Master Plan EIR. In total, the Town Plan area was projected to generate 748 a.m. peak hour and 811 p.m. peak hour new external vehicle trips. These traffic volumes are shown in Figure 3.

Samoa Industrial Waterfront Traffic Volumes – These traffic volumes which were provided assume 10% build-out of parcels feeding into the Preferred Route of the Samoa Industrial Waterfront area. In total, the Industrial Waterfront area was projected to generate 633 a.m. peak hour and 697 p.m. peak hour new external vehicle trips. The Industrial Waterfront traffic volumes for the five study area intersections are shown in Figure 4.

Intersection Analysis Methodology

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The intersections included in this traffic evaluation were analyzed using methodologies from the *Highway Capacity Manual 2000*, Transportation Research Board, 2000. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle. The ranges of delay associated with the various levels of service are indicated in Table 1.

Table 1
Intersection Level of Service Criteria

LOS	Unsignalized and All-Way Stop-Controlled	Signalized
A	Delay of 0 to 10 seconds. Gaps in traffic are readily available for drivers exiting the minor street.	Delay of 0 to 10 seconds. Most vehicles arrive during the green phase, so do not stop at all.
B	Delay of 10 to 15 seconds. Gaps in traffic are somewhat less readily available than with LOS A, but no queuing occurs on the minor street.	Delay of 10 to 20 seconds. More vehicles stop than with LOS A, but many drivers still do not have to stop.
C	Delay of 15 to 25 seconds. Acceptable gaps in traffic are less frequent, and drivers may approach while another vehicle is already waiting to exit the side street.	Delay of 20 to 35 seconds. The number of vehicles stopping is significant, although many still pass through without stopping.
D	Delay of 25 to 35 seconds. There are fewer acceptable gaps in traffic, and drivers may enter a queue of one or two vehicles on the side street.	Delay of 35 to 55 seconds. The influence of congestion is noticeable, and most vehicles have to stop.
E	Delay of 35 to 50 seconds. Few acceptable gaps in traffic are available, and longer queues may form on the side street.	Delay of 55 to 80 seconds. Most, if not all, vehicles must stop and drivers consider the delay excessive.
F	Delay of more than 50 seconds. Drivers may wait for long periods before there is an acceptable gap in traffic for exiting the side streets, creating long queues.	Delay of more than 80 seconds. Vehicles may wait through more than one cycle to clear the intersection.

Reference: *Highway Capacity Manual,* Transportation Research Board, 2000

Analysis of Signalized Intersections

The signalized methodology is used for intersections which are controlled by traffic signals and are based on factors including traffic volumes, green time for each movement, phasing, whether or not the signals are coordinated, truck traffic, and pedestrian activity. Average stopped delay in seconds per vehicle, which includes delay due to initial deceleration, queue move-up time, stopped delay, and final acceleration delay, is used as the basis for evaluation in this signalized LOS methodology.

Analysis of Unsignalized Intersections

The Levels of Service for the intersections with side-street stop controls, or those which are unsignalized and have one or two approaches stop controlled, were analyzed using the "Two-Way Stop-Controlled" intersection capacity method from the HCM. This methodology determines a level of service for each minor turning movement by estimating the level of average delay in seconds per vehicle. Results are presented for individual movements together with the weighted overall age delay for the intersection.

Analysis of All-Way Stop Controlled Intersections

SR 255/New Navy Base Road is controlled with stop signs on two of the three approaches which are offset in a non-standard setup. Because the intersection operates with less capacity than an unsignalized, side street stop controlled intersection, it was analyzed using the "All-Way Stop-Controlled Intersection" methodology from the HCM. This methodology evaluates delay for each approach based on turning movements, opposing and conflicting traffic volumes, and the number of lanes. Average vehicle delay is computed for the intersection as a whole, and is then related to a Level of Service.

Traffic Operation Standards

The County of Humboldt does not have an adopted Level of Service (LOS) standard for traffic conditions. The County Department of Public Works has, however, set a goal of having all intersections operate at LOS C or better. This standard does not differentiate between signalized and unsignalized intersections, and application of the LOS C standard to individual movements at unsignalized intersections may lead to recommendations which create unnecessary delay or maintenance expenses.

For the purposes of this traffic evaluation, **t**he overall intersection operation was therefore compared to the LOS C standard to determine if mitigating measures such as a traffic signal should be recommended. For the individual movements at unsignalized, or two-way stop-controlled, intersections, LOS D operation was assumed to be the minimum acceptable. If operation fell below LOS C overall or LOS D for individual movements, improvements such as additional lanes, changes to the right-of-way controls, or installation of a traffic signal were considered.

The *Traffic Manual* (California Department of Transportation 1978) contains guidelines for determining the need for a traffic signal. Potential need for installing traffic signals at the unsignalized and all-way stop controlled study intersections was evaluated using Warrant 11, the Peak Hour Volume warrant, assuming urban conditions. Warrant 11 is met when there is undue delay to minor street traffic crossing or entering the major street. Although traffic signal warrants may be met for some conditions, the decision to install a traffic signal should also be based on the other traffic signal warrants which consider daily traffic volumes and accident experience, current traffic operations, and adjacent traffic controls.

Intersection Level of Service Results

The results of the intersection impact analysis for the six scenarios are summarized in Table 2 and detailed calculations are attached. Following is a summary of the results.

Table 2
Peak Hour Intersection Levels of Service

Study Intersection *Approach*	**Existing 2013 Conditions**				**Future 2033 Conditions**				**Existing plus Samoa Town Plan**				**Existing plus Samoa Town Plan plus Industrial Waterfront Development**				**Future plus Samoa Town Plan**				**Future plus Samoa Town Plan plus Industrial Waterfront Development**			
	AM Peak		**PM Peak**		**AM Peak**		**PM Peak**		**AM Peak**		**PM Peak**		**AM Peak**		**PM Peak**		**AM Peak**		**PM Peak**		**AM Peak**		**PM Peak**	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. New Navy Base Rd/ Samoa Pulp Rd	4.8	A	1.9	A	4.9	A	1.9	A	6.1	A	5.3	A	4.0	A	4.4	A	6.1	A	5.1	A	4.1	A	4.4	A
Northbound Approach	*9.1*	*A*	*8.9*	*A*	*9.3*	*A*	*9.0*	*A*	*9.3*	*A*	*9.6*	*A*	*10.1*	*B*	*13.4*	*B*	*9.5*	*A*	*9.7*	*A*	*10.3*	*B*	*13.9*	*B*
Westbound Left	*7.4*	*A*	*7.5*	*A*	*7.4*	*A*	*7.5*	*A*	*7.7*	*A*	*7.5*	*A*	*8.3*	*A*	*8.9*	*A*	*7.8*	*A*	*7.6*	*A*	*8.4*	*A*	*9.0*	*A*
2. New Navy Base Rd/ Cookhouse Dr	2.9	A	1.7	A	2.9	A	1.7	A	6.1	A	10.9	B	4.5	A	**95.5**	**F**	6.1	A	11.6	B	4.6	A	**106.2**	**F**
Northbound Approach	*9.0*	*A*	*9.2*	*A*	*9.1*	*A*	*9.3*	*A*	*10.6*	*B*	*21.2*	*C*	*12.3*	*B*	**	***F***	*10.9*	*B*	*23.7*	*C*	*12.8*	*B*	**	***F***
Westbound Left	*7.5*	*A*	*7.4*	*A*	*7.5*	*A*	*7.5*	*A*	*8.6*	*A*	*8.6*	*A*	*9.5*	*A*	*12.2*	*B*	*8.7*	*A*	*8.7*	*A*	*9.6*	*A*	*12.4*	*B*
With Traffic Signal													20.5	C	42.1	D	21.4	C	27.3	C	21.2	C	43.8	D
3. New Navy Base Rd/ Hwy 255	11.4	B	16.6	C	13.2	B	26.	D	38.0	E	28.3	D	**	**F**	**78.4**	**F**	48.6	E	**51.6**	**F**	**	**F**	**108.0**	**F**
With Traffic Signal													28.9	C	32.4	C	24.1	C	27.9	C	31.0	C	36.7	D
12. Hwy 255/Fourth St	14.0	B	14.9	B	21.1	C	21.0	C	18.5	B	25.6	C	21.8	C	58.9	E	32.2	C	52.7	D	140.9	D	**100.0**	**F**
SB Lane Change													19.2	B	21.2	C	21.3	C	22.0	C	28.2	C	34.1	C
13. Hwy 255/Fifth St	6.2	A	5.3	A	6.5	A	6.2	A	6.2	A	6.5	A	6.0	A	7.5	A	6.5	A	7.4	A	6.6	A	8.5	A

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in italics; ** = delay greater than 120 seconds; Shaded cells = conditions with recommended improvements

Existing 2013

All of the study intersections are currently operating acceptably at LOS C or better, either overall or at the stop-controlled side street approaches.

Future 2033

Under Future Conditions with general background growth described above and without development of either the Samoa Town Plan or the Industrial Waterfront area, the majority of the study intersections would operate acceptably at LOS C or better, either overall or on the stop-controlled side street approaches. The exceptions include the following.

- SR 255/New Navy Base Road is expected to deteriorate to LOS D under PM peak hour conditions

Existing plus Samoa Town Plan

Under Existing Conditions with development of the Samoa Town Plan, the majority of the study intersections would continue to operate acceptably at LOS C or better, either overall or on the stop-controlled side street approaches. The exception includes the following.

- SR 255/New Navy Base Road is expected to deteriorate to LOS E under AM peak hour conditions

Existing plus Samoa Town Plan plus Industrial Waterfront Development

Under Existing Conditions with development of the Samoa Town Plan and the Industrial Waterfront area, the following intersections would be expected to operate with unacceptable conditions:

- New Navy Base Road/Cookhouse Drive is expected to deteriorate to LOS F under PM peak hour conditions
- SR 255/New Navy Base Road is expected to deteriorate to LOS F under both AM and PM peak hour conditions
- SR 255/Fourth Street is expected to deteriorate to LOS E under PM peak hour conditions

Future plus Samoa Town Plan

Under Future Conditions with development of the Samoa Town Plan, the majority of the study intersections would continue to operate acceptably at LOS C or better, either overall or on the stop-controlled side street approaches. The exceptions include the following.

- SR 255/New Navy Base Road is expected to deteriorate to LOS F under the PM peak hour conditions
- SR 255/Fourth Street is expected to deteriorate to LOS D under PM peak hour conditions

Future plus Samoa Town Plan plus Industrial Waterfront Development

Under Future Conditions with development of the Samoa Town Plan and the Industrial Waterfront area, the following intersections would be expected to operate with unacceptable conditions:

- New Navy Base Road/Cookhouse Drive is expected to deteriorate to LOS F under PM peak hour conditions
- SR 255/New Navy Base Road is expected to deteriorate to LOS F under both AM and PM peak hour conditions
- SR 255/Fourth Street is expected to deteriorate to LOS F under PM peak hour conditions

Mitigation Measures

Due to the unacceptable conditions at three of the study intersections, the following mitigation measures would be necessary to allow for acceptable operations.

- New Navy Base Road/Cookhouse Drive - A traffic signal or roundabout should be installed. If a traffic signal were installed, the northbound approach should include a separate lane for both left and right-turn movements. The LOS results with this mitigation are shown in Table 2. This mitigation would not be needed until approximately 50 to 75 percent of the anticipated combined development is completed from the Samoa Town Plan area and the Industrial Waterfront.

- SR 255/New Navy Base Road – A traffic signal or roundabout should be installed. The LOS results with this mitigation are shown in Table 2. This mitigation would not be needed until approximately 25 percent of the anticipated combined development is completed from the Samoa Town Plan area and the Industrial Waterfront.

- SR 255/Fourth Street – The southbound approach should be restriped to include one right-turn lane and one combined through/right-turn lane. The appropriate pavement markers to guide the new double right turn lane onto Highway 101 should be completed. This mitigation would not be needed until approximately 50 percent of the anticipated combined development is completed from the Samoa Town Plan area and the Industrial Waterfront.

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Attachments: Figure 1 Existing 2013 Traffic Volumes
Figure 2 Future 2033 Traffic Volumes
Figure 3 Samoa Town Plan Traffic Volumes
Figure 4 Industrial Waterfront Development Traffic Volumes
Attachment A – Level of Service Calculations

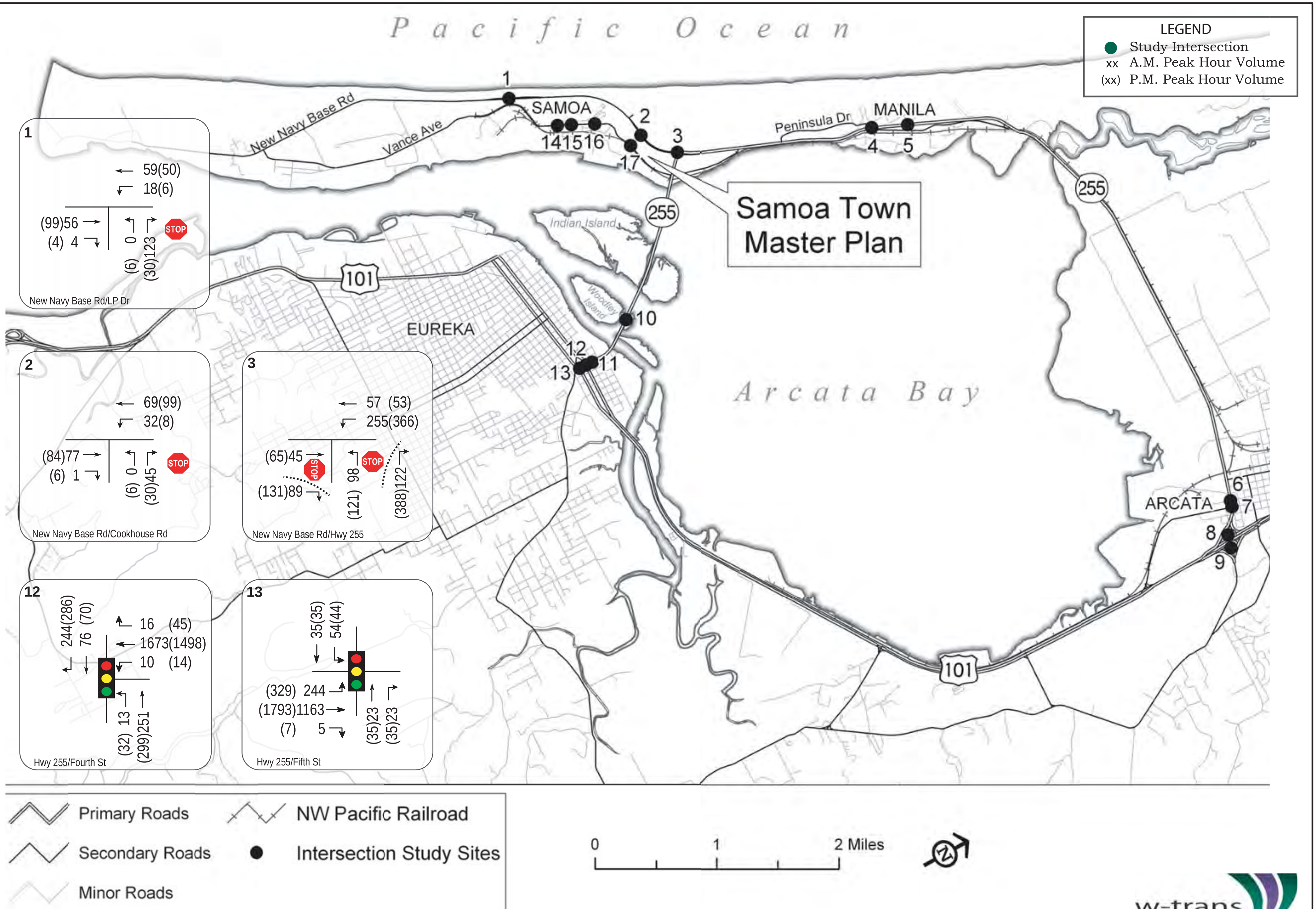

Figure 1 Existing 2013 Traffic Volumes

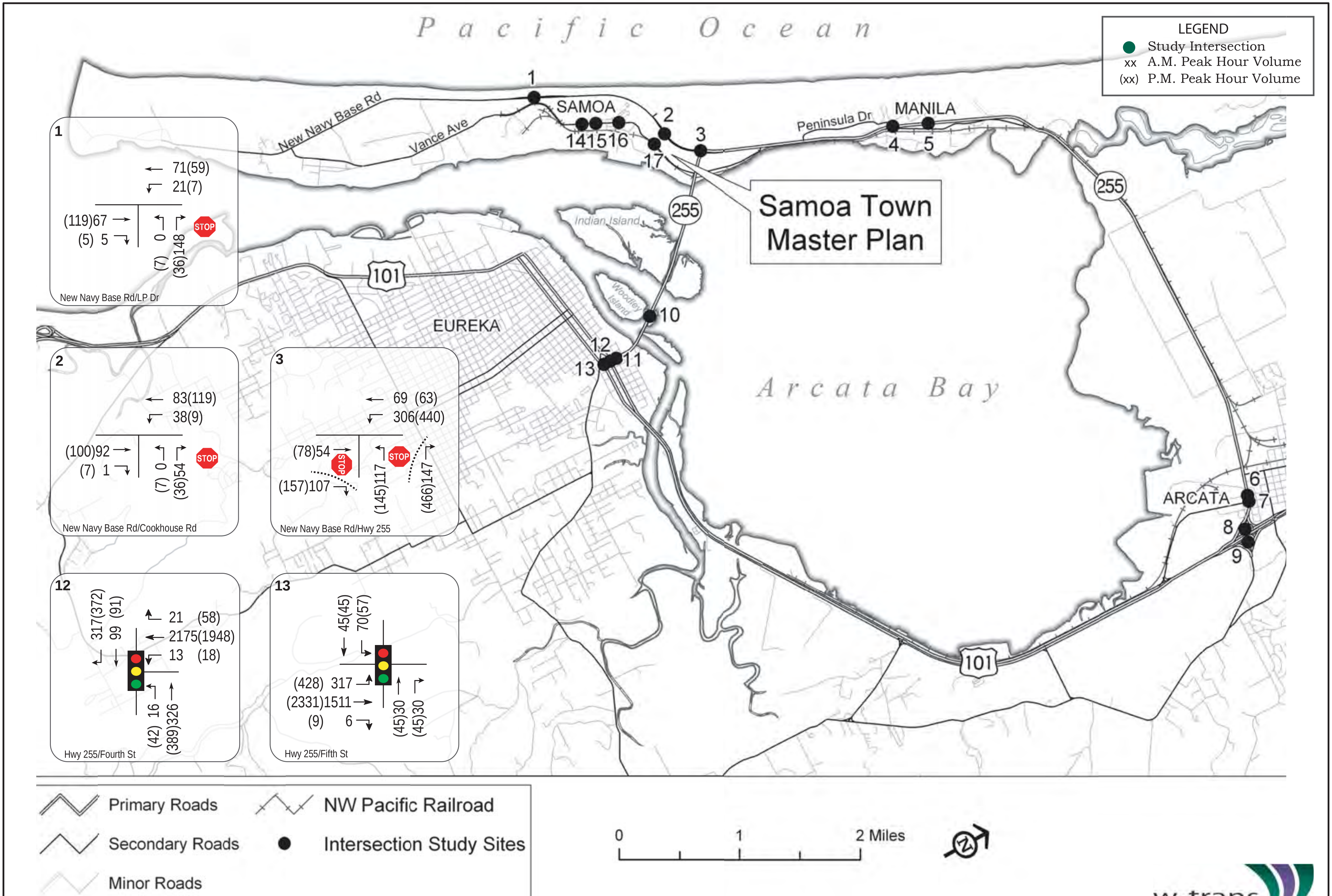

Figure 2 Future 2033 Traffic Volumes

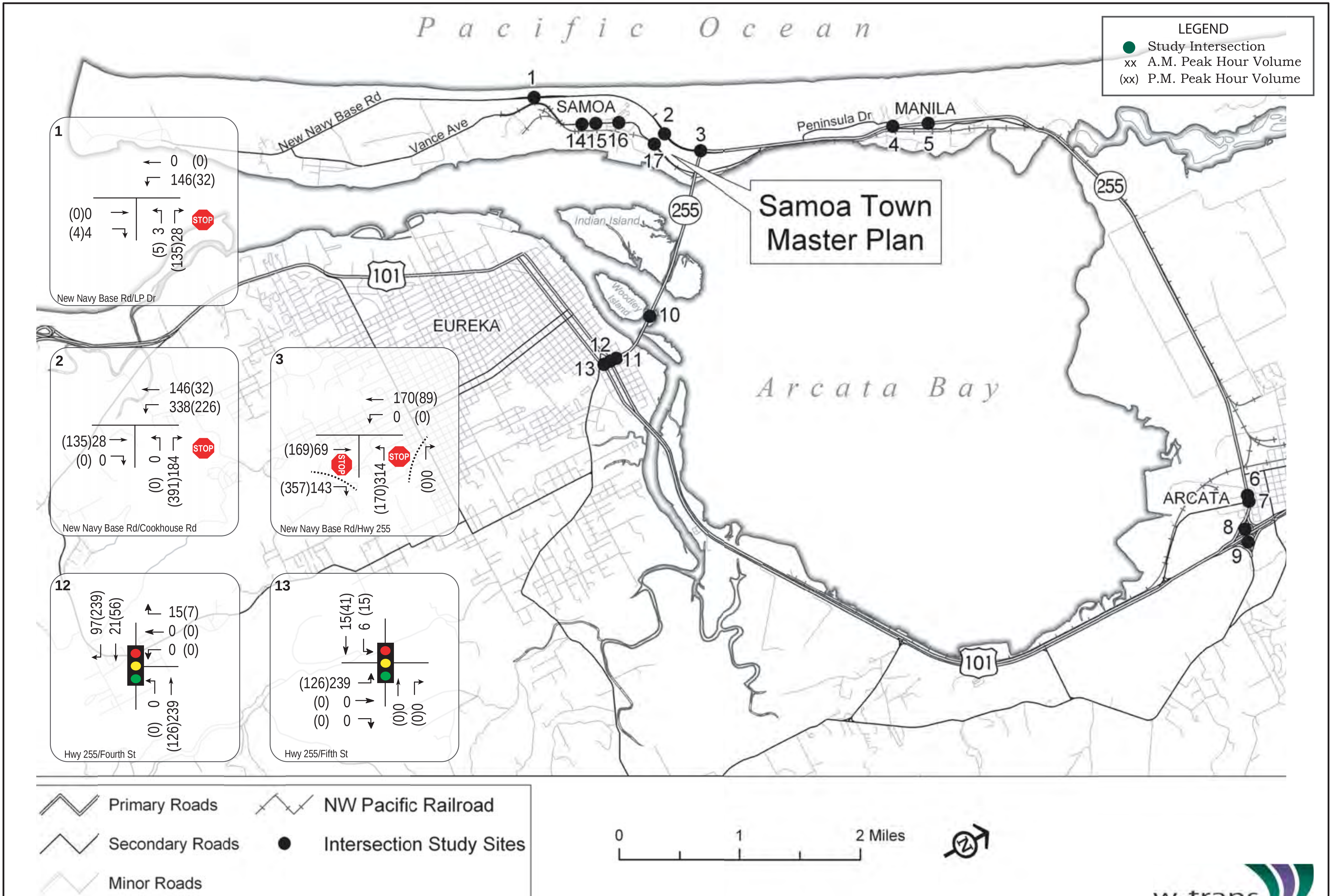

Figure 3 Samoa Town Plan Traffic Volumes

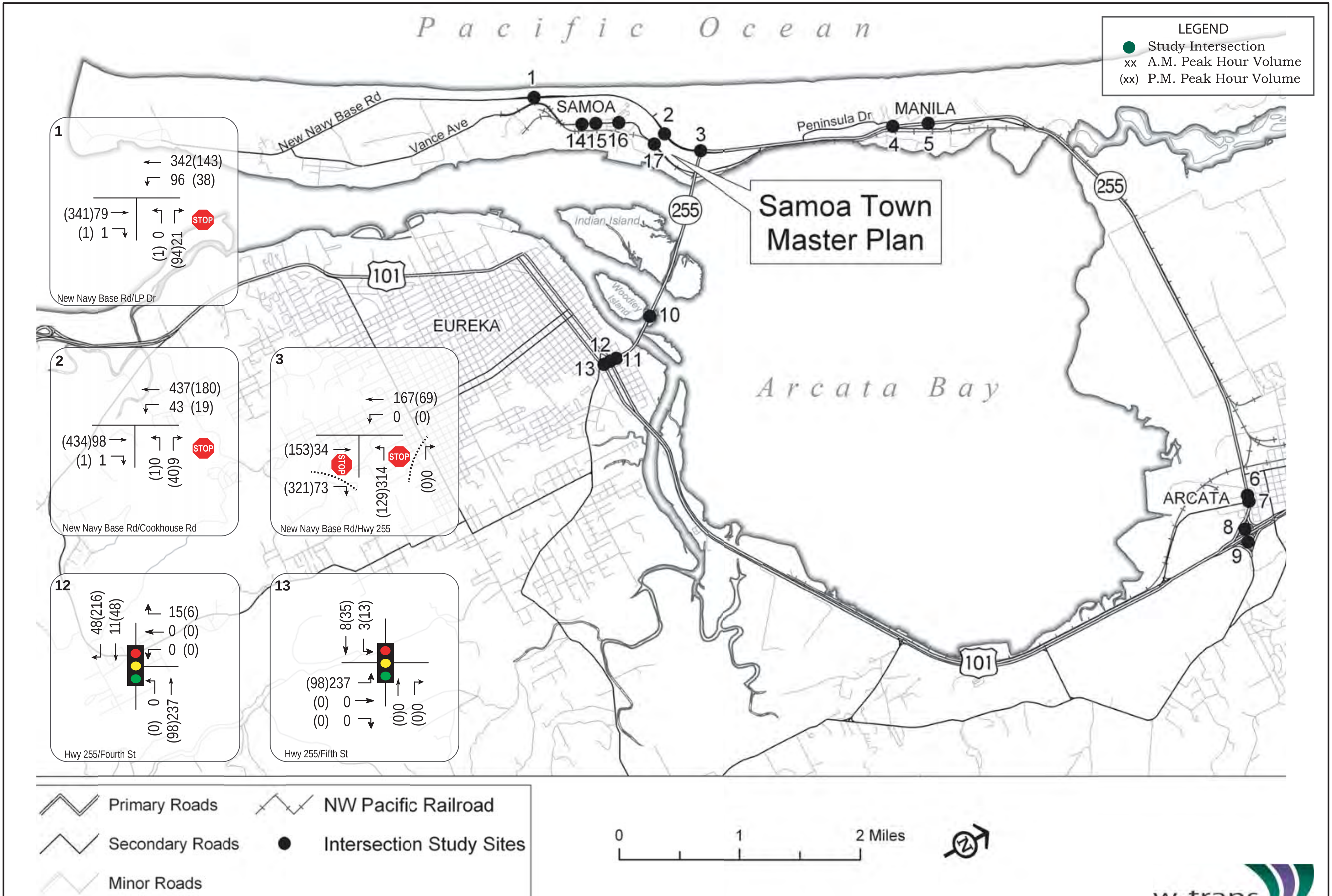

Figure 4 Industrial Waterfront Development Traffic Volumes

```
-----------------------------------------------------------------------------
                   AM Peak Hour - Existing Conditions
                         Samoa Town Master Plan
                           County of Humboldt
-----------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
*****************************************************************************
Intersection #1 New Navy Base Rd/LP Dr
*****************************************************************************
Average Delay (sec/veh):      4.8       Worst Case Level Of Service: A[  9.1]
*****************************************************************************
Street Name:                 LP Dr                      New Navy Base Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  1  0   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:      0    0   123    0    0     0    0   56     4   18   59     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   0    0   123    0    0     0    0   56     4   18   59     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80
PHF Volume:    0    0   154    0    0     0    0   70     5   23   74     0
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
FinalVolume:   0    0   154    0    0     0    0   70     5   23   74     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  191 xxxx    38  xxxx xxxx xxxxx  xxxx xxxx xxxxx    75 xxxx xxxxx
Potent Cap.:  802 xxxx  1040  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1537 xxxx xxxxx
Move Cap.:    793 xxxx  1040  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1537 xxxx xxxxx
Volume/Cap:  0.00 xxxx  0.15  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.01 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx   0.5  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx
Control Del:xxxxx xxxx   9.1 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.4 xxxx xxxxx
LOS by Move:    *    *     A     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:       9.1            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        A               *                *                *
*****************************************************************************
Note: Queue reported is the number of cars per lane.
*****************************************************************************
```



```
-----------------------------------------------------------------------------
                   PM Peak Hour - Existing Conditions
                         Samoa Town Master Plan
                           County of Humboldt
-----------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
*****************************************************************************
Intersection #1 New Navy Base Rd/LP Dr
*****************************************************************************
Average Delay (sec/veh):      1.9       Worst Case Level Of Service: A[  8.9]
*****************************************************************************
Street Name:                 LP Dr                      New Navy Base Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  1  0   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:      6    0    30    0    0     0    0   99     4    6   50     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   6    0    30    0    0     0    0   99     4    6   50     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80
PHF Volume:    8    0    38    0    0     0    0  124     5    8   63     0
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
FinalVolume:   8    0    38    0    0     0    0  124     5    8   63     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  204 xxxx    64  xxxx xxxx xxxxx  xxxx xxxx xxxxx   129 xxxx xxxxx
Potent Cap.:  789 xxxx  1006  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1470 xxxx xxxxx
Move Cap.:    786 xxxx  1006  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1470 xxxx xxxxx
Volume/Cap:  0.01 xxxx  0.04  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.01 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx   0.1  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx
Control Del:  9.6 xxxx   8.7 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.5 xxxx xxxxx
LOS by Move:    A    *     A     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:       8.9            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        A               *                *                *
*****************************************************************************
Note: Queue reported is the number of cars per lane.
*****************************************************************************
```

```
--------------------------------------------------------------------------------
                    AM Peak Hour - Existing Conditions
                         Samoa Town Master Plan
                           County of Humboldt
--------------------------------------------------------------------------------

                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #2 New Navy Base Rd/Cookhouse Rd
********************************************************************************
Average Delay (sec/veh):      2.9       Worst Case Level Of Service: A[  9.0]
********************************************************************************
Street Name:           Cookhouse Rd                    New Navy Base Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  1    0  0  0  0  0    0  0  1  0  1    1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:       0    0    45     0    0     0     0   77     1    32   69     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0    45     0    0     0     0   77     1    32   69     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80
PHF Volume:     0    0    56     0    0     0     0   96     1    40   86     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0    56     0    0     0     0   96     1    40   86     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:xxxxx xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx    96  xxxx xxxx xxxxx  xxxx xxxx xxxxx    98 xxxx xxxxx
Potent Cap.: xxxx xxxx   966  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1508 xxxx xxxxx
Move Cap.:   xxxx xxxx   966  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1508 xxxx xxxxx
Volume/Cap:  xxxx xxxx  0.06  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.03 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx   0.2  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx
Control Del:xxxxx xxxx   9.0 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.5 xxxx xxxxx
LOS by Move:    *    *     A     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:        9.0            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         A                *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```



```
--------------------------------------------------------------------------------
                    PM Peak Hour - Existing Conditions
                         Samoa Town Master Plan
                           County of Humboldt
--------------------------------------------------------------------------------

                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #2 New Navy Base Rd/Cookhouse Rd
********************************************************************************
Average Delay (sec/veh):      1.7       Worst Case Level Of Service: A[  9.2]
********************************************************************************
Street Name:           Cookhouse Rd                    New Navy Base Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  1  0  1    1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:       6    0    30     0    0     0     0   84     6     8   99     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    6    0    30     0    0     0     0   84     6     8   99     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80
PHF Volume:     8    0    38     0    0     0     0  105     8    10  124     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    8    0    38     0    0     0     0  105     8    10  124     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4  6.5   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  249  249   105  xxxx xxxx xxxxx  xxxx xxxx xxxxx   113 xxxx xxxxx
Potent Cap.:  744  657   955  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1490 xxxx xxxxx
Move Cap.:    740  653   955  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1490 xxxx xxxxx
Volume/Cap:  0.01 0.00  0.04  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.01 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.4 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  911 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  0.2 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx  9.2 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    A     *     *    *     *     *    *     *     *    *     *
ApproachDel:        9.2            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         A                *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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--------------------------------------------------------------------------------
                      AM Peak Hour - Existing Conditions
                           Samoa Town Master Plan
                             County of Humboldt
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #3 New Navy Base Rd/Hwy 255
********************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):         0.486
Loss Time (sec):       0              Average Delay (sec/veh):        11.4
Optimal Cycle:         0              Level Of Service:                  B
********************************************************************************
Street Name:                  Hwy 255                      New Navy Base Rd
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Ignore          Include           Ignore          Include
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:      98    0   122     0    0     0     0   45    89   255   57     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   98    0   122     0    0     0     0   45    89   255   57     0
User Adj:    1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  0.00  0.80 0.80  0.80  0.80 0.80  0.00  0.80 0.80  0.80
PHF Volume:   123    0     0     0    0     0     0   56     0   319   71     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  123    0     0     0    0     0     0   56     0   319   71     0
PCE Adj:     1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
FinalVolume:  123    0     0     0    0     0     0   56     0   319   71     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 0.00  1.00  0.00 0.00  0.00  0.00 1.00  1.00  1.00 1.00  0.00
Final Sat.:   564    0   689     0    0     0     0  666   764   656  718     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.22 xxxx  0.00  xxxx xxxx  xxxx  xxxx 0.08  0.00  0.49 0.10  xxxx
Crit Moves:  ****                                   ****        ****
Delay/Veh:   10.4  0.0   0.0   0.0  0.0   0.0   0.0  8.4   0.0  13.1  8.2   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  10.4  0.0   0.0   0.0  0.0   0.0   0.0  8.4   0.0  13.1  8.2   0.0
LOS by Move:    B    *     *     *    *     *     *    A     *     B    A     *
ApproachDel:      10.4            xxxxxx              8.4              12.2
Delay Adj:        1.00             xxxxx             1.00              1.00
ApprAdjDel:       10.4            xxxxxx              8.4              12.2
LOS by Appr:        B                *                 A                 B
AllWayAvgQ:   0.2  0.0   0.0   0.0  0.0   0.0   0.0  0.1   0.0   0.9  0.1   0.0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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--------------------------------------------------------------------------------
                      PM Peak Hour - Existing Conditions
                           Samoa Town Master Plan
                             County of Humboldt
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #3 New Navy Base Rd/Hwy 255
********************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):         0.715
Loss Time (sec):       0              Average Delay (sec/veh):        16.6
Optimal Cycle:         0              Level Of Service:                  C
********************************************************************************
Street Name:                  Hwy 255                      New Navy Base Rd
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Ignore          Include           Ignore          Include
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:     121    0   388     0    0     0     0   65   131   366   53     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  121    0   388     0    0     0     0   65   131   366   53     0
User Adj:    1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  0.00  0.80 0.80  0.80  0.80 0.80  0.00  0.80 0.80  0.80
PHF Volume:   151    0     0     0    0     0     0   81     0   458   66     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  151    0     0     0    0     0     0   81     0   458   66     0
PCE Adj:     1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
FinalVolume:  151    0     0     0    0     0     0   81     0   458   66     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 0.00  1.00  0.00 0.00  0.00  0.00 1.00  1.00  1.00 1.00  0.00
Final Sat.:   524    0   628     0    0     0     0  629   713   640  695     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.29 xxxx  0.00  xxxx xxxx  xxxx  xxxx 0.13  0.00  0.71 0.10  xxxx
Crit Moves:  ****                                   ****        ****
Delay/Veh:   11.7  0.0   0.0   0.0  0.0   0.0   0.0  9.0   0.0  20.8  8.3   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  11.7  0.0   0.0   0.0  0.0   0.0   0.0  9.0   0.0  20.8  8.3   0.0
LOS by Move:    B    *     *     *    *     *     *    A     *     C    A     *
ApproachDel:      11.7            xxxxxx              9.0              19.2
Delay Adj:        1.00             xxxxx             1.00              1.00
ApprAdjDel:       11.7            xxxxxx              9.0              19.2
LOS by Appr:        B                *                 A                 C
AllWayAvgQ:   0.4  0.0   0.0   0.0  0.0   0.0   0.0  0.1   0.0   2.2  0.1   0.0
********************************************************************************
Note: Queue reported is the number of cars per lane.
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--------------------------------------------------------------------------------
                    AM Peak Hour - Existing Conditions
                         Samoa Town Master Plan
                           County of Humboldt
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Operations Method (Base Volume Alternative)
********************************************************************************
Intersection #12 Hwy 255/Fourth St
********************************************************************************
Cycle (sec):         70              Critical Vol./Cap.(X):         0.756
Loss Time (sec):      8              Average Delay (sec/veh):        14.0
Optimal Cycle:       52              Level Of Service:                  B
********************************************************************************
Street Name:                 Hwy 255                       Fourth St
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Y+R:         4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  0   0  0  1  0  1   0  0  0  0  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:     13  251     0    0   76   244    0    0     0   10 1673    16
Growth Adj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  13  251     0    0   76   244    0    0     0   10 1673    16
User Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:    0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93
PHF Volume:   14  270     0    0   82   262    0    0     0   11 1799    17
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  14  270     0    0   82   262    0    0     0   11 1799    17
PCE Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  14  270     0    0   82   262    0    0     0   11 1799    17
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment: 0.70 0.95  1.00 1.00 1.00  0.85 1.00 1.00  1.00 0.95 0.95  0.95
Lanes:      1.00 2.00  0.00 0.00 1.00  1.00 0.00 0.00  0.00 0.01 1.97  0.02
Final Sat.: 1330 3610     0    0 1900  1615    0    0     0   21 3548    34
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.01 0.07  0.00 0.00 0.04  0.16 0.00 0.00  0.00 0.51 0.51  0.51
Crit Moves:                            ****                       ****
Green/Cycle: 0.21 0.21  0.00 0.00 0.21  0.21 0.00 0.00  0.00 0.67 0.67  0.67
Volume/Cap: 0.05 0.35  0.00 0.00 0.20  0.76 0.00 0.00  0.00 0.76 0.76  0.76
Delay/Veh:  21.9 23.6   0.0  0.0 22.8  34.9  0.0  0.0   0.0  9.1  9.1   9.1
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh: 21.9 23.6   0.0  0.0 22.8  34.9  0.0  0.0   0.0  9.1  9.1   9.1
LOS by Move:   C    C     A    A    C     C    A    A     A    A    A     A
HCM2kAvgQ:     0    3     0    0    2     7    0    0     0   15   15    15
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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--------------------------------------------------------------------------------
                    PM Peak Hour - Existing Conditions
                         Samoa Town Master Plan
                           County of Humboldt
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Operations Method (Base Volume Alternative)
********************************************************************************
Intersection #12 Hwy 255/Fourth St
********************************************************************************
Cycle (sec):         70              Critical Vol./Cap.(X):         0.741
Loss Time (sec):      8              Average Delay (sec/veh):        14.9
Optimal Cycle:       50              Level Of Service:                  B
********************************************************************************
Street Name:                 Hwy 255                       Fourth St
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Y+R:         4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  0   0  0  1  0  1   0  0  0  0  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:     32  299     0    0   70   286    0    0     0   14 1498    45
Growth Adj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  32  299     0    0   70   286    0    0     0   14 1498    45
User Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:    0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93
PHF Volume:   34  322     0    0   75   308    0    0     0   15 1611    48
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  34  322     0    0   75   308    0    0     0   15 1611    48
PCE Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  34  322     0    0   75   308    0    0     0   15 1611    48
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment: 0.71 0.95  1.00 1.00 1.00  0.85 1.00 1.00  1.00 0.95 0.95  0.95
Lanes:      1.00 2.00  0.00 0.00 1.00  1.00 0.00 0.00  0.00 0.02 1.92  0.06
Final Sat.: 1340 3610     0    0 1900  1615    0    0     0   32 3456   104
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.03 0.09  0.00 0.00 0.04  0.19 0.00 0.00  0.00 0.47 0.47  0.47
Crit Moves:                            ****                       ****
Green/Cycle: 0.26 0.26  0.00 0.00 0.26  0.26 0.00 0.00  0.00 0.63 0.63  0.63
Volume/Cap: 0.10 0.35  0.00 0.00 0.15  0.74 0.00 0.00  0.00 0.74 0.74  0.74
Delay/Veh:  20.0 21.4   0.0  0.0 20.3  30.9  0.0  0.0   0.0 10.4 10.4  10.4
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh: 20.0 21.4   0.0  0.0 20.3  30.9  0.0  0.0   0.0 10.4 10.4  10.4
LOS by Move:   B    C     A    A    C     C    A    A     A    B    B     B
HCM2kAvgQ:     1    3     0    0    1     8    0    0     0   15   15    15
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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--------------------------------------------------------------------------------
                   AM Peak Hour - Existing Conditions
                         Samoa Town Master Plan
                           County of Humboldt
--------------------------------------------------------------------------------
                  Level Of Service Computation Report
         2000 HCM Operations Method (Base Volume Alternative)
********************************************************************************
Intersection #13 Hwy 255/Fifth St
********************************************************************************
Cycle (sec):       100              Critical Vol./Cap.(X):        0.369
Loss Time (sec):     6              Average Delay (sec/veh):        6.2
Optimal Cycle:      22              Level Of Service:                 A
********************************************************************************
Street Name:                 Hwy 255                      Fifth St
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        0  0  1  1  0   1  0  2  0  0   0  1  2  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:       0   23    23   54   35     0  244 1163     5    0    0     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0   23    23   54   35     0  244 1163     5    0    0     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93
PHF Volume:     0   25    25   58   38     0  262 1251     5    0    0     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0   25    25   58   38     0  262 1251     5    0    0     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    0   25    25   58   38     0  262 1251     5    0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  1.00 0.88  0.88 0.95 0.95  1.00 0.89 0.89  0.85 1.00 1.00  1.00
Lanes:       0.00 1.00  1.00 1.00 2.00  0.00 0.52 2.48  1.00 0.00 0.00  0.00
Final Sat.:     0 1670  1670 1805 3610     0  876 4176  1615    0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.01  0.01 0.03 0.01  0.00 0.30 0.30  0.00 0.00 0.00  0.00
Crit Moves:       ****       ****            ****
Green/Cycle: 0.00 0.04  0.04 0.09 0.13  0.00 0.81 0.81  0.81 0.00 0.00  0.00
Volume/Cap:  0.00 0.37  0.37 0.37 0.08  0.00 0.37 0.37  0.00 0.00 0.00  0.00
Delay/Veh:    0.0 48.5  48.5 44.5 38.5   0.0  2.6  2.6   1.8  0.0  0.0   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0 48.5  48.5 44.5 38.5   0.0  2.6  2.6   1.8  0.0  0.0   0.0
LOS by Move:    A    D     D    D    D     A    A    A     A    A    A     A
HCM2kAvgQ:      0    1     1    2    1     0    5    5     0    0    0     0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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--------------------------------------------------------------------------------
                   PM Peak Hour - Existing Conditions
                         Samoa Town Master Plan
                           County of Humboldt
--------------------------------------------------------------------------------
                  Level Of Service Computation Report
         2000 HCM Operations Method (Base Volume Alternative)
********************************************************************************
Intersection #13 Hwy 255/Fifth St
********************************************************************************
Cycle (sec):       100              Critical Vol./Cap.(X):        0.531
Loss Time (sec):     6              Average Delay (sec/veh):        5.3
Optimal Cycle:      29              Level Of Service:                 A
********************************************************************************
Street Name:                 Hwy 255                      Fifth St
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        0  0  1  1  0   1  0  2  0  0   0  1  2  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:       0   35    35   44   35     0  329 1793     7    0    0     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0   35    35   44   35     0  329 1793     7    0    0     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93
PHF Volume:     0   38    38   47   38     0  354 1928     8    0    0     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0   38    38   47   38     0  354 1928     8    0    0     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    0   38    38   47   38     0  354 1928     8    0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  1.00 0.88  0.88 0.95 0.95  1.00 0.89 0.89  0.85 1.00 1.00  1.00
Lanes:       0.00 1.00  1.00 1.00 2.00  0.00 0.47 2.53  1.00 0.00 0.00  0.00
Final Sat.:     0 1670  1670 1805 3610     0  786 4282  1615    0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.02  0.02 0.03 0.01  0.00 0.45 0.45  0.00 0.00 0.00  0.00
Crit Moves:       ****       ****            ****
Green/Cycle: 0.00 0.04  0.04 0.05 0.09  0.00 0.85 0.85  0.85 0.00 0.00  0.00
Volume/Cap:  0.00 0.53  0.53 0.53 0.11  0.00 0.53 0.53  0.01 0.00 0.00  0.00
Delay/Veh:    0.0 50.7  50.7 52.4 41.8   0.0  2.2  2.2   1.2  0.0  0.0   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0 50.7  50.7 52.4 41.8   0.0  2.2  2.2   1.2  0.0  0.0   0.0
LOS by Move:    A    D     D    D    D     A    A    A     A    A    A     A
HCM2kAvgQ:      0    2     2    1    1     0    8    8     0    0    0     0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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-------------------------------------------------------------------------------
                     AM Peak Hour - Future Conditions
                          Samoa Town Master Plan
                            County of Humboldt
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #1 New Navy Base Rd/LP Dr
********************************************************************************
Average Delay (sec/veh):      4.9      Worst Case Level Of Service: A[  9.3]
********************************************************************************
Street Name:                 LP Dr                         New Navy Base Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:         1  0  0  0  1   0  0  0  0  0   0  0  1  1  0   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:        0    0   148     0    0     0     0   67     5    21   71     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0    0   148     0    0     0     0   67     5    21   71     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80
PHF Volume:      0    0   185     0    0     0     0   84     6    26   89     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     0    0   185     0    0     0     0   84     6    26   89     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  228 xxxx    45  xxxx xxxx xxxxx  xxxx xxxx xxxxx    90 xxxx xxxxx
Potent Cap.:  764 xxxx  1031  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1518 xxxx xxxxx
Move Cap.:    754 xxxx  1031  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1518 xxxx xxxxx
Volume/Cap:  0.00 xxxx  0.18  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.02 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx   0.7  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx
Control Del:xxxxx xxxx   9.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.4 xxxx xxxxx
LOS by Move:     *    *     A     *    *     *     *    *     *     A    *     *
Movement:      LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:        9.3           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         A               *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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-------------------------------------------------------------------------------
                     PM Peak Hour - Future Conditions
                          Samoa Town Master Plan
                            County of Humboldt
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #1 New Navy Base Rd/LP Dr
********************************************************************************
Average Delay (sec/veh):      1.9      Worst Case Level Of Service: A[  9.0]
********************************************************************************
Street Name:                 LP Dr                         New Navy Base Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:         1  0  0  0  1   0  0  0  0  0   0  0  1  1  0   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:        7    0    36     0    0     0     0  119     5     7   59     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     7    0    36     0    0     0     0  119     5     7   59     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80
PHF Volume:      9    0    45     0    0     0     0  149     6     9   74     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     9    0    45     0    0     0     0  149     6     9   74     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  243 xxxx    78  xxxx xxxx xxxxx  xxxx xxxx xxxxx   155 xxxx xxxxx
Potent Cap.:  750 xxxx   989  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1438 xxxx xxxxx
Move Cap.:    746 xxxx   989  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1438 xxxx xxxxx
Volume/Cap:  0.01 xxxx  0.05  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.01 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx   0.1  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx
Control Del:  9.9 xxxx   8.8 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.5 xxxx xxxxx
LOS by Move:     A    *     A     *    *     *     *    *     *     A    *     *
Movement:      LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:        9.0           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         A               *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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-------------------------------------------------------------------------------
                      AM Peak Hour - Future Conditions
                          Samoa Town Master Plan
                            County of Humboldt
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #2 New Navy Base Rd/Cookhouse Rd
********************************************************************************
Average Delay (sec/veh):      2.9       Worst Case Level Of Service: A[  9.1]
********************************************************************************
Street Name:           Cookhouse Rd                     New Navy Base Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  1    0  0  0  0  0    0  0  1  0  1    1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:        0    0    54     0    0     0     0   92     1    38   83     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0    0    54     0    0     0     0   92     1    38   83     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80
PHF Volume:      0    0    68     0    0     0     0  115     1    48  104     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     0    0    68     0    0     0     0  115     1    48  104     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:xxxxx xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx   115  xxxx xxxx xxxxx  xxxx xxxx xxxxx   116 xxxx xxxxx
Potent Cap.: xxxx xxxx   943  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1485 xxxx xxxxx
Move Cap.:   xxxx xxxx   943  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1485 xxxx xxxxx
Volume/Cap:  xxxx xxxx  0.07  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.03 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx   0.2  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx
Control Del:xxxxx xxxx   9.1 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.5 xxxx xxxxx
LOS by Move:     *    *     A     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:        9.1            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         A                *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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-------------------------------------------------------------------------------
                      PM Peak Hour - Future Conditions
                          Samoa Town Master Plan
                            County of Humboldt
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #2 New Navy Base Rd/Cookhouse Rd
********************************************************************************
Average Delay (sec/veh):      1.7       Worst Case Level Of Service: A[  9.3]
********************************************************************************
Street Name:           Cookhouse Rd                     New Navy Base Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  1  0  1    1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:        7    0    36     0    0     0     0  100     7     9  119     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     7    0    36     0    0     0     0  100     7     9  119     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80
PHF Volume:      9    0    45     0    0     0     0  125     9    11  149     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     9    0    45     0    0     0     0  125     9    11  149     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4  6.5   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  296  296   125  xxxx xxxx xxxxx  xxxx xxxx xxxxx   134 xxxx xxxxx
Potent Cap.:  699  619   931  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1463 xxxx xxxxx
Move Cap.:    695  614   931  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1463 xxxx xxxxx
Volume/Cap:  0.01 0.00  0.05  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.01 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.5 xxxx xxxxx
LOS by Move:     *    *     *     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  882 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  0.2 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx  9.3 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    A     *     *    *     *     *    *     *     *    *     *
ApproachDel:        9.3            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         A                *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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-------------------------------------------------------------------------------
                     AM Peak Hour - Future Conditions
                          Samoa Town Master Plan
                            County of Humboldt
-------------------------------------------------------------------------------
                       Level Of Service Computation Report
            2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #3 New Navy Base Rd/Hwy 255
********************************************************************************
Cycle (sec):          100             Critical Vol./Cap.(X):           0.594
Loss Time (sec):        0             Average Delay (sec/veh):          13.2
Optimal Cycle:          0             Level Of Service:                    B
********************************************************************************
Street Name:                  Hwy 255                     New Navy Base Rd
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Ignore          Include           Ignore          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:     117    0   147     0    0     0     0   54   107   306   69     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse: 117    0   147     0    0     0     0   54   107   306   69     0
User Adj:    1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  0.00  0.80 0.80  0.80  0.80 0.80  0.00  0.80 0.80  0.80
PHF Volume:   146    0     0     0    0     0     0   68     0   383   86     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  146    0     0     0    0     0     0   68     0   383   86     0
PCE Adj:     1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
FinalVolume:  146    0     0     0    0     0     0   68     0   383   86     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 0.00  1.00  0.00 0.00  0.00  0.00 1.00  1.00  1.00 1.00  0.00
Final Sat.:   542    0   656     0    0     0     0  641   729   644  702     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.27 xxxx  0.00  xxxx xxxx  xxxx  xxxx 0.11  0.00  0.59 0.12  xxxx
Crit Moves:  ****                                   ****        ****
Delay/Veh:   11.2  0.0   0.0   0.0  0.0   0.0   0.0  8.8   0.0  15.8  8.4   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  11.2  0.0   0.0   0.0  0.0   0.0   0.0  8.8   0.0  15.8  8.4   0.0
LOS by Move:    B    *     *     *    *     *     *    A     *     C    A     *
ApproachDel:      11.2            xxxxxx              8.8             14.5
Delay Adj:        1.00             xxxxx             1.00             1.00
ApprAdjDel:       11.2            xxxxxx              8.8             14.5
LOS by Appr:         B                 *                A                B
AllWayAvgQ:   0.3  0.0   0.0   0.0  0.0   0.0   0.0  0.1   0.0   1.4  0.1   0.0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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-------------------------------------------------------------------------------
                     PM Peak Hour - Future Conditions
                          Samoa Town Master Plan
                            County of Humboldt
-------------------------------------------------------------------------------
                       Level Of Service Computation Report
            2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #3 New Navy Base Rd/Hwy 255
********************************************************************************
Cycle (sec):          100             Critical Vol./Cap.(X):           0.881
Loss Time (sec):        0             Average Delay (sec/veh):          26.2
Optimal Cycle:          0             Level Of Service:                    D
********************************************************************************
Street Name:                  Hwy 255                     New Navy Base Rd
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Ignore          Include           Ignore          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:     145    0   466     0    0     0     0   78   157   440   63     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse: 145    0   466     0    0     0     0   78   157   440   63     0
User Adj:    1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  0.00  0.80 0.80  0.80  0.80 0.80  0.00  0.80 0.80  0.80
PHF Volume:   181    0     0     0    0     0     0   98     0   550   79     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  181    0     0     0    0     0     0   98     0   550   79     0
PCE Adj:     1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
FinalVolume:  181    0     0     0    0     0     0   98     0   550   79     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 0.00  1.00  0.00 0.00  0.00  0.00 1.00  1.00  1.00 1.00  0.00
Final Sat.:   508    0   608     0    0     0     0  595   670   624  674     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.36 xxxx  0.00  xxxx xxxx  xxxx  xxxx 0.16  0.00  0.88 0.12  xxxx
Crit Moves:  ****                                   ****        ****
Delay/Veh:   13.1  0.0   0.0   0.0  0.0   0.0   0.0  9.6   0.0  35.9  8.6   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  13.1  0.0   0.0   0.0  0.0   0.0   0.0  9.6   0.0  35.9  8.6   0.0
LOS by Move:    B    *     *     *    *     *     *    A     *     E    A     *
ApproachDel:      13.1            xxxxxx              9.6             32.5
Delay Adj:        1.00             xxxxx             1.00             1.00
ApprAdjDel:       13.1            xxxxxx              9.6             32.5
LOS by Appr:         B                 *                A                D
AllWayAvgQ:   0.5  0.0   0.0   0.0  0.0   0.0   0.0  0.2   0.0   4.8  0.1   0.0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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AM Peak Hour - Future Conditions
Samoa Town Master Plan
County of Humboldt

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #12 Hwy 255/Fourth St

Cycle (sec):	70	Critical Vol./Cap.(X):	0.914
Loss Time (sec):	8	Average Delay (sec/veh):	21.1
Optimal Cycle:	90	Level Of Service:	C

Street Name:	Hwy 255						Fourth St					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	0	0 0	1 0	1	0 0	0 0	0	0 1	0 1	0
Volume Module:2033												
Base Vol:	16	326	0	0	99	317	0	0	0	13	2175	21
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	16	326	0	0	99	317	0	0	0	13	2175	21
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	16	326	0	0	99	317	0	0	0	13	2175	21
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	16	326	0	0	99	317	0	0	0	13	2175	21
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	16	326	0	0	99	317	0	0	0	13	2175	21
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.69	0.95	1.00	1.00	1.00	0.85	1.00	1.00	1.00	0.95	0.95	0.95
Lanes:	1.00	2.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.01	1.97	0.02
Final Sat.:	1305	3610	0	0	1900	1615	0	0	0	21	3547	34
Capacity Analysis Module:												
Vol/Sat:	0.01	0.09	0.00	0.00	0.05	0.20	0.00	0.00	0.00	0.61	0.61	0.61
Crit Moves:						****					****	
Green/Cycle:	0.21	0.21	0.00	0.00	0.21	0.21	0.00	0.00	0.00	0.67	0.67	0.67
Volume/Cap:	0.06	0.42	0.00	0.00	0.24	0.91	0.00	0.00	0.00	0.91	0.91	0.91
Delay/Veh:	21.9	24.1	0.0	0.0	23.1	54.5	0.0	0.0	0.0	15.7	15.7	15.7
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	21.9	24.1	0.0	0.0	23.1	54.5	0.0	0.0	0.0	15.7	15.7	15.7
LOS by Move:	C	C	A	A	C	D	A	A	A	B	B	B
HCM2kAvgQ:	0	3	0	0	2	11	0	0	0	26	26	26

Note: Queue reported is the number of cars per lane.

PM Peak Hour - Future Conditions
Samoa Town Master Plan
County of Humboldt

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #12 Hwy 255/Fourth St

Cycle (sec):	70	Critical Vol./Cap.(X):	0.896
Loss Time (sec):	8	Average Delay (sec/veh):	21.0
Optimal Cycle:	83	Level Of Service:	C

Street Name:	Hwy 255						Fourth St					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	0	0 0	1 0	1	0 0	0 0	0	0 1	0 1	0
Volume Module:2033												
Base Vol:	42	389	0	0	91	372	0	0	0	18	1948	58
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	42	389	0	0	91	372	0	0	0	18	1948	58
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	42	389	0	0	91	372	0	0	0	18	1948	58
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	42	389	0	0	91	372	0	0	0	18	1948	58
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	42	389	0	0	91	372	0	0	0	18	1948	58
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.69	0.95	1.00	1.00	1.00	0.85	1.00	1.00	1.00	0.95	0.95	0.95
Lanes:	1.00	2.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.02	1.92	0.06
Final Sat.:	1317	3610	0	0	1900	1615	0	0	0	32	3457	103
Capacity Analysis Module:												
Vol/Sat:	0.03	0.11	0.00	0.00	0.05	0.23	0.00	0.00	0.00	0.56	0.56	0.56
Crit Moves:						****					****	
Green/Cycle:	0.26	0.26	0.00	0.00	0.26	0.26	0.00	0.00	0.00	0.63	0.63	0.63
Volume/Cap:	0.12	0.42	0.00	0.00	0.19	0.90	0.00	0.00	0.00	0.90	0.90	0.90
Delay/Veh:	20.1	22.0	0.0	0.0	20.5	46.5	0.0	0.0	0.0	16.2	16.2	16.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	20.1	22.0	0.0	0.0	20.5	46.5	0.0	0.0	0.0	16.2	16.2	16.2
LOS by Move:	C	C	A	A	C	D	A	A	A	B	B	B
HCM2kAvgQ:	1	4	0	0	2	12	0	0	0	24	24	24

Note: Queue reported is the number of cars per lane.

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-------------------------------------------------------------------------------
                      AM Peak Hour - Future Conditions
                           Samoa Town Master Plan
                             County of Humboldt
-------------------------------------------------------------------------------

                     Level Of Service Computation Report
            2000 HCM Operations Method (Base Volume Alternative)
*******************************************************************************
Intersection #13 Hwy 255/Fifth St
*******************************************************************************
Cycle (sec):          100              Critical Vol./Cap.(X):          0.445
Loss Time (sec):        6              Average Delay (sec/veh):          6.5
Optimal Cycle:         25              Level Of Service:                   A
*******************************************************************************
Street Name:                Hwy 255                        Fifth St
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:     0    0    0     0    0    0     0    0    0     0    0    0
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        0  0  1  1  0   1  0  2  0  0   0  1  2  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:       0   30    30    70   45     0   317 1511     6     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0   30    30    70   45     0   317 1511     6     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0   30    30    70   45     0   317 1511     6     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0   30    30    70   45     0   317 1511     6     0    0     0
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    0   30    30    70   45     0   317 1511     6     0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  1.00 0.88  0.88  0.95 0.95  1.00  0.89 0.89  0.85  1.00 1.00  1.00
Lanes:       0.00 1.00  1.00  1.00 2.00  0.00  0.52 2.48  1.00  0.00 0.00  0.00
Final Sat.:     0 1670  1670  1805 3610     0   876 4176  1615     0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.02  0.02  0.04 0.01  0.00  0.36 0.36  0.00  0.00 0.00  0.00
Crit Moves:       ****        ****              ****
Green/Cycle: 0.00 0.04  0.04  0.09 0.13  0.00  0.81 0.81  0.81  0.00 0.00  0.00
Volume/Cap:  0.00 0.45  0.45  0.45 0.10  0.00  0.45 0.45  0.00  0.00 0.00  0.00
Delay/Veh:    0.0 49.2  49.2  45.4 38.6   0.0   2.8  2.8   1.8   0.0  0.0   0.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0 49.2  49.2  45.4 38.6   0.0   2.8  2.8   1.8   0.0  0.0   0.0
LOS by Move:    A    D     D     D    D     A     A    A     A     A    A     A
HCM2kAvgQ:      0    2     2     2    1     0     6    6     0     0    0     0
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```



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-------------------------------------------------------------------------------
                      PM Peak Hour - Future Conditions
                           Samoa Town Master Plan
                             County of Humboldt
-------------------------------------------------------------------------------

                     Level Of Service Computation Report
            2000 HCM Operations Method (Base Volume Alternative)
*******************************************************************************
Intersection #13 Hwy 255/Fifth St
*******************************************************************************
Cycle (sec):          100              Critical Vol./Cap.(X):          0.641
Loss Time (sec):        6              Average Delay (sec/veh):          6.2
Optimal Cycle:         36              Level Of Service:                   A
*******************************************************************************
Street Name:                Hwy 255                        Fifth St
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:     0    0    0     0    0    0     0    0    0     0    0    0
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        0  0  1  1  0   1  0  2  0  0   0  1  2  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:       0   45    45    57   45     0   428 2331     9     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0   45    45    57   45     0   428 2331     9     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0   45    45    57   45     0   428 2331     9     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0   45    45    57   45     0   428 2331     9     0    0     0
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    0   45    45    57   45     0   428 2331     9     0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  1.00 0.88  0.88  0.95 0.95  1.00  0.89 0.89  0.85  1.00 1.00  1.00
Lanes:       0.00 1.00  1.00  1.00 2.00  0.00  0.47 2.53  1.00  0.00 0.00  0.00
Final Sat.:     0 1670  1670  1805 3610     0   786 4282  1615     0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.03  0.03  0.03 0.01  0.00  0.54 0.54  0.01  0.00 0.00  0.00
Crit Moves:       ****        ****              ****
Green/Cycle: 0.00 0.04  0.04  0.05 0.09  0.00  0.85 0.85  0.85  0.00 0.00  0.00
Volume/Cap:  0.00 0.64  0.64  0.64 0.14  0.00  0.64 0.64  0.01  0.00 0.00  0.00
Delay/Veh:    0.0 56.8  56.8  61.5 42.0   0.0   2.8  2.8   1.2   0.0  0.0   0.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0 56.8  56.8  61.5 42.0   0.0   2.8  2.8   1.2   0.0  0.0   0.0
LOS by Move:    A    E     E     E    D     A     A    A     A     A    A     A
HCM2kAvgQ:      0    3     3     2    1     0    11   11     0     0    0     0
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
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----------------------------------------------------------------------------------
                 AM Peak Hour - Existing plus STMP Conditions
                           Samoa Town Master Plan
                             County of Humboldt
----------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
**********************************************************************************
Intersection #1 New Navy Base Rd/LP Dr
**********************************************************************************
Average Delay (sec/veh):      6.1       Worst Case Level Of Service: A[  9.3]
**********************************************************************************
Street Name:               LP Dr                           New Navy Base Rd
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  1  0   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:       0    0   123    0    0     0    0   56     4   18   59     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0   123    0    0     0    0   56     4   18   59     0
Added Vol:      3    0    28    0    0     0    0    0     4  146    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    3    0   151    0    0     0    0   56     8  164   59     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80
PHF Volume:     4    0   189    0    0     0    0   70    10  205   74     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
FinalVolume:    4    0   189    0    0     0    0   70    10  205   74     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  559 xxxx    40  xxxx xxxx xxxxx  xxxx xxxx xxxxx    80 xxxx xxxxx
Potent Cap.:  494 xxxx  1037  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1531 xxxx xxxxx
Move Cap.:    443 xxxx  1037  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1531 xxxx xxxxx
Volume/Cap:  0.01 xxxx  0.18  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.13 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx   0.7  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.5 xxxx xxxxx
Control Del: 13.2 xxxx   9.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.7 xxxx xxxxx
LOS by Move:    B    *     A     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:        9.3            xxxxxx            xxxxxx            xxxxxx
ApproachLOS:         A                *                 *                 *
**********************************************************************************
Note: Queue reported is the number of cars per lane.
**********************************************************************************
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----------------------------------------------------------------------------------
                 PM Peak Hour - Existing plus STMP Conditions
                           Samoa Town Master Plan
                             County of Humboldt
----------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
**********************************************************************************
Intersection #1 New Navy Base Rd/LP Dr
**********************************************************************************
Average Delay (sec/veh):      5.3       Worst Case Level Of Service: A[  9.6]
**********************************************************************************
Street Name:               LP Dr                           New Navy Base Rd
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  1  0   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:       6    0    30    0    0     0    0   99     4    6   50     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    6    0    30    0    0     0    0   99     4    6   50     0
Added Vol:      5    0   135    0    0     0    0    0     4   32    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:   11    0   165    0    0     0    0   99     8   38   50     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80
PHF Volume:    14    0   206    0    0     0    0  124    10   48   63     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
FinalVolume:   14    0   206    0    0     0    0  124    10   48   63     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  286 xxxx    67  xxxx xxxx xxxxx  xxxx xxxx xxxxx   134 xxxx xxxxx
Potent Cap.:  708 xxxx  1002  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1463 xxxx xxxxx
Move Cap.:    691 xxxx  1002  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1463 xxxx xxxxx
Volume/Cap:  0.02 xxxx  0.21  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.03 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx   0.8  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx
Control Del: 10.3 xxxx   9.5 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.5 xxxx xxxxx
LOS by Move:    B    *     A     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:        9.6            xxxxxx            xxxxxx            xxxxxx
ApproachLOS:         A                *                 *                 *
**********************************************************************************
Note: Queue reported is the number of cars per lane.
**********************************************************************************
```

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------------------------------------------------------------------------------
                 AM Peak Hour - Existing plus STMP Conditions
                            Samoa Town Master Plan
                              County of Humboldt
------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #2 New Navy Base Rd/Cookhouse Rd
******************************************************************************
Average Delay (sec/veh):      6.1       Worst Case Level Of Service: B[ 10.6]
******************************************************************************
Street Name:           Cookhouse Rd                    New Navy Base Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:        0    0   45    0    0    0    0   77    1   32   69    0
Growth Adj:   1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse:     0    0   45    0    0    0    0   77    1   32   69    0
Added Vol:       0    0  184    0    0    0    0   28    0  338  146    0
PasserByVol:     0    0    0    0    0    0    0    0    0    0    0    0
Initial Fut:     0    0  229    0    0    0    0  105    1  370  215    0
User Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj:      0.80 0.80 0.80 0.80 0.80 0.80 0.80 0.80 0.80 0.80 0.80 0.80
PHF Volume:      0    0  286    0    0    0    0  131    1  463  269    0
Reduct Vol:      0    0    0    0    0    0    0    0    0    0    0    0
FinalVolume:     0    0  286    0    0    0    0  131    1  463  269    0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:xxxxx xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx   131  xxxx xxxx xxxxx  xxxx xxxx xxxxx   133 xxxx xxxxx
Potent Cap.: xxxx xxxx   924  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1465 xxxx xxxxx
Move Cap.:   xxxx xxxx   924  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1465 xxxx xxxxx
Volume/Cap:  xxxx xxxx  0.31  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.32 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx   1.3  xxxx xxxx xxxxx  xxxx xxxx xxxxx   1.4 xxxx xxxxx
Control Del:xxxxx xxxx  10.6 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.6 xxxx xxxxx
LOS by Move:     *    *    B     *    *    *     *    *    *     A    *    *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *    *     *    *    *     *    *    *     *    *    *
ApproachDel:       10.6           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:          B              *                *                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```



```
------------------------------------------------------------------------------
                 PM Peak Hour - Existing plus STMP Conditions
                            Samoa Town Master Plan
                              County of Humboldt
------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #2 New Navy Base Rd/Cookhouse Rd
******************************************************************************
Average Delay (sec/veh):     10.9       Worst Case Level Of Service: C[ 21.2]
******************************************************************************
Street Name:           Cookhouse Rd                    New Navy Base Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  1! 0  0   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:        6    0   30    0    0    0    0   84    6    8   99    0
Growth Adj:   1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse:     6    0   30    0    0    0    0   84    6    8   99    0
Added Vol:       0    0  391    0    0    0    0  135    0  226   32    0
PasserByVol:     0    0    0    0    0    0    0    0    0    0    0    0
Initial Fut:     6    0  421    0    0    0    0  219    6  234  131    0
User Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj:      0.80 0.80 0.80 0.80 0.80 0.80 0.80 0.80 0.80 0.80 0.80 0.80
PHF Volume:      8    0  526    0    0    0    0  274    8  293  164    0
Reduct Vol:      0    0    0    0    0    0    0    0    0    0    0    0
FinalVolume:     8    0  526    0    0    0    0  274    8  293  164    0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4  6.5   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1023 1023   274  xxxx xxxx xxxxx  xxxx xxxx xxxxx   281 xxxx xxxxx
Potent Cap.:  264  238   770  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1293 xxxx xxxxx
Move Cap.:    218  184   770  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1293 xxxx xxxxx
Volume/Cap:  0.03 0.00  0.68  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.23 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.9 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.6 xxxx xxxxx
LOS by Move:     *    *    *     *    *    *     *    *    *     A    *    *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx  743 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  6.2 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx 21.2 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    C    *     *    *    *     *    *    *     *    *    *
ApproachDel:       21.2           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:          C              *                *                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
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-----------------------------------------------------------------------------
             AM Peak Hour - Existing plus STMP Conditions
                      Samoa Town Master Plan
                        County of Humboldt
-----------------------------------------------------------------------------

                  Level Of Service Computation Report
         2000 HCM 4-Way Stop Method (Future Volume Alternative)
*****************************************************************************
Intersection #3 New Navy Base Rd/Hwy 255
*****************************************************************************
Cycle (sec):        100             Critical Vol./Cap.(X):        1.004
Loss Time (sec):      0             Average Delay (sec/veh):       38.0
Optimal Cycle:        0             Level Of Service:                 E
*****************************************************************************
Street Name:                 Hwy 255                    New Navy Base Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Ignore          Include          Ignore           Include
Min. Green:     0    0    0     0    0    0     0    0    0     0    0    0
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:      98    0  122     0    0    0     0   45   89   255   57    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   98    0  122     0    0    0     0   45   89   255   57    0
Added Vol:    314    0    0     0    0    0     0   69  143     0  170    0
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:  412    0  122     0    0    0     0  114  232   255  227    0
User Adj:    1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 0.00  1.00 1.00 1.00
PHF Adj:     0.80 0.80 0.00  0.80 0.80 0.80  0.80 0.80 0.00  0.80 0.80 0.80
PHF Volume:   515    0    0     0    0    0     0  143    0   319  284    0
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:  515    0    0     0    0    0     0  143    0   319  284    0
PCE Adj:     1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 0.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 0.00  1.00 1.00 1.00
FinalVolume:  515    0    0     0    0    0     0  143    0   319  284    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:       1.00 0.00 1.00  0.00 0.00 0.00  0.00 1.00 1.00  1.00 1.00 0.00
Final Sat.:   513    0  603     0    0    0     0  487  538   502  539    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     1.00 xxxx 0.00  xxxx xxxx xxxx  xxxx 0.29 0.00  0.63 0.53 xxxx
Crit Moves:  ****                                 ****        ****
Delay/Veh:   67.0  0.0  0.0   0.0  0.0  0.0   0.0 13.0  0.0  21.5 16.5  0.0
Delay Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:  67.0  0.0  0.0   0.0  0.0  0.0   0.0 13.0  0.0  21.5 16.5  0.0
LOS by Move:    F    *    *     *    *    *     *    B    *     C    C    *
ApproachDel:      67.0            xxxxxx            13.0            19.1
Delay Adj:        1.00             xxxxx            1.00            1.00
ApprAdjDel:       67.0            xxxxxx            13.0            19.1
LOS by Appr:         F                *                B               C
AllWayAvgQ:   8.2  0.0  0.0   0.0  0.0  0.0   0.0  0.4  0.0   1.6  1.1  0.0
*****************************************************************************
```



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-----------------------------------------------------------------------------
             PM Peak Hour - Existing plus STMP Conditions
                      Samoa Town Master Plan
                        County of Humboldt
-----------------------------------------------------------------------------

                  Level Of Service Computation Report
         2000 HCM 4-Way Stop Method (Future Volume Alternative)
*****************************************************************************
Intersection #3 New Navy Base Rd/Hwy 255
*****************************************************************************
Cycle (sec):        100             Critical Vol./Cap.(X):        0.882
Loss Time (sec):      0             Average Delay (sec/veh):       28.3
Optimal Cycle:        0             Level Of Service:                 D
*****************************************************************************
Street Name:                 Hwy 255                    New Navy Base Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Ignore          Include          Ignore           Include
Min. Green:     0    0    0     0    0    0     0    0    0     0    0    0
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:     121    0  388     0    0    0     0   65  131   366   53    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:  121    0  388     0    0    0     0   65  131   366   53    0
Added Vol:    170    0    0     0    0    0     0  169  357     0   89    0
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:  291    0  388     0    0    0     0  234  488   366  142    0
User Adj:    1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 0.00  1.00 1.00 1.00
PHF Adj:     0.80 0.80 0.00  0.80 0.80 0.80  0.80 0.80 0.00  0.80 0.80 0.80
PHF Volume:   364    0    0     0    0    0     0  293    0   458  178    0
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:  364    0    0     0    0    0     0  293    0   458  178    0
PCE Adj:     1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 0.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 0.00  1.00 1.00 1.00
FinalVolume:  364    0    0     0    0    0     0  293    0   458  178    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:       1.00 0.00 1.00  0.00 0.00 0.00  0.00 1.00 1.00  1.00 1.00 0.00
Final Sat.:   479    0  561     0    0    0     0  512  559   519  552    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.76 xxxx 0.00  xxxx xxxx xxxx  xxxx 0.57 0.00  0.88 0.32 xxxx
Crit Moves:  ****                                 ****        ****
Delay/Veh:   28.6  0.0  0.0   0.0  0.0  0.0   0.0 17.9  0.0  40.9 12.0  0.0
Delay Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:  28.6  0.0  0.0   0.0  0.0  0.0   0.0 17.9  0.0  40.9 12.0  0.0
LOS by Move:    D    *    *     *    *    *     *    C    *     E    B    *
ApproachDel:      28.6            xxxxxx            17.9            32.8
Delay Adj:        1.00             xxxxx            1.00            1.00
ApprAdjDel:       28.6            xxxxxx            17.9            32.8
LOS by Appr:         D                *                C               D
AllWayAvgQ:   2.5  0.0  0.0   0.0  0.0  0.0   0.0  1.2  0.0   4.5  0.4  0.0
*****************************************************************************
```

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-----------------------------------------------------------------------------
               AM Peak Hour - Existing plus STMP Conditions
                         Samoa Town Master Plan
                           County of Humboldt
-----------------------------------------------------------------------------
                  Level Of Service Computation Report
        2000 HCM Operations Method (Future Volume Alternative)
*****************************************************************************
Intersection #12 Hwy 255/Fourth St
*****************************************************************************
Cycle (sec):          70             Critical Vol./Cap.(X):        0.835
Loss Time (sec):       8             Average Delay (sec/veh):       18.5
Optimal Cycle:        66             Level Of Service:                 B
*****************************************************************************
Street Name:                Hwy 255                       Fourth St
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Y+R:         4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  0   0  0  1  0  1   0  0  0  0  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:     13  251     0    0   76   244    0    0     0   10 1673    16
Growth Adj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  13  251     0    0   76   244    0    0     0   10 1673    16
Added Vol:     0  239     0    0   21    97    0    0     0    0    0    15
PasserByVol:   0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  13  490     0    0   97   341    0    0     0   10 1673    31
User Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:    0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93
PHF Volume:   14  527     0    0  104   367    0    0     0   11 1799    33
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  14  527     0    0  104   367    0    0     0   11 1799    33
PCE Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  14  527     0    0  104   367    0    0     0   11 1799    33
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment: 0.68 0.95  1.00 1.00 1.00  0.85 1.00 1.00  1.00 0.95 0.95  0.95
Lanes:      1.00 2.00  0.00 0.00 1.00  1.00 0.00 0.00  0.00 0.01 1.95  0.04
Final Sat.: 1298 3610     0    0 1900  1615    0    0     0   21 3510    65
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.01 0.15  0.00 0.00 0.05  0.23 0.00 0.00  0.00 0.51 0.51  0.51
Crit Moves:                             ****                      ****
Green/Cycle: 0.27 0.27  0.00 0.00 0.27  0.27 0.00 0.00  0.00 0.61 0.61  0.61
Volume/Cap: 0.04 0.54  0.00 0.00 0.20  0.84 0.00 0.00  0.00 0.84 0.84  0.84
Delay/Veh:  18.8 22.3   0.0  0.0 19.8  37.0  0.0  0.0   0.0 13.6 13.6  13.6
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh: 18.8 22.3   0.0  0.0 19.8  37.0  0.0  0.0   0.0 13.6 13.6  13.6
LOS by Move:   B    C     A    A    B     D    A    A     A    B    B     B
HCM2kAvgQ:     0    5     0    0    2    10    0    0     0   19   19    19
*****************************************************************************
```



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-----------------------------------------------------------------------------
               PM Peak Hour - Existing plus STMP Conditions
                         Samoa Town Master Plan
                           County of Humboldt
-----------------------------------------------------------------------------
                  Level Of Service Computation Report
        2000 HCM Operations Method (Future Volume Alternative)
*****************************************************************************
Intersection #12 Hwy 255/Fourth St
*****************************************************************************
Cycle (sec):          70             Critical Vol./Cap.(X):        0.924
Loss Time (sec):       8             Average Delay (sec/veh):       25.6
Optimal Cycle:        95             Level Of Service:                 C
*****************************************************************************
Street Name:                Hwy 255                       Fourth St
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Y+R:         4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  0   0  0  1  0  1   0  0  0  0  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:     32  299     0    0   70   286    0    0     0   14 1498    45
Growth Adj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  32  299     0    0   70   286    0    0     0   14 1498    45
Added Vol:     0  126     0    0   56   239    0    0     0    0    0     7
PasserByVol:   0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  32  425     0    0  126   525    0    0     0   14 1498    52
User Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:    0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93
PHF Volume:   34  457     0    0  135   565    0    0     0   15 1611    56
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  34  457     0    0  135   565    0    0     0   15 1611    56
PCE Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  34  457     0    0  135   565    0    0     0   15 1611    56
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment: 0.66 0.95  1.00 1.00 1.00  0.85 1.00 1.00  1.00 0.94 0.94  0.94
Lanes:      1.00 2.00  0.00 0.00 1.00  1.00 0.00 0.00  0.00 0.02 1.91  0.07
Final Sat.: 1256 3610     0    0 1900  1615    0    0     0   32 3437   119
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.03 0.13  0.00 0.00 0.07  0.35 0.00 0.00  0.00 0.47 0.47  0.47
Crit Moves:                             ****                      ****
Green/Cycle: 0.38 0.38  0.00 0.00 0.38  0.38 0.00 0.00  0.00 0.51 0.51  0.51
Volume/Cap: 0.07 0.33  0.00 0.00 0.19  0.92 0.00 0.00  0.00 0.92 0.92  0.92
Delay/Veh:  14.0 15.6   0.0  0.0 14.7  40.6  0.0  0.0   0.0 24.4 24.4  24.4
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh: 14.0 15.6   0.0  0.0 14.7  40.6  0.0  0.0   0.0 24.4 24.4  24.4
LOS by Move:   B    B     A    A    B     D    A    A     A    C    C     C
HCM2kAvgQ:     0    4     0    0    2    16    0    0     0   23   23    23
*****************************************************************************
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---------------------------------------------------------------------------------
             AM Peak Hour - Existing plus STMP Conditions
                       Samoa Town Master Plan
                         County of Humboldt
---------------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
*********************************************************************************
Intersection #13 Hwy 255/Fifth St
*********************************************************************************
Cycle (sec):        100               Critical Vol./Cap.(X):        0.433
Loss Time (sec):      6               Average Delay (sec/veh):        6.2
Optimal Cycle:       24               Level Of Service:                 A
*********************************************************************************
Street Name:                 Hwy 255                         Fifth St
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     0    0    0    0    0    0    0    0    0    0    0    0
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        0  0  1  1  0   1  0  2  0  0   0  1  2  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:       0   23    23   54   35     0  244 1163     5    0    0     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0   23    23   54   35     0  244 1163     5    0    0     0
Added Vol:      0    0     0    6   15     0  239    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    0   23    23   60   50     0  483 1163     5    0    0     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93
PHF Volume:     0   25    25   65   54     0  519 1251     5    0    0     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0   25    25   65   54     0  519 1251     5    0    0     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    0   25    25   65   54     0  519 1251     5    0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  1.00 0.88  0.88 0.95 0.95  1.00 0.87 0.87  0.85 1.00 1.00  1.00
Lanes:       0.00 1.00  1.00 1.00 2.00  0.00 0.88 2.12  1.00 0.00 0.00  0.00
Final Sat.:     0 1670  1670 1805 3610     0 1455 3504  1615    0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.01  0.01 0.04 0.01  0.00 0.36 0.36  0.00 0.00 0.00  0.00
Crit Moves:       ****       ****            ****
Green/Cycle: 0.00 0.03  0.03 0.08 0.12  0.00 0.82 0.82  0.82 0.00 0.00  0.00
Volume/Cap:  0.00 0.43  0.43 0.43 0.13  0.00 0.43 0.43  0.00 0.00 0.00  0.00
Delay/Veh:    0.0 50.0  50.0 45.7 39.7   0.0  2.5  2.5   1.6  0.0  0.0   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0 50.0  50.0 45.7 39.7   0.0  2.5  2.5   1.6  0.0  0.0   0.0
LOS by Move:    A    D     D    D    D     A    A    A     A    A    A     A
HCM2kAvgQ:      0    1     1    2    1     0    6    6     0    0    0     0
*********************************************************************************
```



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---------------------------------------------------------------------------------
             PM Peak Hour - Existing plus STMP Conditions
                       Samoa Town Master Plan
                         County of Humboldt
---------------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
*********************************************************************************
Intersection #13 Hwy 255/Fifth St
*********************************************************************************
Cycle (sec):        100               Critical Vol./Cap.(X):        0.572
Loss Time (sec):      6               Average Delay (sec/veh):        6.5
Optimal Cycle:       31               Level Of Service:                 A
*********************************************************************************
Street Name:                 Hwy 255                         Fifth St
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     0    0    0    0    0    0    0    0    0    0    0    0
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        0  0  1  1  0   1  0  2  0  0   0  1  2  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:       0   35    35   44   35     0  329 1793     7    0    0     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0   35    35   44   35     0  329 1793     7    0    0     0
Added Vol:      0    0     0   15   41     0  126    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    0   35    35   59   76     0  455 1793     7    0    0     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93
PHF Volume:     0   38    38   63   82     0  489 1928     8    0    0     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0   38    38   63   82     0  489 1928     8    0    0     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    0   38    38   63   82     0  489 1928     8    0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  1.00 0.88  0.88 0.95 0.95  1.00 0.88 0.88  0.85 1.00 1.00  1.00
Lanes:       0.00 1.00  1.00 1.00 2.00  0.00 0.61 2.39  1.00 0.00 0.00  0.00
Final Sat.:     0 1670  1670 1805 3610     0 1018 4013  1615    0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.02  0.02 0.04 0.02  0.00 0.48 0.48  0.00 0.00 0.00  0.00
Crit Moves:       ****       ****            ****
Green/Cycle: 0.00 0.04  0.04 0.06 0.10  0.00 0.84 0.84  0.84 0.00 0.00  0.00
Volume/Cap:  0.00 0.57  0.57 0.57 0.22  0.00 0.57 0.57  0.01 0.00 0.00  0.00
Delay/Veh:    0.0 53.2  53.2 52.7 41.7   0.0  2.7  2.7   1.3  0.0  0.0   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0 53.2  53.2 52.7 41.7   0.0  2.7  2.7   1.3  0.0  0.0   0.0
LOS by Move:    A    D     D    D    D     A    A    A     A    A    A     A
HCM2kAvgQ:      0    2     2    2    1     0    9    9     0    0    0     0
*********************************************************************************
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--------------------------------------------------------------------------------
                   AM Peak Hour - Existing plus STMP plus IWD
                             Samoa Town Master Plan
                               County of Humboldt
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #1 New Navy Base Rd/LP Dr
********************************************************************************
Average Delay (sec/veh):       4.0      Worst Case Level Of Service: B[ 10.1]
********************************************************************************
Street Name:                 LP Dr                       New Navy Base Rd
Approach:        North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:            Include          Include          Include          Include
Lanes:         1  0  0  0  1   0  0  0  0  0   0  0  1  1  0   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:        0    0   123    0    0     0    0   56     4   18   59     0
Growth Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:     0    0   123    0    0     0    0   56     4   18   59     0
Added Vol:       3    0    49    0    0     0    0   79     5  242  342     0
PasserByVol:     0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:     3    0   172    0    0     0    0  135     9  260  401     0
User Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:      0.80 0.80  0.80 0.80 0.80  0.80 0.80 0.80  0.80 0.80 0.80  0.80
PHF Volume:      4    0   215    0    0     0    0  169    11  325  501     0
Reduct Vol:      0    0     0    0    0     0    0    0     0    0    0     0
FinalVolume:     4    0   215    0    0     0    0  169    11  325  501     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1326 xxxx    90  xxxx xxxx xxxxx  xxxx xxxx xxxxx   180 xxxx xxxxx
Potent Cap.:  173 xxxx   973  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1408 xxxx xxxxx
Move Cap.:    143 xxxx   973  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1408 xxxx xxxxx
Volume/Cap:  0.03 xxxx  0.22  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.23 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx   0.8  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.9 xxxx xxxxx
Control Del: 30.9 xxxx   9.7 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.3 xxxx xxxxx
LOS by Move:    D    *     A     *    *     *     *    *     *     A    *     *
Movement:      LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:      10.1            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        B                *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```



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--------------------------------------------------------------------------------
                   PM Peak Hour - Existing plus STMP plus IWD
                             Samoa Town Master Plan
                               County of Humboldt
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #1 New Navy Base Rd/LP Dr
********************************************************************************
Average Delay (sec/veh):       4.4      Worst Case Level Of Service: B[ 13.4]
********************************************************************************
Street Name:                 LP Dr                       New Navy Base Rd
Approach:        North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:            Include          Include          Include          Include
Lanes:         1  0  0  0  1   0  0  0  0  0   0  0  1  1  0   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:        6    0    30    0    0     0    0   99     4    6   50     0
Growth Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:     6    0    30    0    0     0    0   99     4    6   50     0
Added Vol:       6    0   229    0    0     0    0  341     5   70  143     0
PasserByVol:     0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    12    0   259    0    0     0    0  440     9   76  193     0
User Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:      0.80 0.80  0.80 0.80 0.80  0.80 0.80 0.80  0.80 0.80 0.80  0.80
PHF Volume:     15    0   324    0    0     0    0  550    11   95  241     0
Reduct Vol:      0    0     0    0    0     0    0    0     0    0    0     0
FinalVolume:    15    0   324    0    0     0    0  550    11   95  241     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  987 xxxx   281  xxxx xxxx xxxxx  xxxx xxxx xxxxx   561 xxxx xxxxx
Potent Cap.:  277 xxxx   763  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1020 xxxx xxxxx
Move Cap.:    257 xxxx   763  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1020 xxxx xxxxx
Volume/Cap:  0.06 xxxx  0.42  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.09 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.2 xxxx   2.1  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.3 xxxx xxxxx
Control Del: 19.9 xxxx  13.1 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.9 xxxx xxxxx
LOS by Move:    C    *     B     *    *     *     *    *     *     A    *     *
Movement:      LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:      13.4            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        B                *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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-------------------------------------------------------------------------------
                  AM Peak Hour - Existing plus STMP plus IWD
                           Samoa Town Master Plan
                             County of Humboldt
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #2 New Navy Base Rd/Cookhouse Rd
*******************************************************************************
Average Delay (sec/veh):      4.5      Worst Case Level Of Service: B[ 12.3]
*******************************************************************************
Street Name:           Cookhouse Rd                     New Navy Base Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:       0  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:      0    0    45    0    0    0     0   77     1    32   69     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   0    0    45    0    0    0     0   77     1    32   69     0
Added Vol:     0    0   193    0    0    0     0  126     1   381  583     0
PasserByVol:   0    0     0    0    0    0     0    0     0     0    0     0
Initial Fut:   0    0   238    0    0    0     0  203     2   413  652     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80
PHF Volume:    0    0   298    0    0    0     0  254     3   516  815     0
Reduct Vol:    0    0     0    0    0    0     0    0     0     0    0     0
FinalVolume:   0    0   298    0    0    0     0  254     3   516  815     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:xxxxx xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx   254  xxxx xxxx xxxxx  xxxx xxxx xxxxx   256 xxxx xxxxx
Potent Cap.: xxxx xxxx   790  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1320 xxxx xxxxx
Move Cap.:   xxxx xxxx   790  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1320 xxxx xxxxx
Volume/Cap:  xxxx xxxx  0.38  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.39 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx   1.8  xxxx xxxx xxxxx  xxxx xxxx xxxxx   1.9 xxxx xxxxx
Control Del:xxxxx xxxx  12.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   9.5 xxxx xxxxx
LOS by Move:    *    *     B    *    *     *     *    *     *     A    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:       12.3            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         B                *                *                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```



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-------------------------------------------------------------------------------
                  PM Peak Hour - Existing plus STMP plus IWD
                           Samoa Town Master Plan
                             County of Humboldt
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #2 New Navy Base Rd/Cookhouse Rd
*******************************************************************************
Average Delay (sec/veh):     95.5      Worst Case Level Of Service: F[338.7]
*******************************************************************************
Street Name:           Cookhouse Rd                     New Navy Base Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:       0  0  1! 0  0   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:      6    0    30    0    0    0     0   84     6     8   99     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   6    0    30    0    0    0     0   84     6     8   99     0
Added Vol:     1    0   431    0    0    0     0  569     1   245  212     0
PasserByVol:   0    0     0    0    0    0     0    0     0     0    0     0
Initial Fut:   7    0   461    0    0    0     0  653     7   253  311     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80
PHF Volume:    9    0   576    0    0    0     0  816     9   316  389     0
Reduct Vol:    0    0     0    0    0    0     0    0     0     0    0     0
FinalVolume:   9    0   576    0    0    0     0  816     9   316  389     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4  6.5   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1838 1838   816  xxxx xxxx xxxxx  xxxx xxxx xxxxx   825 xxxx xxxxx
Potent Cap.:   84   77   380  xxxx xxxx xxxxx  xxxx xxxx xxxxx   814 xxxx xxxxx
Move Cap.:     59   47   380  xxxx xxxx xxxxx  xxxx xxxx xxxxx   814 xxxx xxxxx
Volume/Cap:  0.15 0.00  1.52  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.39 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   1.9 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx  12.2 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     *    *     *     B    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  351 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx 35.4 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx  339 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    F     *     *    *     *     *    *     *     *    *     *
ApproachDel:      338.7            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         F                *                *                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
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---------------------------------------------------------------------------------
             AM Peak Hour - Existing plus STMP plus IWD Mitigated
                           Samoa Town Master Plan
                             County of Humboldt
---------------------------------------------------------------------------------
                      Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
*********************************************************************************
Intersection #2 New Navy Base Rd/Cookhouse Rd
*********************************************************************************
Cycle (sec):        100               Critical Vol./Cap.(X):         0.580
Loss Time (sec):      6               Average Delay (sec/veh):        20.5
Optimal Cycle:       32               Level Of Service:                  C
*********************************************************************************
Street Name:             Cookhouse Rd                    New Navy Base Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Permitted        Permitted        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:         1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:       0    0    45    0    0     0    0   77     1   32   69     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0    0    45    0    0     0    0   77     1   32   69     0
Added Vol:      0    0   193    0    0     0    0  126     1  381  583     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    0    0   238    0    0     0    0  203     2  413  652     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90
PHF Volume:     0    0   264    0    0     0    0  226     2  459  724     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0    0   264    0    0     0    0  226     2  459  724     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    0    0   264    0    0     0    0  226     2  459  724     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  1.00 1.00  0.85 1.00 1.00  1.00 1.00 1.00  0.85 0.95 1.00  1.00
Lanes:       1.00 0.00  1.00 0.00 0.00  0.00 0.00 1.00  1.00 1.00 1.00  0.00
Final Sat.:  1900    0  1615    0    0     0    0 1900  1615 1805 1900     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.00  0.16 0.00 0.00  0.00 0.00 0.12  0.00 0.25 0.38  0.00
Crit Moves:             ****                ****                   ****
Green/Cycle: 0.00 0.00  0.28 0.00 0.00  0.00 0.00 0.21  0.21 0.45 0.66  0.00
Volume/Cap:  0.00 0.00  0.58 0.00 0.00  0.00 0.00 0.57  0.01 0.57 0.58  0.00
Delay/Veh:    0.0  0.0  32.7  0.0  0.0   0.0  0.0 37.4  31.3 21.4 10.2   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0  0.0  32.7  0.0  0.0   0.0  0.0 37.4  31.3 21.4 10.2   0.0
LOS by Move:    A    A     C    A    A     A    A    D     C    C    B     A
HCM2kAvgQ:      0    0     8    0    0     0    0    7     0   10   12     0
*********************************************************************************
```



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---------------------------------------------------------------------------------
             PM Peak Hour - Existing plus STMP plus IWD Mitigated
                           Samoa Town Master Plan
                             County of Humboldt
---------------------------------------------------------------------------------
                      Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
*********************************************************************************
Intersection #2 New Navy Base Rd/Cookhouse Rd
*********************************************************************************
Cycle (sec):        100               Critical Vol./Cap.(X):         0.909
Loss Time (sec):      6               Average Delay (sec/veh):        42.1
Optimal Cycle:       99               Level Of Service:                  D
*********************************************************************************
Street Name:             Cookhouse Rd                    New Navy Base Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Permitted        Permitted        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:         1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:       6    0    30    0    0     0    0   84     6    8   99     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    6    0    30    0    0     0    0   84     6    8   99     0
Added Vol:      1    0   431    0    0     0    0  569     1  245  212     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    7    0   461    0    0     0    0  653     7  253  311     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90
PHF Volume:     8    0   512    0    0     0    0  726     8  281  346     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    8    0   512    0    0     0    0  726     8  281  346     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    8    0   512    0    0     0    0  726     8  281  346     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.92 1.00  0.85 1.00 1.00  1.00 1.00 1.00  0.85 0.95 1.00  1.00
Lanes:       1.00 0.00  1.00 0.00 0.00  0.00 0.00 1.00  1.00 1.00 1.00  0.00
Final Sat.:  1744    0  1615    0    0     0    0 1900  1615 1805 1900     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.00  0.32 0.00 0.00  0.00 0.00 0.38  0.00 0.16 0.18  0.00
Crit Moves:             ****                     ****         ****
Green/Cycle: 0.35 0.00  0.35 0.00 0.00  0.00 0.00 0.42  0.42 0.17 0.59  0.00
Volume/Cap:  0.01 0.00  0.91 0.00 0.00  0.00 0.00 0.91  0.01 0.91 0.31  0.00
Delay/Veh:   21.3  0.0  49.8  0.0  0.0   0.0  0.0 41.5  16.9 69.8 10.4   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  21.3  0.0  49.8  0.0  0.0   0.0  0.0 41.5  16.9 69.8 10.4   0.0
LOS by Move:    C    A     D    A    A     A    A    D     B    E    B     A
HCM2kAvgQ:      0    0    19    0    0     0    0   25     0   10    5     0
*********************************************************************************
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-------------------------------------------------------------------------------
                 AM Peak Hour - Existing plus STMP plus IWD
                          Samoa Town Master Plan
                            County of Humboldt
-------------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
*******************************************************************************
Intersection #3 New Navy Base Rd/Hwy 255
*******************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):         1.887
Loss Time (sec):       0              Average Delay (sec/veh):       220.1
Optimal Cycle:         0              Level Of Service:                  F
*******************************************************************************
Street Name:               Hwy 255                     New Navy Base Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Ignore          Include           Ignore          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Lanes:       1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:     98    0   122    0    0     0    0   45    89  255   57     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  98    0   122    0    0     0    0   45    89  255   57     0
Added Vol:   628    0     0    0    0     0    0  103   216    0  337     0
PasserByVol:   0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut: 726    0   122    0    0     0    0  148   305  255  394     0
User Adj:    1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  0.00  0.80 0.80  0.80  0.80 0.80  0.00  0.80 0.80  0.80
PHF Volume:  908    0     0    0    0     0    0  185     0  319  493     0
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol: 908    0     0    0    0     0    0  185     0  319  493     0
PCE Adj:     1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
FinalVolume: 908    0     0    0    0     0    0  185     0  319  493     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 0.00  1.00  0.00 0.00  0.00  0.00 1.00  1.00  1.00 1.00  0.00
Final Sat.:  481    0   560    0    0     0    0  475   523  495  532     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     1.89 xxxx  0.00  xxxx xxxx  xxxx  xxxx 0.39  0.00  0.64 0.93  xxxx
Crit Moves:  ****                                 ****              ****
Delay/Veh:  424.6  0.0   0.0   0.0  0.0   0.0   0.0 14.9   0.0  22.2 48.4   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh: 424.6  0.0   0.0   0.0  0.0   0.0   0.0 14.9   0.0  22.2 48.4   0.0
LOS by Move:    F    *     *     *    *     *     *    B     *     C    E     *
ApproachDel:     424.6            xxxxxx            14.9             38.1
Delay Adj:        1.00             xxxxx            1.00             1.00
ApprAdjDel:      424.6            xxxxxx            14.9             38.1
LOS by Appr:        F                *                B                E
AllWayAvgQ:  55.4  0.0   0.0   0.0  0.0   0.0   0.0  0.6   0.0   1.7  5.8   0.0
*******************************************************************************
```



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-------------------------------------------------------------------------------
                 PM Peak Hour - Existing plus STMP plus IWD
                          Samoa Town Master Plan
                            County of Humboldt
-------------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
*******************************************************************************
Intersection #3 New Navy Base Rd/Hwy 255
*******************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):         1.156
Loss Time (sec):       0              Average Delay (sec/veh):        78.4
Optimal Cycle:         0              Level Of Service:                  F
*******************************************************************************
Street Name:               Hwy 255                     New Navy Base Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Ignore          Include           Ignore          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Lanes:       1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:    121    0   388    0    0     0    0   65   131  366   53     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse: 121    0   388    0    0     0    0   65   131  366   53     0
Added Vol:   299    0     0    0    0     0    0  322   678    0  158     0
PasserByVol:   0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut: 420    0   388    0    0     0    0  387   809  366  211     0
User Adj:    1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  0.00  0.80 0.80  0.80  0.80 0.80  0.00  0.80 0.80  0.80
PHF Volume:  525    0     0    0    0     0    0  484     0  458  264     0
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol: 525    0     0    0    0     0    0  484     0  458  264     0
PCE Adj:     1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
FinalVolume: 525    0     0    0    0     0    0  484     0  458  264     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 0.00  1.00  0.00 0.00  0.00  0.00 1.00  1.00  1.00 1.00  0.00
Final Sat.:  454    0   533    0    0     0    0  477   526  453  484     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     1.16 xxxx  0.00  xxxx xxxx  xxxx  xxxx 1.01  0.00  1.01 0.54  xxxx
Crit Moves:  ****                                 ****        ****
Delay/Veh:  119.1  0.0   0.0   0.0  0.0   0.0   0.0 72.2   0.0  72.7 18.7   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh: 119.1  0.0   0.0   0.0  0.0   0.0   0.0 72.2   0.0  72.7 18.7   0.0
LOS by Move:    F    *     *     *    *     *     *    F     *     F    C     *
ApproachDel:     119.1            xxxxxx            72.2             53.0
Delay Adj:        1.00             xxxxx            1.00             1.00
ApprAdjDel:      119.1            xxxxxx            72.2             53.0
LOS by Appr:        F                *                F                F
AllWayAvgQ:  13.7  0.0   0.0   0.0  0.0   0.0   0.0  8.2   0.0   7.8  1.2   0.0
*******************************************************************************
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-------------------------------------------------------------------------------
          AM Peak Hour - Existing plus STMP plus IWD Mitigated
                          Samoa Town Master Plan
                            County of Humboldt
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
*******************************************************************************
Intersection #3 New Navy Base Rd/Hwy 255
*******************************************************************************
Cycle (sec):        100              Critical Vol./Cap.(X):        0.734
Loss Time (sec):      6              Average Delay (sec/veh):       28.9
Optimal Cycle:       47              Level Of Service:                 C
*******************************************************************************
Street Name:                 Hwy 255                     New Navy Base Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Ignore          Include           Ignore          Include
Min. Green:     0    0    0     0    0    0     0    0    0     0    0    0
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:      98    0   122    0    0     0    0   45    89  255   57     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:   98    0   122    0    0     0    0   45    89  255   57     0
Added Vol:    628    0     0    0    0     0    0  103   216    0  337     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  726    0   122    0    0     0    0  148   305  255  394     0
User Adj:    1.00 1.00  0.00 1.00 1.00  1.00 1.00 1.00  0.00 1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.00 0.90 0.90  0.90 0.90 0.90  0.00 0.90 0.90  0.90
PHF Volume:   807    0     0    0    0     0    0  164     0  283  438     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  807    0     0    0    0     0    0  164     0  283  438     0
PCE Adj:     1.00 1.00  0.00 1.00 1.00  1.00 1.00 1.00  0.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  0.00 1.00 1.00  1.00 1.00 1.00  0.00 1.00 1.00  1.00
FinalVolume:  807    0     0    0    0     0    0  164     0  283  438     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.95 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 0.95 1.00  1.00
Lanes:       1.00 0.00  1.00 0.00 0.00  0.00 0.00 1.00  1.00 1.00 1.00  0.00
Final Sat.:  1805    0  1900    0    0     0    0 1900  1900 1805 1900     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.45 0.00  0.00 0.00 0.00  0.00 0.00 0.09  0.00 0.16 0.23  0.00
Crit Moves:  ****                                 ****        ****
Green/Cycle: 0.61 0.00  0.00 0.00 0.00  0.00 0.00 0.12  0.00 0.21 0.33  0.00
Volume/Cap:  0.73 0.00  0.00 0.00 0.00  0.00 0.00 0.73  0.00 0.73 0.69  0.00
Delay/Veh:   16.5  0.0   0.0  0.0  0.0   0.0  0.0 54.5   0.0 43.8 32.4   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  16.5  0.0   0.0  0.0  0.0   0.0  0.0 54.5   0.0 43.8 32.4   0.0
LOS by Move:    B    A     A    A    A     A    A    D     A    D    C     A
HCM2kAvgQ:     18    0     0    0    0     0    0    5     0    8   12     0
*******************************************************************************
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-------------------------------------------------------------------------------
          PM Peak Hour - Existing plus STMP plus IWD Mitigated
                          Samoa Town Master Plan
                            County of Humboldt
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
*******************************************************************************
Intersection #3 New Navy Base Rd/Hwy 255
*******************************************************************************
Cycle (sec):        100              Critical Vol./Cap.(X):        0.755
Loss Time (sec):      6              Average Delay (sec/veh):       32.4
Optimal Cycle:       50              Level Of Service:                 C
*******************************************************************************
Street Name:                 Hwy 255                     New Navy Base Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Ignore          Include           Ignore          Include
Min. Green:     0    0    0     0    0    0     0    0    0     0    0    0
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:     121    0   388    0    0     0    0   65   131  366   53     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  121    0   388    0    0     0    0   65   131  366   53     0
Added Vol:    299    0     0    0    0     0    0  322   678    0  158     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  420    0   388    0    0     0    0  387   809  366  211     0
User Adj:    1.00 1.00  0.00 1.00 1.00  1.00 1.00 1.00  0.00 1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.00 0.90 0.90  0.90 0.90 0.90  0.00 0.90 0.90  0.90
PHF Volume:   467    0     0    0    0     0    0  430     0  407  234     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  467    0     0    0    0     0    0  430     0  407  234     0
PCE Adj:     1.00 1.00  0.00 1.00 1.00  1.00 1.00 1.00  0.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  0.00 1.00 1.00  1.00 1.00 1.00  0.00 1.00 1.00  1.00
FinalVolume:  467    0     0    0    0     0    0  430     0  407  234     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.95 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 0.95 1.00  1.00
Lanes:       1.00 0.00  1.00 0.00 0.00  0.00 0.00 1.00  1.00 1.00 1.00  0.00
Final Sat.:  1805    0  1900    0    0     0    0 1900  1900 1805 1900     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.26 0.00  0.00 0.00 0.00  0.00 0.00 0.23  0.00 0.23 0.12  0.00
Crit Moves:  ****                                 ****        ****
Green/Cycle: 0.34 0.00  0.00 0.00 0.00  0.00 0.00 0.30  0.00 0.30 0.60  0.00
Volume/Cap:  0.76 0.00  0.00 0.00 0.00  0.00 0.00 0.76  0.00 0.76 0.21  0.00
Delay/Veh:   34.5  0.0   0.0  0.0  0.0   0.0  0.0 37.4   0.0 37.8  9.3   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  34.5  0.0   0.0  0.0  0.0   0.0  0.0 37.4   0.0 37.8  9.3   0.0
LOS by Move:    C    A     A    A    A     A    A    D     A    D    A     A
HCM2kAvgQ:     14    0     0    0    0     0    0   11     0   12    3     0
*******************************************************************************
```

```
AM Existing plus STMP plus Tue Jul 16, 2013 13:10:10              Page 7-1
-------------------------------------------------------------------------------
                  AM Peak Hour - Existing plus STMP plus IWD
                           Samoa Town Master Plan
                             County of Humboldt
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Operations Method (Future Volume Alternative)
*******************************************************************************
Intersection #12 Hwy 255/Fourth St
*******************************************************************************
Cycle (sec):          70                Critical Vol./Cap.(X):         0.877
Loss Time (sec):       8                Average Delay (sec/veh):        21.8
Optimal Cycle:        77                Level Of Service:                  C
*******************************************************************************
Street Name:                  Hwy 255                         Fourth St
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Y+R:         4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  0   0  0  1  0  1   0  0  0  0  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:     13  251     0    0   76   244    0    0     0   10 1673    16
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  13  251     0    0   76   244    0    0     0   10 1673    16
Added Vol:     0  476     0    0   32   145    0    0     0    0    0    30
PasserByVol:   0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  13  727     0    0  108   389    0    0     0   10 1673    46
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93
PHF Volume:   14  782     0    0  116   418    0    0     0   11 1799    49
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  14  782     0    0  116   418    0    0     0   11 1799    49
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  14  782     0    0  116   418    0    0     0   11 1799    49
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.67 0.95  1.00 1.00 1.00  0.85 1.00 1.00  1.00 0.95 0.95  0.95
Lanes:       1.00 2.00  0.00 0.00 1.00  1.00 0.00 0.00  0.00 0.01 1.94  0.05
Final Sat.:  1281 3610     0    0 1900  1615    0    0     0   21 3476    96
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.22  0.00 0.00 0.06  0.26 0.00 0.00  0.00 0.52 0.52  0.52
Crit Moves:                             ****                      ****
Green/Cycle: 0.30 0.30  0.00 0.00 0.30  0.30 0.00 0.00  0.00 0.59 0.59  0.59
Volume/Cap:  0.04 0.73  0.00 0.00 0.21  0.88 0.00 0.00  0.00 0.88 0.88  0.88
Delay/Veh:   17.6 24.8   0.0  0.0 18.7  40.0  0.0  0.0   0.0 16.7 16.7  16.7
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  17.6 24.8   0.0  0.0 18.7  40.0  0.0  0.0   0.0 16.7 16.7  16.7
LOS by Move:    B    C     A    A    B     D    A    A     A    B    B     B
HCM2kAvgQ:      0    8     0    0    2    12    0    0     0   22   22    22
*******************************************************************************

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PM Existing plus STMP plus Tue Jul 16, 2013 13:10:24              Page 5-1
-------------------------------------------------------------------------------
                  PM Peak Hour - Existing plus STMP plus IWD
                           Samoa Town Master Plan
                             County of Humboldt
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Operations Method (Future Volume Alternative)
*******************************************************************************
Intersection #12 Hwy 255/Fourth St
*******************************************************************************
Cycle (sec):          70                Critical Vol./Cap.(X):         1.089
Loss Time (sec):       8                Average Delay (sec/veh):        58.9
Optimal Cycle:       180                Level Of Service:                  E
*******************************************************************************
Street Name:                  Hwy 255                         Fourth St
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Y+R:         4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  0   0  0  1  0  1   0  0  0  0  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:     32  299     0    0   70   286    0    0     0   14 1498    45
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  32  299     0    0   70   286    0    0     0   14 1498    45
Added Vol:     0  224     0    0  104   455    0    0     0    0    0    13
PasserByVol:   0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  32  523     0    0  174   741    0    0     0   14 1498    58
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93
PHF Volume:   34  562     0    0  187   797    0    0     0   15 1611    62
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  34  562     0    0  187   797    0    0     0   15 1611    62
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  34  562     0    0  187   797    0    0     0   15 1611    62
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.61 0.95  1.00 1.00 1.00  0.85 1.00 1.00  1.00 0.94 0.94  0.94
Lanes:       1.00 2.00  0.00 0.00 1.00  1.00 0.00 0.00  0.00 0.02 1.91  0.07
Final Sat.:  1165 3610     0    0 1900  1615    0    0     0   32 3420   132
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.03 0.16  0.00 0.00 0.10  0.49 0.00 0.00  0.00 0.47 0.47  0.47
Crit Moves:                             ****                      ****
Green/Cycle: 0.45 0.45  0.00 0.00 0.45  0.45 0.00 0.00  0.00 0.43 0.43  0.43
Volume/Cap:  0.07 0.34  0.00 0.00 0.22  1.09 0.00 0.00  0.00 1.09 1.09  1.09
Delay/Veh:   10.8 12.5   0.0  0.0 11.7  79.1  0.0  0.0   0.0 70.9 70.9  70.9
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  10.8 12.5   0.0  0.0 11.7  79.1  0.0  0.0   0.0 70.9 70.9  70.9
LOS by Move:    B    B     A    A    B     E    A    A     A    E    E     E
HCM2kAvgQ:      0    4     0    0    2    30    0    0     0   33   33    33
*******************************************************************************

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```

```
-----------------------------------------------------------------------------
              AM Peak Hour - Existing plus STMP plus IWD Mitigated
                           Samoa Town Master Plan
                             County of Humboldt
-----------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
*****************************************************************************
Intersection #12 Hwy 255/Fourth St
*****************************************************************************
Cycle (sec):         70               Critical Vol./Cap.(X):         0.829
Loss Time (sec):      8               Average Delay (sec/veh):        19.2
Optimal Cycle:       65               Level Of Service:                  B
*****************************************************************************
Street Name:                Hwy 255                          Fourth St
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
Lanes:        1  0  2  0  0    0  0  0  1  1    0  0  0  0  0    0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:      13  251     0     0   76   244     0    0     0    10 1673    16
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   13  251     0     0   76   244     0    0     0    10 1673    16
Added Vol:      0  476     0     0   32   145     0    0     0     0    0    30
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   13  727     0     0  108   389     0    0     0    10 1673    46
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.93 0.93  0.93  0.93 0.93  0.93  0.93 0.93  0.93  0.93 0.93  0.93
PHF Volume:    14  782     0     0  116   418     0    0     0    11 1799    49
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   14  782     0     0  116   418     0    0     0    11 1799    49
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   14  782     0     0  116   418     0    0     0    11 1799    49
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.67 0.95  1.00  1.00 0.88  0.88  1.00 1.00  1.00  0.95 0.95  0.95
Lanes:       1.00 2.00  0.00  0.00 0.43  1.57  0.00 0.00  0.00  0.01 1.94  0.05
Final Sat.:  1281 3610     0     0  729  2626     0    0     0    21 3476    96
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.22  0.00  0.00 0.16  0.16  0.00 0.00  0.00  0.52 0.52  0.52
Crit Moves:       ****                                                ****
Green/Cycle: 0.26 0.26  0.00  0.00 0.26  0.26  0.00 0.00  0.00  0.62 0.62  0.62
Volume/Cap:  0.04 0.83  0.00  0.00 0.61  0.61  0.00 0.00  0.00  0.83 0.83  0.83
Delay/Veh:   19.4 30.6   0.0   0.0 24.0  24.0   0.0  0.0   0.0  13.0 13.0  13.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  19.4 30.6   0.0   0.0 24.0  24.0   0.0  0.0   0.0  13.0 13.0  13.0
LOS by Move:    B    C     A     A    C     C     A    A     A     B    B     B
HCM2kAvgQ:      0    9     0     0    6     6     0    0     0    19   19    19
*****************************************************************************
```



```
-----------------------------------------------------------------------------
              PM Peak Hour - Existing plus STMP plus IWD Mitigated
                           Samoa Town Master Plan
                             County of Humboldt
-----------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
*****************************************************************************
Intersection #12 Hwy 255/Fourth St
*****************************************************************************
Cycle (sec):         70               Critical Vol./Cap.(X):         0.864
Loss Time (sec):      8               Average Delay (sec/veh):        21.2
Optimal Cycle:       73               Level Of Service:                  C
*****************************************************************************
Street Name:                Hwy 255                          Fourth St
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
Lanes:        1  0  2  0  0    0  0  0  1  1    0  0  0  0  0    0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:      32  299     0     0   70   286     0    0     0    14 1498    45
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   32  299     0     0   70   286     0    0     0    14 1498    45
Added Vol:      0  224     0     0  104   455     0    0     0     0    0    13
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   32  523     0     0  174   741     0    0     0    14 1498    58
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.93 0.93  0.93  0.93 0.93  0.93  0.93 0.93  0.93  0.93 0.93  0.93
PHF Volume:    34  562     0     0  187   797     0    0     0    15 1611    62
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   34  562     0     0  187   797     0    0     0    15 1611    62
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   34  562     0     0  187   797     0    0     0    15 1611    62
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.58 0.95  1.00  1.00 0.88  0.88  1.00 1.00  1.00  0.94 0.94  0.94
Lanes:       1.00 2.00  0.00  0.00 0.38  1.62  0.00 0.00  0.00  0.02 1.91  0.07
Final Sat.:  1108 3610     0     0  635  2705     0    0     0    32 3420   132
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.03 0.16  0.00  0.00 0.29  0.29  0.00 0.00  0.00  0.47 0.47  0.47
Crit Moves:                        ****                               ****
Green/Cycle: 0.34 0.34  0.00  0.00 0.34  0.34  0.00 0.00  0.00  0.54 0.54  0.54
Volume/Cap:  0.09 0.46  0.00  0.00 0.86  0.86  0.00 0.00  0.00  0.86 0.86  0.86
Delay/Veh:   15.8 18.3   0.0   0.0 28.6  28.6   0.0  0.0   0.0  18.0 18.0  18.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  15.8 18.3   0.0   0.0 28.6  28.6   0.0  0.0   0.0  18.0 18.0  18.0
LOS by Move:    B    B     A     A    C     C     A    A     A     B    B     B
HCM2kAvgQ:      0    5     0     0   13    13     0    0     0    20   20    20
*****************************************************************************
```

```
------------------------------------------------------------------------------
              AM Peak Hour - Existing plus STMP plus IWD
                        Samoa Town Master Plan
                          County of Humboldt
------------------------------------------------------------------------------
                  Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
******************************************************************************
Intersection #13 Hwy 255/Fifth St
******************************************************************************
Cycle (sec):          100                Critical Vol./Cap.(X):        0.561
Loss Time (sec):        6                Average Delay (sec/veh):        6.0
Optimal Cycle:         30                Level Of Service:                 A
******************************************************************************
Street Name:                 Hwy 255                       Fifth St
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        0  0  1  1  0   1  0  2  0  0   0  1  2  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:       0   23    23   54   35     0  244 1163     5    0    0     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0   23    23   54   35     0  244 1163     5    0    0     0
Added Vol:      0    0     0    9   23     0  476    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    0   23    23   63   58     0  720 1163     5    0    0     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93
PHF Volume:     0   25    25   68   62     0  774 1251     5    0    0     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0   25    25   68   62     0  774 1251     5    0    0     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    0   25    25   68   62     0  774 1251     5    0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  1.00 0.88  0.88 0.95 0.95  1.00 0.86 0.86  0.85 1.00 1.00  1.00
Lanes:       0.00 1.00  1.00 1.00 2.00  0.00 1.00 2.00  1.00 0.00 0.00  0.00
Final Sat.:     0 1670  1670 1805 3610     0 1630 3261  1615    0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.01  0.01 0.04 0.02  0.00 0.47 0.38  0.00 0.00 0.00  0.00
Crit Moves:       ****       ****            ****
Green/Cycle: 0.00 0.03  0.03 0.07 0.09  0.00 0.85 0.85  0.85 0.00 0.00  0.00
Volume/Cap:  0.00 0.56  0.56 0.56 0.19  0.00 0.56 0.45  0.00 0.00 0.00  0.00
Delay/Veh:    0.0 56.1  56.1 51.1 42.1   0.0  2.4  2.0   1.2  0.0  0.0   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0 56.1  56.1 51.1 42.1   0.0  2.4  2.0   1.2  0.0  0.0   0.0
LOS by Move:    A    E     E    D    D     A    A    A     A    A    A     A
HCM2kAvgQ:      0    2     2    2    1     0    8    6     0    0    0     0
******************************************************************************
```



```
------------------------------------------------------------------------------
              PM Peak Hour - Existing plus STMP plus IWD
                        Samoa Town Master Plan
                          County of Humboldt
------------------------------------------------------------------------------
                  Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
******************************************************************************
Intersection #13 Hwy 255/Fifth St
******************************************************************************
Cycle (sec):          100                Critical Vol./Cap.(X):        0.606
Loss Time (sec):        6                Average Delay (sec/veh):        7.5
Optimal Cycle:         33                Level Of Service:                 A
******************************************************************************
Street Name:                 Hwy 255                       Fifth St
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        0  0  1  1  0   1  0  2  0  0   0  1  2  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2013
Base Vol:       0   35    35   44   35     0  329 1793     7    0    0     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0   35    35   44   35     0  329 1793     7    0    0     0
Added Vol:      0    0     0   28   76     0  224    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    0   35    35   72  111     0  553 1793     7    0    0     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93
PHF Volume:     0   38    38   77  119     0  595 1928     8    0    0     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0   38    38   77  119     0  595 1928     8    0    0     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    0   38    38   77  119     0  595 1928     8    0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  1.00 0.88  0.88 0.95 0.95  1.00 0.88 0.88  0.85 1.00 1.00  1.00
Lanes:       0.00 1.00  1.00 1.00 2.00  0.00 0.71 2.29  1.00 0.00 0.00  0.00
Final Sat.:     0 1670  1670 1805 3610     0 1180 3826  1615    0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.02  0.02 0.04 0.03  0.00 0.50 0.50  0.00 0.00 0.00  0.00
Crit Moves:       ****       ****            ****
Green/Cycle: 0.00 0.04  0.04 0.07 0.11  0.00 0.83 0.83  0.83 0.00 0.00  0.00
Volume/Cap:  0.00 0.61  0.61 0.61 0.31  0.00 0.61 0.61  0.01 0.00 0.00  0.00
Delay/Veh:    0.0 55.7  55.7 53.2 41.6   0.0  3.1  3.1   1.4  0.0  0.0   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0 55.7  55.7 53.2 41.6   0.0  3.1  3.1   1.4  0.0  0.0   0.0
LOS by Move:    A    E     E    D    D     A    A    A     A    A    A     A
HCM2kAvgQ:      0    2     2    2    2     0   10   10     0    0    0     0
******************************************************************************
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--------------------------------------------------------------------------------
                       AM Peak Hour - Future plus STMP
                          Samoa Town Master Plan
                            County of Humboldt
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #1 New Navy Base Rd/LP Dr
********************************************************************************
Average Delay (sec/veh):      6.1       Worst Case Level Of Service: A[  9.5]
********************************************************************************
Street Name:               LP Dr                         New Navy Base Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  1  0   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:       0    0   148     0    0     0     0   67     5    21   71     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0   148     0    0     0     0   67     5    21   71     0
Added Vol:      3    0    28     0    0     0     0    0     4   146    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    3    0   176     0    0     0     0   67     9   167   71     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80
PHF Volume:     4    0   220     0    0     0     0   84    11   209   89     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    4    0   220     0    0     0     0   84    11   209   89     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  596 xxxx    48  xxxx xxxx xxxxx  xxxx xxxx xxxxx    95 xxxx xxxxx
Potent Cap.:  470 xxxx  1027  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1512 xxxx xxxxx
Move Cap.:    420 xxxx  1027  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1512 xxxx xxxxx
Volume/Cap:  0.01 xxxx  0.21  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.14 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx   0.8  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.5 xxxx xxxxx
Control Del: 13.6 xxxx   9.5 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.8 xxxx xxxxx
LOS by Move:    B    *     A     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:        9.5           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         A                *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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--------------------------------------------------------------------------------
                       PM Peak Hour - Future plus STMP
                          Samoa Town Master Plan
                            County of Humboldt
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #1 New Navy Base Rd/LP Dr
********************************************************************************
Average Delay (sec/veh):      5.1       Worst Case Level Of Service: A[  9.7]
********************************************************************************
Street Name:               LP Dr                         New Navy Base Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  1  0   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:       7    0    36     0    0     0     0  119     5     7   59     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    7    0    36     0    0     0     0  119     5     7   59     0
Added Vol:      5    0   135     0    0     0     0    0     4    32    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   12    0   171     0    0     0     0  119     9    39   59     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80
PHF Volume:    15    0   214     0    0     0     0  149    11    49   74     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   15    0   214     0    0     0     0  149    11    49   74     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  326 xxxx    80  xxxx xxxx xxxxx  xxxx xxxx xxxxx   160 xxxx xxxxx
Potent Cap.:  673 xxxx   986  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1432 xxxx xxxxx
Move Cap.:    655 xxxx   986  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1432 xxxx xxxxx
Volume/Cap:  0.02 xxxx  0.22  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.03 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx   0.8  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx
Control Del: 10.6 xxxx   9.7 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.6 xxxx xxxxx
LOS by Move:    B    *     A     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:        9.7           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         A                *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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------------------------------------------------------------------------------
                       AM Peak Hour - Future plus STMP
                           Samoa Town Master Plan
                             County of Humboldt
------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #2 New Navy Base Rd/Cookhouse Rd
******************************************************************************
Average Delay (sec/veh):      6.1      Worst Case Level Of Service: B[ 10.9]
******************************************************************************
Street Name:              Cookhouse Rd                  New Navy Base Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:        0    0    54     0    0     0     0   92     1    38   83     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0    0    54     0    0     0     0   92     1    38   83     0
Added Vol:       0    0   184     0    0     0     0   28     0   338  146     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0    0   238     0    0     0     0  120     1   376  229     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80
PHF Volume:      0    0   298     0    0     0     0  150     1   470  286     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     0    0   298     0    0     0     0  150     1   470  286     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:xxxxx xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx   150  xxxx xxxx xxxxx  xxxx xxxx xxxxx   151 xxxx xxxxx
Potent Cap.: xxxx xxxx   902  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1442 xxxx xxxxx
Move Cap.:   xxxx xxxx   902  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1442 xxxx xxxxx
Volume/Cap:  xxxx xxxx  0.33  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.33 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx   1.4  xxxx xxxx xxxxx  xxxx xxxx xxxxx   1.4 xxxx xxxxx
Control Del:xxxxx xxxx  10.9 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.7 xxxx xxxxx
LOS by Move:    *    *     B     *    *     *     *    *     *     A    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:        10.9            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:           B               *                *                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
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------------------------------------------------------------------------------
                       PM Peak Hour - Future plus STMP
                           Samoa Town Master Plan
                             County of Humboldt
------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #2 New Navy Base Rd/Cookhouse Rd
******************************************************************************
Average Delay (sec/veh):     11.6      Worst Case Level Of Service: C[ 23.7]
******************************************************************************
Street Name:              Cookhouse Rd                  New Navy Base Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  1! 0  0   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:        7    0    36     0    0     0     0  100     7     9  119     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     7    0    36     0    0     0     0  100     7     9  119     0
Added Vol:       0    0   391     0    0     0     0  135     0   226   32     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     7    0   427     0    0     0     0  235     7   235  151     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80
PHF Volume:      9    0   534     0    0     0     0  294     9   294  189     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     9    0   534     0    0     0     0  294     9   294  189     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4  6.5   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1070 1070   294  xxxx xxxx xxxxx  xxxx xxxx xxxxx   303 xxxx xxxxx
Potent Cap.:  247  223   750  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1270 xxxx xxxxx
Move Cap.:    203  171   750  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1270 xxxx xxxxx
Volume/Cap:  0.04 0.00  0.71  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.23 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.9 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.7 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     *    *     *     A    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  719 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  7.0 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx 23.7 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    C     *     *    *     *     *    *     *     *    *     *
ApproachDel:        23.7            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:           C               *                *                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
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--------------------------------------------------------------------------------
                  AM Peak Hour - Future plus STMP Mitigated
                          Samoa Town Master Plan
                            County of Humboldt
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #2 New Navy Base Rd/Cookhouse Rd
********************************************************************************
Cycle (sec):         100             Critical Vol./Cap.(X):         0.495
Loss Time (sec):       6             Average Delay (sec/veh):        21.4
Optimal Cycle:        27             Level Of Service:                  C
********************************************************************************
Street Name:               Cookhouse Rd                   New Navy Base Rd
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0     0    0    0     0    0    0     0    0    0
Y+R:         4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:      0    0   54     0    0    0     0   92    1    38   83    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   0    0   54     0    0    0     0   92    1    38   83    0
Added Vol:     0    0  184     0    0    0     0   28    0   338  146    0
PasserByVol:   0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:   0    0  238     0    0    0     0  120    1   376  229    0
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90
PHF Volume:    0    0  264     0    0    0     0  133    1   418  254    0
Reduct Vol:    0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:   0    0  264     0    0    0     0  133    1   418  254    0
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
FinalVolume:   0    0  264     0    0    0     0  133    1   418  254    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900
Adjustment:  1.00 1.00 0.85  1.00 1.00 1.00  1.00 1.00 0.85  0.95 1.00 1.00
Lanes:       1.00 0.00 1.00  0.00 0.00 0.00  0.00 1.00 1.00  1.00 1.00 0.00
Final Sat.:  1900    0 1615     0    0    0     0 1900 1615  1805 1900    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.00 0.16  0.00 0.00 0.00  0.00 0.07 0.00  0.23 0.13 0.00
Crit Moves:            ****                       ****       ****
Green/Cycle: 0.00 0.00 0.33  0.00 0.00 0.00  0.00 0.14 0.14  0.47 0.61 0.00
Volume/Cap:  0.00 0.00 0.50  0.00 0.00 0.00  0.00 0.50 0.00  0.50 0.22 0.00
Delay/Veh:    0.0  0.0 27.5   0.0  0.0  0.0   0.0 41.0 36.9  18.9  8.9  0.0
User DelAdj: 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:   0.0  0.0 27.5   0.0  0.0  0.0   0.0 41.0 36.9  18.9  8.9  0.0
LOS by Move:   A    A    C     A    A    A     A    D    D     B    A    A
HCM2kAvgQ:     0    0    7     0    0    0     0    4    0     9    3    0
********************************************************************************
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--------------------------------------------------------------------------------
                  PM Peak Hour - Future plus STMP Mitigated
                          Samoa Town Master Plan
                            County of Humboldt
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #2 New Navy Base Rd/Cookhouse Rd
********************************************************************************
Cycle (sec):         100             Critical Vol./Cap.(X):         0.613
Loss Time (sec):       6             Average Delay (sec/veh):        27.3
Optimal Cycle:        34             Level Of Service:                  C
********************************************************************************
Street Name:               Cookhouse Rd                   New Navy Base Rd
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0     0    0    0     0    0    0     0    0    0
Y+R:         4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:      7    0   36     0    0    0     0  100    7     9  119    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   7    0   36     0    0    0     0  100    7     9  119    0
Added Vol:     0    0  391     0    0    0     0  135    0   226   32    0
PasserByVol:   0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:   7    0  427     0    0    0     0  235    7   235  151    0
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90
PHF Volume:    8    0  474     0    0    0     0  261    8   261  168    0
Reduct Vol:    0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:   8    0  474     0    0    0     0  261    8   261  168    0
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
FinalVolume:   8    0  474     0    0    0     0  261    8   261  168    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900
Adjustment:  0.92 1.00 0.85  1.00 1.00 1.00  1.00 1.00 0.85  0.95 1.00 1.00
Lanes:       1.00 0.00 1.00  0.00 0.00 0.00  0.00 1.00 1.00  1.00 1.00 0.00
Final Sat.:  1756    0 1615     0    0    0     0 1900 1615  1805 1900    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.00 0.29  0.00 0.00 0.00  0.00 0.14 0.00  0.14 0.09 0.00
Crit Moves:            ****                       ****       ****
Green/Cycle: 0.48 0.00 0.48  0.00 0.00 0.00  0.00 0.22 0.22  0.24 0.46 0.00
Volume/Cap:  0.01 0.00 0.61  0.00 0.00 0.00  0.00 0.61 0.02  0.61 0.19 0.00
Delay/Veh:   13.6  0.0 20.6   0.0  0.0  0.0   0.0 37.5 30.3  36.7 16.1  0.0
User DelAdj: 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:  13.6  0.0 20.6   0.0  0.0  0.0   0.0 37.5 30.3  36.7 16.1  0.0
LOS by Move:   B    A    C     A    A    A     A    D    C     D    B    A
HCM2kAvgQ:     0    0   11     0    0    0     0    8    0     7    3    0
********************************************************************************
```

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-------------------------------------------------------------------------------
                        AM Peak Hour - Future plus STMP
                           Samoa Town Master Plan
                             County of Humboldt
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM 4-Way Stop Method (Future Volume Alternative)
*******************************************************************************
Intersection #3 New Navy Base Rd/Hwy 255
*******************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):         1.079
Loss Time (sec):       0              Average Delay (sec/veh):        48.6
Optimal Cycle:         0              Level Of Service:                  E
*******************************************************************************
Street Name:                  Hwy 255                     New Navy Base Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Ignore          Include           Ignore          Include
Min. Green:     0    0    0     0    0    0     0    0    0     0    0    0
Lanes:         1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:     117    0  147     0    0    0     0   54  107   306   69    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:  117    0  147     0    0    0     0   54  107   306   69    0
Added Vol:    314    0    0     0    0    0     0   69  143     0  170    0
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:  431    0  147     0    0    0     0  123  250   306  239    0
User Adj:    1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 0.00  1.00 1.00 1.00
PHF Adj:     0.80 0.80 0.00  0.80 0.80 0.80  0.80 0.80 0.00  0.80 0.80 0.80
PHF Volume:   539    0    0     0    0    0     0  154    0   383  299    0
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:  539    0    0     0    0    0     0  154    0   383  299    0
PCE Adj:     1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 0.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 0.00  1.00 1.00 1.00
FinalVolume:  539    0    0     0    0    0     0  154    0   383  299    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:       1.00 0.00 1.00  0.00 0.00 0.00  0.00 1.00 1.00  1.00 1.00 0.00
Final Sat.:   499    0  585     0    0    0     0  481  530   501  537    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     1.08 xxxx 0.00  xxxx xxxx xxxx  xxxx 0.32 0.00  0.76 0.56 xxxx
Crit Moves:  ****                                 ****       ****
Delay/Veh:   89.4  0.0  0.0   0.0  0.0  0.0   0.0 13.5  0.0  29.5 17.4  0.0
Delay Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:  89.4  0.0  0.0   0.0  0.0  0.0   0.0 13.5  0.0  29.5 17.4  0.0
LOS by Move:    F    *    *     *    *    *     *    B    *     D    C    *
ApproachDel:       89.4           xxxxxx             13.5             24.2
Delay Adj:         1.00            xxxxx             1.00             1.00
ApprAdjDel:        89.4           xxxxxx             13.5             24.2
LOS by Appr:          F                *                B                C
AllWayAvgQ:  11.0  0.0  0.0   0.0  0.0  0.0   0.0  0.5  0.0   2.7  1.2  0.0
*******************************************************************************
```



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-------------------------------------------------------------------------------
                        PM Peak Hour - Future plus STMP
                           Samoa Town Master Plan
                             County of Humboldt
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM 4-Way Stop Method (Future Volume Alternative)
*******************************************************************************
Intersection #3 New Navy Base Rd/Hwy 255
*******************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):         1.090
Loss Time (sec):       0              Average Delay (sec/veh):        51.6
Optimal Cycle:         0              Level Of Service:                  F
*******************************************************************************
Street Name:                  Hwy 255                     New Navy Base Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Ignore          Include           Ignore          Include
Min. Green:     0    0    0     0    0    0     0    0    0     0    0    0
Lanes:         1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:     145    0  466     0    0    0     0   78  157   440   63    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:  145    0  466     0    0    0     0   78  157   440   63    0
Added Vol:    170    0    0     0    0    0     0  169  357     0   89    0
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:  315    0  466     0    0    0     0  247  514   440  152    0
User Adj:    1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 0.00  1.00 1.00 1.00
PHF Adj:     0.80 0.80 0.00  0.80 0.80 0.80  0.80 0.80 0.00  0.80 0.80 0.80
PHF Volume:   394    0    0     0    0    0     0  309    0   550  190    0
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:  394    0    0     0    0    0     0  309    0   550  190    0
PCE Adj:     1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 0.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 0.00  1.00 1.00 1.00
FinalVolume:  394    0    0     0    0    0     0  309    0   550  190    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:       1.00 0.00 1.00  0.00 0.00 0.00  0.00 1.00 1.00  1.00 1.00 0.00
Final Sat.:   473    0  557     0    0    0     0  498  544   505  535    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.83 xxxx 0.00  xxxx xxxx xxxx  xxxx 0.62 0.00  1.09 0.36 xxxx
Crit Moves:  ****                                 ****       ****
Delay/Veh:   37.3  0.0  0.0   0.0  0.0  0.0   0.0 20.5  0.0  92.6 12.9  0.0
Delay Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:  37.3  0.0  0.0   0.0  0.0  0.0   0.0 20.5  0.0  92.6 12.9  0.0
LOS by Move:    E    *    *     *    *    *     *    C    *     F    B    *
ApproachDel:       37.3           xxxxxx             20.5             72.1
Delay Adj:         1.00            xxxxx             1.00             1.00
ApprAdjDel:        37.3           xxxxxx             20.5             72.1
LOS by Appr:          E                *                C                F
AllWayAvgQ:   3.6  0.0  0.0   0.0  0.0  0.0   0.0  1.5  0.0  11.6  0.5  0.0
*******************************************************************************
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--------------------------------------------------------------------------------
                 AM Peak Hour - Future plus STMP Mitigated
                          Samoa Town Master Plan
                            County of Humboldt
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
              2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #3 New Navy Base Rd/Hwy 255
********************************************************************************
Cycle (sec):        100              Critical Vol./Cap.(X):         0.559
Loss Time (sec):      6              Average Delay (sec/veh):        24.1
Optimal Cycle:       30              Level Of Service:                  C
********************************************************************************
Street Name:                  Hwy 255                     New Navy Base Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Ignore          Include           Ignore          Include
Min. Green:     0    0    0     0    0    0     0    0    0     0    0    0
Y+R:          4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:     117    0  147     0    0    0     0   54  107   306   69    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse: 117    0  147     0    0    0     0   54  107   306   69    0
Added Vol:   314    0    0     0    0    0     0   69  143     0  170    0
PasserByVol:   0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut: 431    0  147     0    0    0     0  123  250   306  239    0
User Adj:    1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 0.00  1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.00  0.90 0.90 0.90  0.90 0.90 0.00  0.90 0.90 0.90
PHF Volume:  479    0    0     0    0    0     0  137    0   340  266    0
Reduct Vol:    0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol: 479    0    0     0    0    0     0  137    0   340  266    0
PCE Adj:     1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 0.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 0.00  1.00 1.00 1.00
FinalVolume: 479    0    0     0    0    0     0  137    0   340  266    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900
Adjustment:  0.95 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  0.95 1.00 1.00
Lanes:       1.00 0.00 1.00  0.00 0.00 0.00  0.00 1.00 1.00  1.00 1.00 0.00
Final Sat.:  1805    0 1900     0    0    0     0 1900 1900  1805 1900    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.27 0.00 0.00  0.00 0.00 0.00  0.00 0.07 0.00  0.19 0.14 0.00
Crit Moves:  ****                                 ****       ****
Green/Cycle: 0.47 0.00 0.00  0.00 0.00 0.00  0.00 0.13 0.00  0.34 0.47 0.00
Volume/Cap:  0.56 0.00 0.00  0.00 0.00 0.00  0.00 0.56 0.00  0.56 0.30 0.00
Delay/Veh:   19.6  0.0  0.0   0.0  0.0  0.0   0.0 43.8  0.0  28.3 16.8  0.0
User DelAdj: 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:  19.6  0.0  0.0   0.0  0.0  0.0   0.0 43.8  0.0  28.3 16.8  0.0
LOS by Move:    B    A    A     A    A    A     A    D    A     C    B    A
HCM2kAvgQ:     11    0    0     0    0    0     0    4    0     8    5    0
********************************************************************************
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--------------------------------------------------------------------------------
                 PM Peak Hour - Future plus STMP Mitigated
                          Samoa Town Master Plan
                            County of Humboldt
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
              2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #3 New Navy Base Rd/Hwy 255
********************************************************************************
Cycle (sec):        100              Critical Vol./Cap.(X):         0.648
Loss Time (sec):      6              Average Delay (sec/veh):        27.9
Optimal Cycle:       37              Level Of Service:                  C
********************************************************************************
Street Name:                  Hwy 255                     New Navy Base Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Ignore          Include           Ignore          Include
Min. Green:     0    0    0     0    0    0     0    0    0     0    0    0
Y+R:          4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:     145    0  466     0    0    0     0   78  157   440   63    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse: 145    0  466     0    0    0     0   78  157   440   63    0
Added Vol:   170    0    0     0    0    0     0  169  357     0   89    0
PasserByVol:   0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut: 315    0  466     0    0    0     0  247  514   440  152    0
User Adj:    1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 0.00  1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.00  0.90 0.90 0.90  0.90 0.90 0.00  0.90 0.90 0.90
PHF Volume:  350    0    0     0    0    0     0  274    0   489  169    0
Reduct Vol:    0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol: 350    0    0     0    0    0     0  274    0   489  169    0
PCE Adj:     1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 0.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 0.00  1.00 1.00 1.00  1.00 1.00 0.00  1.00 1.00 1.00
FinalVolume: 350    0    0     0    0    0     0  274    0   489  169    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900
Adjustment:  0.95 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  0.95 1.00 1.00
Lanes:       1.00 0.00 1.00  0.00 0.00 0.00  0.00 1.00 1.00  1.00 1.00 0.00
Final Sat.:  1805    0 1900     0    0    0     0 1900 1900  1805 1900    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.19 0.00 0.00  0.00 0.00 0.00  0.00 0.14 0.00  0.27 0.09 0.00
Crit Moves:  ****                                 ****       ****
Green/Cycle: 0.30 0.00 0.00  0.00 0.00 0.00  0.00 0.22 0.00  0.42 0.64 0.00
Volume/Cap:  0.65 0.00 0.00  0.00 0.00 0.00  0.00 0.65 0.00  0.65 0.14 0.00
Delay/Veh:   33.2  0.0  0.0   0.0  0.0  0.0   0.0 38.8  0.0  25.2  7.1  0.0
User DelAdj: 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:  33.2  0.0  0.0   0.0  0.0  0.0   0.0 38.8  0.0  25.2  7.1  0.0
LOS by Move:    C    A    A     A    A    A     A    D    A     C    A    A
HCM2kAvgQ:     10    0    0     0    0    0     0    8    0    12    2    0
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--------------------------------------------------------------------------------
                      AM Peak Hour - Future plus STMP
                          Samoa Town Master Plan
                            County of Humboldt
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #12 Hwy 255/Fourth St
********************************************************************************
Cycle (sec):         70                 Critical Vol./Cap.(X):        0.987
Loss Time (sec):      8                 Average Delay (sec/veh):       32.2
Optimal Cycle:      137                 Level Of Service:                 C
********************************************************************************
Street Name:                 Hwy 255                          Fourth St
Approach:      North Bound      South Bound      East Bound      West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Y+R:         4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  0   0  0  1  0  1   0  0  0  0  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:     16  326     0    0   99   317    0    0     0   13 2175    21
Growth Adj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  16  326     0    0   99   317    0    0     0   13 2175    21
Added Vol:     0  239     0    0   21    97    0    0     0    0    0    15
PasserByVol:   0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  16  565     0    0  120   414    0    0     0   13 2175    36
User Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:   16  565     0    0  120   414    0    0     0   13 2175    36
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  16  565     0    0  120   414    0    0     0   13 2175    36
PCE Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  16  565     0    0  120   414    0    0     0   13 2175    36
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment: 0.67 0.95  1.00 1.00 1.00  0.85 1.00 1.00  1.00 0.95 0.95  0.95
Lanes:      1.00 2.00  0.00 0.00 1.00  1.00 0.00 0.00  0.00 0.01 1.96  0.03
Final Sat.: 1277 3610     0    0 1900  1615    0    0     0   21 3520    58
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.01 0.16  0.00 0.00 0.06  0.26 0.00 0.00  0.00 0.62 0.62  0.62
Crit Moves:                             ****                        ****
Green/Cycle: 0.26 0.26  0.00 0.00 0.26  0.26 0.00 0.00  0.00 0.63 0.63  0.63
Volume/Cap: 0.05 0.60  0.00 0.00 0.24  0.99 0.00 0.00  0.00 0.99 0.99  0.99
Delay/Veh:  19.5 23.9   0.0  0.0 20.7  66.2  0.0  0.0   0.0 28.8 28.8  28.8
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh: 19.5 23.9   0.0  0.0 20.7  66.2  0.0  0.0   0.0 28.8 28.8  28.8
LOS by Move:   B    C     A    A    C     E    A    A     A    C    C     C
HCM2kAvgQ:     0    6     0    0    2    15    0    0     0   33   33    33
********************************************************************************
```



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--------------------------------------------------------------------------------
                      PM Peak Hour - Future plus STMP
                          Samoa Town Master Plan
                            County of Humboldt
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #12 Hwy 255/Fourth St
********************************************************************************
Cycle (sec):         70                 Critical Vol./Cap.(X):        1.066
Loss Time (sec):      8                 Average Delay (sec/veh):       52.7
Optimal Cycle:      180                 Level Of Service:                 D
********************************************************************************
Street Name:                 Hwy 255                          Fourth St
Approach:      North Bound      South Bound      East Bound      West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Y+R:         4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  0   0  0  1  0  1   0  0  0  0  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:     42  389     0    0   91   372    0    0     0   18 1948    58
Growth Adj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  42  389     0    0   91   372    0    0     0   18 1948    58
Added Vol:     0  126     0    0   56   239    0    0     0    0    0     7
PasserByVol:   0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  42  515     0    0  147   611    0    0     0   18 1948    65
User Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:   42  515     0    0  147   611    0    0     0   18 1948    65
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  42  515     0    0  147   611    0    0     0   18 1948    65
PCE Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  42  515     0    0  147   611    0    0     0   18 1948    65
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment: 0.65 0.95  1.00 1.00 1.00  0.85 1.00 1.00  1.00 0.94 0.94  0.94
Lanes:      1.00 2.00  0.00 0.00 1.00  1.00 0.00 0.00  0.00 0.02 1.92  0.06
Final Sat.: 1227 3610     0    0 1900  1615    0    0     0   32 3442   115
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.03 0.14  0.00 0.00 0.08  0.38 0.00 0.00  0.00 0.57 0.57  0.57
Crit Moves:                             ****                        ****
Green/Cycle: 0.35 0.35  0.00 0.00 0.35  0.35 0.00 0.00  0.00 0.53 0.53  0.53
Volume/Cap: 0.10 0.40  0.00 0.00 0.22  1.07 0.00 0.00  0.00 1.07 1.07  1.07
Delay/Veh:  15.2 17.2   0.0  0.0 16.0  79.0  0.0  0.0   0.0 57.3 57.3  57.3
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh: 15.2 17.2   0.0  0.0 16.0  79.0  0.0  0.0   0.0 57.3 57.3  57.3
LOS by Move:   B    B     A    A    B     E    A    A     A    E    E     E
HCM2kAvgQ:     1    4     0    0    2    23    0    0     0   37   37    37
********************************************************************************
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--------------------------------------------------------------------------------
                AM Peak Hour - Future plus STMP Mitigated
                        Samoa Town Master Plan
                         County of Humboldt
--------------------------------------------------------------------------------
                 Level Of Service Computation Report
       2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #12 Hwy 255/Fourth St
********************************************************************************
Cycle (sec):          70              Critical Vol./Cap.(X):        0.877
Loss Time (sec):       8              Average Delay (sec/veh):       21.3
Optimal Cycle:        77              Level Of Service:                 C
********************************************************************************
Street Name:                 Hwy 255                       Fourth St
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted         Permitted         Permitted         Permitted
Rights:          Include           Include           Include           Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Y+R:         4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  0   0  0  0  1  1   0  0  0  0  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:     16  326     0    0   99   317    0    0     0   13 2175    21
Growth Adj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  16  326     0    0   99   317    0    0     0   13 2175    21
Added Vol:     0  239     0    0   21    97    0    0     0    0    0    15
PasserByVol:   0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  16  565     0    0  120   414    0    0     0   13 2175    36
User Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:   16  565     0    0  120   414    0    0     0   13 2175    36
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  16  565     0    0  120   414    0    0     0   13 2175    36
PCE Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  16  565     0    0  120   414    0    0     0   13 2175    36
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment: 0.65 0.95  1.00 1.00 0.88  0.88 1.00 1.00  1.00 0.95 0.95  0.95
Lanes:      1.00 2.00  0.00 0.00 0.45  1.55 0.00 0.00  0.00 0.01 1.96  0.03
Final Sat.: 1243 3610     0    0  755  2604    0    0     0   21 3520    58
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.01 0.16  0.00 0.00 0.16  0.16 0.00 0.00  0.00 0.62 0.62  0.62
Crit Moves:                       ****                            ****
Green/Cycle: 0.18 0.18  0.00 0.00 0.18  0.18 0.00 0.00  0.00 0.70 0.70  0.70
Volume/Cap:  0.07 0.86  0.00 0.00 0.88  0.88 0.00 0.00  0.00 0.88 0.88  0.88
Delay/Veh:   23.9 39.3   0.0  0.0 41.5  41.5  0.0  0.0   0.0 11.8 11.8  11.8
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  23.9 39.3   0.0  0.0 41.5  41.5  0.0  0.0   0.0 11.8 11.8  11.8
LOS by Move:    C    D     A    A    D     D    A    A     A    B    B     B
HCM2kAvgQ:      0    7     0    0    9     9    0    0     0   23   23    23
********************************************************************************
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--------------------------------------------------------------------------------
                PM Peak Hour - Future plus STMP Mitigated
                        Samoa Town Master Plan
                         County of Humboldt
--------------------------------------------------------------------------------
                 Level Of Service Computation Report
       2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #12 Hwy 255/Fourth St
********************************************************************************
Cycle (sec):          70              Critical Vol./Cap.(X):        0.895
Loss Time (sec):       8              Average Delay (sec/veh):       22.0
Optimal Cycle:        83              Level Of Service:                 C
********************************************************************************
Street Name:                 Hwy 255                       Fourth St
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted         Permitted         Permitted         Permitted
Rights:          Include           Include           Include           Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Y+R:         4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  0   0  0  0  1  1   0  0  0  0  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:     42  389     0    0   91   372    0    0     0   18 1948    58
Growth Adj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  42  389     0    0   91   372    0    0     0   18 1948    58
Added Vol:     0  126     0    0   56   239    0    0     0    0    0     7
PasserByVol:   0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  42  515     0    0  147   611    0    0     0   18 1948    65
User Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:   42  515     0    0  147   611    0    0     0   18 1948    65
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  42  515     0    0  147   611    0    0     0   18 1948    65
PCE Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  42  515     0    0  147   611    0    0     0   18 1948    65
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment: 0.62 0.95  1.00 1.00 0.88  0.88 1.00 1.00  1.00 0.94 0.94  0.94
Lanes:      1.00 2.00  0.00 0.00 0.39  1.61 0.00 0.00  0.00 0.02 1.92  0.06
Final Sat.: 1176 3610     0    0  648  2692    0    0     0   32 3442   115
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.04 0.14  0.00 0.00 0.23  0.23 0.00 0.00  0.00 0.57 0.57  0.57
Crit Moves:                       ****                            ****
Green/Cycle: 0.25 0.25  0.00 0.00 0.25  0.25 0.00 0.00  0.00 0.63 0.63  0.63
Volume/Cap:  0.14 0.56  0.00 0.00 0.90  0.90 0.00 0.00  0.00 0.90 0.90  0.90
Delay/Veh:   20.4 23.6   0.0  0.0 37.3  37.3  0.0  0.0   0.0 16.0 16.0  16.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  20.4 23.6   0.0  0.0 37.3  37.3  0.0  0.0   0.0 16.0 16.0  16.0
LOS by Move:    C    C     A    A    D     D    A    A     A    B    B     B
HCM2kAvgQ:      1    5     0    0   12    12    0    0     0   24   24    24
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--------------------------------------------------------------------------------
                        AM Peak Hour - Future plus STMP
                            Samoa Town Master Plan
                              County of Humboldt
--------------------------------------------------------------------------------
                       Level Of Service Computation Report
             2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #13 Hwy 255/Fifth St
********************************************************************************
Cycle (sec):          100              Critical Vol./Cap.(X):         0.506
Loss Time (sec):        6              Average Delay (sec/veh):         6.5
Optimal Cycle:         27              Level Of Service:                  A
********************************************************************************
Street Name:                  Hwy 255                           Fifth St
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        0  0  1  1  0   1  0  2  0  0   0  1  2  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:       0   30    30   70   45     0  317 1511     6    0    0     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0   30    30   70   45     0  317 1511     6    0    0     0
Added Vol:      0    0     0    6   15     0  239    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    0   30    30   76   60     0  556 1511     6    0    0     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:     0   30    30   76   60     0  556 1511     6    0    0     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0   30    30   76   60     0  556 1511     6    0    0     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    0   30    30   76   60     0  556 1511     6    0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  1.00 0.88  0.88 0.95 0.95  1.00 0.87 0.87  0.85 1.00 1.00  1.00
Lanes:       0.00 1.00  1.00 1.00 2.00  0.00 0.81 2.19  1.00 0.00 0.00  0.00
Final Sat.:     0 1670  1670 1805 3610     0 1339 3640  1615    0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.02  0.02 0.04 0.02  0.00 0.42 0.42  0.00 0.00 0.00  0.00
Crit Moves:       ****       ****            ****
Green/Cycle: 0.00 0.04  0.04 0.08 0.12  0.00 0.82 0.82  0.82 0.00 0.00  0.00
Volume/Cap:  0.00 0.51  0.51 0.51 0.14  0.00 0.51 0.51  0.00 0.00 0.00  0.00
Delay/Veh:    0.0 50.9  50.9 46.6 39.6   0.0  2.8  2.8   1.6  0.0  0.0   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0 50.9  50.9 46.6 39.6   0.0  2.8  2.8   1.6  0.0  0.0   0.0
LOS by Move:    A    D     D    D    D     A    A    A     A    A    A     A
HCM2kAvgQ:      0    2     2    2    1     0    7    7     0    0    0     0
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--------------------------------------------------------------------------------
                        PM Peak Hour - Future plus STMP
                            Samoa Town Master Plan
                              County of Humboldt
--------------------------------------------------------------------------------
                       Level Of Service Computation Report
             2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #13 Hwy 255/Fifth St
********************************************************************************
Cycle (sec):          100              Critical Vol./Cap.(X):         0.680
Loss Time (sec):        6              Average Delay (sec/veh):         7.4
Optimal Cycle:         40              Level Of Service:                  A
********************************************************************************
Street Name:                  Hwy 255                           Fifth St
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        0  0  1  1  0   1  0  2  0  0   0  1  2  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:       0   45    45   57   45     0  428 2331     9    0    0     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0   45    45   57   45     0  428 2331     9    0    0     0
Added Vol:      0    0     0   15   41     0  126    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    0   45    45   72   86     0  554 2331     9    0    0     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:     0   45    45   72   86     0  554 2331     9    0    0     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0   45    45   72   86     0  554 2331     9    0    0     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    0   45    45   72   86     0  554 2331     9    0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  1.00 0.88  0.88 0.95 0.95  1.00 0.88 0.88  0.85 1.00 1.00  1.00
Lanes:       0.00 1.00  1.00 1.00 2.00  0.00 0.58 2.42  1.00 0.00 0.00  0.00
Final Sat.:     0 1670  1670 1805 3610     0  967 4069  1615    0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.03  0.03 0.04 0.02  0.00 0.57 0.57  0.01 0.00 0.00  0.00
Crit Moves:       ****       ****            ****
Green/Cycle: 0.00 0.04  0.04 0.06 0.10  0.00 0.84 0.84  0.84 0.00 0.00  0.00
Volume/Cap:  0.00 0.68  0.68 0.68 0.24  0.00 0.68 0.68  0.01 0.00 0.00  0.00
Delay/Veh:    0.0 60.9  60.9 62.7 42.0   0.0  3.4  3.4   1.3  0.0  0.0   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0 60.9  60.9 62.7 42.0   0.0  3.4  3.4   1.3  0.0  0.0   0.0
LOS by Move:    A    E     E    E    D     A    A    A     A    A    A     A
HCM2kAvgQ:      0    3     3    2    1     0   13   13     0    0    0     0
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-------------------------------------------------------------------------------
                 AM Peak Hour - Future plus STMP plus IWD
                          Samoa Town Master Plan
                            County of Humboldt
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #1 New Navy Base Rd/LP Dr
*******************************************************************************
Average Delay (sec/veh):      4.1       Worst Case Level Of Service: B[ 10.3]
*******************************************************************************
Street Name:             LP Dr                         New Navy Base Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  1  0   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:        0    0  148     0    0    0     0   67    5    21   71    0
Growth Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:     0    0  148     0    0    0     0   67    5    21   71    0
Added Vol:       3    0   49     0    0    0     0   79    5   242  342    0
PasserByVol:     0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:     3    0  197     0    0    0     0  146   10   263  413    0
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      0.80 0.80 0.80  0.80 0.80 0.80  0.80 0.80 0.80  0.80 0.80 0.80
PHF Volume:      4    0  246     0    0    0     0  183   13   329  516    0
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
FinalVolume:     4    0  246     0    0    0     0  183   13   329  516    0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1363 xxxx    98  xxxx xxxx xxxxx  xxxx xxxx xxxxx   195 xxxx xxxxx
Potent Cap.:  165 xxxx   964  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1390 xxxx xxxxx
Move Cap.:    135 xxxx   964  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1390 xxxx xxxxx
Volume/Cap:  0.03 xxxx  0.26  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.24 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx   1.0  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.9 xxxx xxxxx
Control Del: 32.5 xxxx  10.0 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.4 xxxx xxxxx
LOS by Move:    D    *     B     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:       10.3           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         B               *                *                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```



```
-------------------------------------------------------------------------------
                 PM Peak Hour - Future plus STMP plus IWD
                          Samoa Town Master Plan
                            County of Humboldt
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #1 New Navy Base Rd/LP Dr
*******************************************************************************
Average Delay (sec/veh):      4.4       Worst Case Level Of Service: B[ 13.9]
*******************************************************************************
Street Name:             LP Dr                         New Navy Base Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  1  0   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:        7    0   36     0    0    0     0  119    5     7   59    0
Growth Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:     7    0   36     0    0    0     0  119    5     7   59    0
Added Vol:       6    0  229     0    0    0     0  341    5    70  143    0
PasserByVol:     0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:    13    0  265     0    0    0     0  460   10    77  202    0
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      0.80 0.80 0.80  0.80 0.80 0.80  0.80 0.80 0.80  0.80 0.80 0.80
PHF Volume:     16    0  331     0    0    0     0  575   13    96  253    0
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
FinalVolume:    16    0  331     0    0    0     0  575   13    96  253    0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1026 xxxx   294  xxxx xxxx xxxxx  xxxx xxxx xxxxx   588 xxxx xxxxx
Potent Cap.:  262 xxxx   750  xxxx xxxx xxxxx  xxxx xxxx xxxxx   998 xxxx xxxxx
Move Cap.:    243 xxxx   750  xxxx xxxx xxxxx  xxxx xxxx xxxxx   998 xxxx xxxxx
Volume/Cap:  0.07 xxxx  0.44  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.10 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.2 xxxx   2.3  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.3 xxxx xxxxx
Control Del: 20.9 xxxx  13.5 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   9.0 xxxx xxxxx
LOS by Move:    C    *     B     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:       13.9           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         B               *                *                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

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-----------------------------------------------------------------------------
                  AM Peak Hour - Future plus STMP plus IWD
                          Samoa Town Master Plan
                            County of Humboldt
-----------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*****************************************************************************
Intersection #2 New Navy Base Rd/Cookhouse Rd
*****************************************************************************
Average Delay (sec/veh):      4.6      Worst Case Level Of Service: B[ 12.8]
*****************************************************************************
Street Name:           Cookhouse Rd                   New Navy Base Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  1    0  0  0  0  0    0  0  1  0  1    1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:        0    0    54     0    0     0     0   92     1    38   83     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0    0    54     0    0     0     0   92     1    38   83     0
Added Vol:       0    0   193     0    0     0     0  126     1   381  583     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0    0   247     0    0     0     0  218     2   419  666     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80
PHF Volume:      0    0   309     0    0     0     0  273     3   524  833     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     0    0   309     0    0     0     0  273     3   524  833     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:xxxxx xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx   273  xxxx xxxx xxxxx  xxxx xxxx xxxxx   275 xxxx xxxxx
Potent Cap.: xxxx xxxx   771  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1300 xxxx xxxxx
Move Cap.:   xxxx xxxx   771  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1300 xxxx xxxxx
Volume/Cap:  xxxx xxxx  0.40  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.40 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx   1.9  xxxx xxxx xxxxx  xxxx xxxx xxxxx   2.0 xxxx xxxxx
Control Del:xxxxx xxxx  12.8 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   9.6 xxxx xxxxx
LOS by Move:    *    *     B     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:       12.8            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:          B               *                *                *
*****************************************************************************
Note: Queue reported is the number of cars per lane.
*****************************************************************************
```



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-----------------------------------------------------------------------------
                  PM Peak Hour - Future plus STMP plus IWD
                          Samoa Town Master Plan
                            County of Humboldt
-----------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*****************************************************************************
Intersection #2 New Navy Base Rd/Cookhouse Rd
*****************************************************************************
Average Delay (sec/veh):    106.2      Worst Case Level Of Service: F[381.7]
*****************************************************************************
Street Name:           Cookhouse Rd                   New Navy Base Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  1  0  1    1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:        7    0    36     0    0     0     0  100     7     9  119     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     7    0    36     0    0     0     0  100     7     9  119     0
Added Vol:       1    0   431     0    0     0     0  569     1   245  212     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     8    0   467     0    0     0     0  669     8   254  331     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80  0.80 0.80  0.80
PHF Volume:     10    0   584     0    0     0     0  836    10   318  414     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    10    0   584     0    0     0     0  836    10   318  414     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4  6.5   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1885 1885   836  xxxx xxxx xxxxx  xxxx xxxx xxxxx   846 xxxx xxxxx
Potent Cap.:   79   71   370  xxxx xxxx xxxxx  xxxx xxxx xxxxx   799 xxxx xxxxx
Move Cap.:     54   43   370  xxxx xxxx xxxxx  xxxx xxxx xxxxx   799 xxxx xxxxx
Volume/Cap:  0.18 0.00  1.58  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.40 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   1.9 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx  12.4 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     *    *     *     B    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx  337 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx 38.0 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx  382 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    F     *     *    *     *     *    *     *     *    *     *
ApproachDel:      381.7            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:          F               *                *                *
*****************************************************************************
Note: Queue reported is the number of cars per lane.
*****************************************************************************
```

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--------------------------------------------------------------------------------
              AM Peak Hour - Future plus STMP plus IWD Mitigated
                           Samoa Town Master Plan
                            County of Humboldt
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #2 New Navy Base Rd/Cookhouse Rd
********************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):         0.591
Loss Time (sec):       6              Average Delay (sec/veh):        21.2
Optimal Cycle:        32              Level Of Service:                  C
********************************************************************************
Street Name:              Cookhouse Rd                   New Navy Base Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:     0    0    0     0    0    0     0    0    0     0    0    0
Y+R:          4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0
Lanes:         1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:       0    0   54     0    0    0     0   92    1    38   83    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:    0    0   54     0    0    0     0   92    1    38   83    0
Added Vol:      0    0  193     0    0    0     0  126    1   381  583    0
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:    0    0  247     0    0    0     0  218    2   419  666    0
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90
PHF Volume:     0    0  274     0    0    0     0  242    2   466  740    0
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:    0    0  274     0    0    0     0  242    2   466  740    0
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
FinalVolume:    0    0  274     0    0    0     0  242    2   466  740    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900
Adjustment:  1.00 1.00 0.85  1.00 1.00 1.00  1.00 1.00 0.85  0.95 1.00 1.00
Lanes:       1.00 0.00 1.00  0.00 0.00 0.00  0.00 1.00 1.00  1.00 1.00 0.00
Final Sat.:  1900    0 1615     0    0    0     0 1900 1615  1805 1900    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.00 0.17  0.00 0.00 0.00  0.00 0.13 0.00  0.26 0.39 0.00
Crit Moves:            ****                       ****       ****
Green/Cycle: 0.00 0.00 0.29  0.00 0.00 0.00  0.00 0.22 0.22  0.44 0.65 0.00
Volume/Cap:  0.00 0.00 0.59  0.00 0.00 0.00  0.00 0.59 0.01  0.59 0.60 0.00
Delay/Veh:    0.0  0.0 32.6   0.0  0.0  0.0   0.0 37.5 30.8  22.6 10.7  0.0
User DelAdj: 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:   0.0  0.0 32.6   0.0  0.0  0.0   0.0 37.5 30.8  22.6 10.7  0.0
LOS by Move:    A    A    C     A    A    A     A    D    C     C    B    A
HCM2kAvgQ:      0    0    8     0    0    0     0    7    0    10   13    0
********************************************************************************
```



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--------------------------------------------------------------------------------
              PM Peak Hour - Future plus STMP plus IWD Mitigated
                           Samoa Town Master Plan
                            County of Humboldt
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #2 New Navy Base Rd/Cookhouse Rd
********************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):         0.924
Loss Time (sec):       6              Average Delay (sec/veh):        43.8
Optimal Cycle:       110              Level Of Service:                  D
********************************************************************************
Street Name:              Cookhouse Rd                   New Navy Base Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:     0    0    0     0    0    0     0    0    0     0    0    0
Y+R:          4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0
Lanes:         1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:       7    0   36     0    0    0     0  100    7     9  119    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:    7    0   36     0    0    0     0  100    7     9  119    0
Added Vol:      1    0  431     0    0    0     0  569    1   245  212    0
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:    8    0  467     0    0    0     0  669    8   254  331    0
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90
PHF Volume:     9    0  519     0    0    0     0  743    9   282  368    0
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:    9    0  519     0    0    0     0  743    9   282  368    0
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
FinalVolume:    9    0  519     0    0    0     0  743    9   282  368    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900
Adjustment:  0.91 1.00 0.85  1.00 1.00 1.00  1.00 1.00 0.85  0.95 1.00 1.00
Lanes:       1.00 0.00 1.00  0.00 0.00 0.00  0.00 1.00 1.00  1.00 1.00 0.00
Final Sat.:  1735    0 1615     0    0    0     0 1900 1615  1805 1900    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.00 0.32  0.00 0.00 0.00  0.00 0.39 0.01  0.16 0.19 0.00
Crit Moves:            ****                       ****       ****
Green/Cycle: 0.35 0.00 0.35  0.00 0.00 0.00  0.00 0.42 0.42  0.17 0.59 0.00
Volume/Cap:  0.01 0.00 0.92  0.00 0.00 0.00  0.00 0.92 0.01  0.92 0.33 0.00
Delay/Veh:   21.4  0.0 52.6   0.0  0.0  0.0   0.0 43.6 16.7  73.3 10.5  0.0
User DelAdj: 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:  21.4  0.0 52.6   0.0  0.0  0.0   0.0 43.6 16.7  73.3 10.5  0.0
LOS by Move:    C    A    D     A    A    A     A    D    B     E    B    A
HCM2kAvgQ:      0    0   20     0    0    0     0   26    0    10    6    0
********************************************************************************
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--------------------------------------------------------------------------------
                  AM Peak Hour - Future plus STMP plus IWD
                          Samoa Town Master Plan
                            County of Humboldt
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #3 New Navy Base Rd/Hwy 255
********************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):        1.968
Loss Time (sec):       0              Average Delay (sec/veh):      234.0
Optimal Cycle:         0              Level Of Service:                 F
********************************************************************************
Street Name:                 Hwy 255                      New Navy Base Rd
Approach:        North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:            Ignore          Include           Ignore          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Lanes:         1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:     117    0   147    0    0     0    0   54   107   306   69     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  117    0   147    0    0     0    0   54   107   306   69     0
Added Vol:    628    0     0    0    0     0    0  103   216     0  337     0
PasserByVol:    0    0     0    0    0     0    0    0     0     0    0     0
Initial Fut:  745    0   147    0    0     0    0  157   323   306  406     0
User Adj:    1.00 1.00  0.00 1.00 1.00  1.00 1.00 1.00  0.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  0.00 0.80 0.80  0.80 0.80 0.80  0.00  0.80 0.80  0.80
PHF Volume:   931    0     0    0    0     0    0  196     0   383  508     0
Reduct Vol:     0    0     0    0    0     0    0    0     0     0    0     0
Reduced Vol:  931    0     0    0    0     0    0  196     0   383  508     0
PCE Adj:     1.00 1.00  0.00 1.00 1.00  1.00 1.00 1.00  0.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  0.00 1.00 1.00  1.00 1.00 1.00  0.00  1.00 1.00  1.00
FinalVolume:  931    0     0    0    0     0    0  196     0   383  508     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 0.00  1.00 0.00 0.00  0.00 0.00 1.00  1.00  1.00 1.00  0.00
Final Sat.:   473    0   552    0    0     0    0  473   521   493  530     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     1.97 xxxx  0.00 xxxx xxxx  xxxx xxxx 0.41  0.00  0.78 0.96  xxxx
Crit Moves:  ****                                ****              ****
Delay/Veh:  460.9  0.0   0.0  0.0  0.0   0.0  0.0 15.5   0.0  30.9 55.0   0.0
Delay Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh: 460.9  0.0   0.0  0.0  0.0   0.0  0.0 15.5   0.0  30.9 55.0   0.0
LOS by Move:    F    *     *    *    *     *    *    C     *     D    F     *
ApproachDel:      460.9           xxxxxx            15.5             44.6
Delay Adj:         1.00            xxxxx            1.00             1.00
ApprAdjDel:       460.9           xxxxxx            15.5             44.6
LOS by Appr:          F                *               C                E
AllWayAvgQ:  59.2  0.0   0.0  0.0  0.0   0.0  0.0  0.7   0.0   2.9  6.7   0.0
********************************************************************************
```



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--------------------------------------------------------------------------------
                  PM Peak Hour - Future plus STMP plus IWD
                          Samoa Town Master Plan
                            County of Humboldt
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #3 New Navy Base Rd/Hwy 255
********************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):        1.223
Loss Time (sec):       0              Average Delay (sec/veh):      108.0
Optimal Cycle:         0              Level Of Service:                 F
********************************************************************************
Street Name:                 Hwy 255                      New Navy Base Rd
Approach:        North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:            Ignore          Include           Ignore          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Lanes:         1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:     145    0   466    0    0     0    0   78   157   440   63     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  145    0   466    0    0     0    0   78   157   440   63     0
Added Vol:    299    0     0    0    0     0    0  322   678     0  158     0
PasserByVol:    0    0     0    0    0     0    0    0     0     0    0     0
Initial Fut:  444    0   466    0    0     0    0  400   835   440  221     0
User Adj:    1.00 1.00  0.00 1.00 1.00  1.00 1.00 1.00  0.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  0.00 0.80 0.80  0.80 0.80 0.80  0.00  0.80 0.80  0.80
PHF Volume:   555    0     0    0    0     0    0  500     0   550  276     0
Reduct Vol:     0    0     0    0    0     0    0    0     0     0    0     0
Reduced Vol:  555    0     0    0    0     0    0  500     0   550  276     0
PCE Adj:     1.00 1.00  0.00 1.00 1.00  1.00 1.00 1.00  0.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  0.00 1.00 1.00  1.00 1.00 1.00  0.00  1.00 1.00  1.00
FinalVolume:  555    0     0    0    0     0    0  500     0   550  276     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 0.00  1.00 0.00 0.00  0.00 0.00 1.00  1.00  1.00 1.00  0.00
Final Sat.:   454    0   533    0    0     0    0  477   525   453  484     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     1.22 xxxx  0.00 xxxx xxxx  xxxx xxxx 1.05  0.00  1.21 0.57  xxxx
Crit Moves:  ****                                ****              ****
Delay/Veh:  143.9  0.0   0.0  0.0  0.0   0.0  0.0 82.0   0.0 140.0 19.6   0.0
Delay Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh: 143.9  0.0   0.0  0.0  0.0   0.0  0.0 82.0   0.0 140.0 19.6   0.0
LOS by Move:    F    *     *    *    *     *    *    F     *     F    C     *
ApproachDel:      143.9           xxxxxx            82.0             99.7
Delay Adj:         1.00            xxxxx            1.00             1.00
ApprAdjDel:       143.9           xxxxxx            82.0             99.7
LOS by Appr:          F                *               F                F
AllWayAvgQ:  16.8  0.0   0.0  0.0  0.0   0.0  0.0  9.5   0.0  16.3  1.3   0.0
********************************************************************************
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-------------------------------------------------------------------------------
              AM Peak Hour - Future plus STMP plus IWD Mitigated
                           Samoa Town Master Plan
                            County of Humboldt
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
*******************************************************************************
Intersection #3 New Navy Base Rd/Hwy 255
*******************************************************************************
Cycle (sec):        100              Critical Vol./Cap.(X):        0.786
Loss Time (sec):      6              Average Delay (sec/veh):       31.0
Optimal Cycle:       55              Level Of Service:                 C
*******************************************************************************
Street Name:                 Hwy 255                     New Navy Base Rd
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Ignore          Include           Ignore          Include
Min. Green:     0    0    0     0    0    0     0    0    0     0    0    0
Y+R:          4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0
Lanes:         1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:     117    0   147     0    0     0     0   54   107   306   69     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  117    0   147     0    0     0     0   54   107   306   69     0
Added Vol:    628    0     0     0    0     0     0  103   216     0  337     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  745    0   147     0    0     0     0  157   323   306  406     0
User Adj:    1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.00  0.90 0.90  0.90  0.90 0.90  0.00  0.90 0.90  0.90
PHF Volume:   828    0     0     0    0     0     0  174     0   340  451     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  828    0     0     0    0     0     0  174     0   340  451     0
PCE Adj:     1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
FinalVolume:  828    0     0     0    0     0     0  174     0   340  451     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.95 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  0.95 1.00  1.00
Lanes:       1.00 0.00  1.00  0.00 0.00  0.00  0.00 1.00  1.00  1.00 1.00  0.00
Final Sat.:  1805    0  1900     0    0     0     0 1900  1900  1805 1900     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.46 0.00  0.00  0.00 0.00  0.00  0.00 0.09  0.00  0.19 0.24  0.00
Crit Moves:  ****                                   ****        ****
Green/Cycle: 0.58 0.00  0.00  0.00 0.00  0.00  0.00 0.12  0.00  0.24 0.36  0.00
Volume/Cap:  0.79 0.00  0.00  0.00 0.00  0.00  0.00 0.79  0.00  0.79 0.67  0.00
Delay/Veh:   20.0  0.0   0.0   0.0  0.0   0.0   0.0 59.7   0.0  44.8 29.7   0.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  20.0  0.0   0.0   0.0  0.0   0.0   0.0 59.7   0.0  44.8 29.7   0.0
LOS by Move:    B    A     A     A    A     A     A    E     A     D    C     A
HCM2kAvgQ:     21    0     0     0    0     0     0    5     0    10   12     0
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-------------------------------------------------------------------------------
              PM Peak Hour - Future plus STMP plus IWD Mitigated
                           Samoa Town Master Plan
                            County of Humboldt
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
*******************************************************************************
Intersection #3 New Navy Base Rd/Hwy 255
*******************************************************************************
Cycle (sec):        100              Critical Vol./Cap.(X):        0.828
Loss Time (sec):      6              Average Delay (sec/veh):       36.7
Optimal Cycle:       65              Level Of Service:                 D
*******************************************************************************
Street Name:                 Hwy 255                     New Navy Base Rd
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Ignore          Include           Ignore          Include
Min. Green:     0    0    0     0    0    0     0    0    0     0    0    0
Y+R:          4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0
Lanes:         1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   1  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:     145    0   466     0    0     0     0   78   157   440   63     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  145    0   466     0    0     0     0   78   157   440   63     0
Added Vol:    299    0     0     0    0     0     0  322   678     0  158     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  444    0   466     0    0     0     0  400   835   440  221     0
User Adj:    1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
PHF Adj:     0.90 0.90  0.00  0.90 0.90  0.90  0.90 0.90  0.00  0.90 0.90  0.90
PHF Volume:   493    0     0     0    0     0     0  444     0   489  246     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  493    0     0     0    0     0     0  444     0   489  246     0
PCE Adj:     1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
FinalVolume:  493    0     0     0    0     0     0  444     0   489  246     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.95 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  0.95 1.00  1.00
Lanes:       1.00 0.00  1.00  0.00 0.00  0.00  0.00 1.00  1.00  1.00 1.00  0.00
Final Sat.:  1805    0  1900     0    0     0     0 1900  1900  1805 1900     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.27 0.00  0.00  0.00 0.00  0.00  0.00 0.23  0.00  0.27 0.13  0.00
Crit Moves:  ****                                   ****        ****
Green/Cycle: 0.33 0.00  0.00  0.00 0.00  0.00  0.00 0.28  0.00  0.33 0.61  0.00
Volume/Cap:  0.83 0.00  0.00  0.00 0.00  0.00  0.00 0.83  0.00  0.83 0.21  0.00
Delay/Veh:   40.2  0.0   0.0   0.0  0.0   0.0   0.0 43.9   0.0  40.5  8.8   0.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  40.2  0.0   0.0   0.0  0.0   0.0   0.0 43.9   0.0  40.5  8.8   0.0
LOS by Move:    D    A     A     A    A     A     A    D     A     D    A     A
HCM2kAvgQ:     16    0     0     0    0     0     0   12     0    15    3     0
*******************************************************************************
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-------------------------------------------------------------------------------
                  AM Peak Hour - Future plus STMP plus IWD
                          Samoa Town Master Plan
                           County of Humboldt
-------------------------------------------------------------------------------
                   Level Of Service Computation Report
         2000 HCM Operations Method (Future Volume Alternative)
*******************************************************************************
Intersection #12 Hwy 255/Fourth St
*******************************************************************************
Cycle (sec):          70               Critical Vol./Cap.(X):         1.026
Loss Time (sec):       8               Average Delay (sec/veh):        40.9
Optimal Cycle:       180               Level Of Service:                  D
*******************************************************************************
Street Name:                Hwy 255                          Fourth St
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted         Permitted         Permitted         Permitted
Rights:          Include           Include           Include           Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Y+R:         4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  0   0  0  1  0  1   0  0  0  0  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:      16  326     0    0   99   317    0    0     0   13 2175    21
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:   16  326     0    0   99   317    0    0     0   13 2175    21
Added Vol:      0  476     0    0   32   145    0    0     0    0    0    30
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:   16  802     0    0  131   462    0    0     0   13 2175    51
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:    16  802     0    0  131   462    0    0     0   13 2175    51
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:   16  802     0    0  131   462    0    0     0   13 2175    51
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:   16  802     0    0  131   462    0    0     0   13 2175    51
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.66 0.95  1.00 1.00 1.00  0.85 1.00 1.00  1.00 0.95 0.95  0.95
Lanes:       1.00 2.00  0.00 0.00 1.00  1.00 0.00 0.00  0.00 0.01 1.94  0.05
Final Sat.:  1248 3610     0    0 1900  1615    0    0     0   21 3493    82
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.22  0.00 0.00 0.07  0.29 0.00 0.00  0.00 0.62 0.62  0.62
Crit Moves:                             ****                      ****
Green/Cycle: 0.28 0.28  0.00 0.00 0.28  0.28 0.00 0.00  0.00 0.61 0.61  0.61
Volume/Cap:  0.05 0.80  0.00 0.00 0.25  1.03 0.00 0.00  0.00 1.03 1.03  1.03
Delay/Veh:   18.5 27.9   0.0  0.0 19.8  74.5  0.0  0.0   0.0 40.0 40.0  40.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  18.5 27.9   0.0  0.0 19.8  74.5  0.0  0.0   0.0 40.0 40.0  40.0
LOS by Move:    B    C     A    A    B     E    A    A     A    D    D     D
HCM2kAvgQ:      0    9     0    0    2    17    0    0     0   37   37    37
*******************************************************************************
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-------------------------------------------------------------------------------
                  PM Peak Hour - Future plus STMP plus IWD
                          Samoa Town Master Plan
                           County of Humboldt
-------------------------------------------------------------------------------
                   Level Of Service Computation Report
         2000 HCM Operations Method (Future Volume Alternative)
*******************************************************************************
Intersection #12 Hwy 255/Fourth St
*******************************************************************************
Cycle (sec):          70               Critical Vol./Cap.(X):         1.219
Loss Time (sec):       8               Average Delay (sec/veh):       100.0
Optimal Cycle:       180               Level Of Service:                  F
*******************************************************************************
Street Name:                Hwy 255                          Fourth St
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted         Permitted         Permitted         Permitted
Rights:          Include           Include           Include           Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Y+R:         4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  0   0  0  1  0  1   0  0  0  0  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:      42  389     0    0   91   372    0    0     0   18 1948    58
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:   42  389     0    0   91   372    0    0     0   18 1948    58
Added Vol:      0  224     0    0  104   455    0    0     0    0    0    13
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:   42  613     0    0  195   827    0    0     0   18 1948    71
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:    42  613     0    0  195   827    0    0     0   18 1948    71
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:   42  613     0    0  195   827    0    0     0   18 1948    71
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:   42  613     0    0  195   827    0    0     0   18 1948    71
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.60 0.95  1.00 1.00 1.00  0.85 1.00 1.00  1.00 0.94 0.94  0.94
Lanes:       1.00 2.00  0.00 0.00 1.00  1.00 0.00 0.00  0.00 0.02 1.91  0.07
Final Sat.:  1132 3610     0    0 1900  1615    0    0     0   32 3432   125
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.04 0.17  0.00 0.00 0.10  0.51 0.00 0.00  0.00 0.57 0.57  0.57
Crit Moves:                             ****                      ****
Green/Cycle: 0.42 0.42  0.00 0.00 0.42  0.42 0.00 0.00  0.00 0.47 0.47  0.47
Volume/Cap:  0.09 0.40  0.00 0.00 0.24  1.22 0.00 0.00  0.00 1.22 1.22  1.22
Delay/Veh:   12.3 14.4   0.0  0.0 13.3 131.9  0.0  0.0   0.0 122.9  123 122.9
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  12.3 14.4   0.0  0.0 13.3 131.9  0.0  0.0   0.0 122.9  123 122.9
LOS by Move:    B    B     A    A    B     F    A    A     A    F    F     F
HCM2kAvgQ:      1    5     0    0    3    39    0    0     0   50   50    50
*******************************************************************************
```

```
-------------------------------------------------------------------------------
              AM Peak Hour - Future plus STMP plus IWD Mitigated
                          Samoa Town Master Plan
                            County of Humboldt
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
*******************************************************************************
Intersection #12 Hwy 255/Fourth St
*******************************************************************************
Cycle (sec):        70               Critical Vol./Cap.(X):        0.954
Loss Time (sec):     8               Average Delay (sec/veh):       28.2
Optimal Cycle:     111               Level Of Service:                 C
*******************************************************************************
Street Name:                 Hwy 255                       Fourth St
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Y+R:         4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  0   0  0  0  1  1   0  0  0  0  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:     16  326     0    0   99   317    0    0     0   13 2175    21
Growth Adj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  16  326     0    0   99   317    0    0     0   13 2175    21
Added Vol:     0  476     0    0   32   145    0    0     0    0    0    30
PasserByVol:   0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  16  802     0    0  131   462    0    0     0   13 2175    51
User Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:   16  802     0    0  131   462    0    0     0   13 2175    51
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  16  802     0    0  131   462    0    0     0   13 2175    51
PCE Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  16  802     0    0  131   462    0    0     0   13 2175    51
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment: 0.65 0.95  1.00 1.00 0.88  0.88 1.00 1.00  1.00 0.95 0.95  0.95
Lanes:      1.00 2.00  0.00 0.00 0.44  1.56 0.00 0.00  0.00 0.01 1.94  0.05
Final Sat.: 1226 3610     0    0  741  2614    0    0     0   21 3493    82
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.01 0.22  0.00 0.00 0.18  0.18 0.00 0.00  0.00 0.62 0.62  0.62
Crit Moves:      ****                                            ****
Green/Cycle: 0.23 0.23  0.00 0.00 0.23  0.23 0.00 0.00  0.00 0.65 0.65  0.65
Volume/Cap:  0.06 0.95  0.00 0.00 0.76  0.76 0.00 0.00  0.00 0.95 0.95  0.95
Delay/Veh:   21.0 47.1   0.0  0.0 29.4  29.4  0.0  0.0   0.0 21.1 21.1  21.1
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  21.0 47.1   0.0  0.0 29.4  29.4  0.0  0.0   0.0 21.1 21.1  21.1
LOS by Move:    C    D     A    A    C     C    A    A     A    C    C     C
HCM2kAvgQ:      0   11     0    0    8     8    0    0     0   30   30    30
*******************************************************************************
```



```
-------------------------------------------------------------------------------
              PM Peak Hour - Future plus STMP plus IWD Mitigated
                          Samoa Town Master Plan
                            County of Humboldt
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
*******************************************************************************
Intersection #12 Hwy 255/Fourth St
*******************************************************************************
Cycle (sec):        70               Critical Vol./Cap.(X):        0.986
Loss Time (sec):     8               Average Delay (sec/veh):       34.1
Optimal Cycle:     136               Level Of Service:                 C
*******************************************************************************
Street Name:                 Hwy 255                       Fourth St
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Y+R:         4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  0   0  0  0  1  1   0  0  0  0  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:     42  389     0    0   91   372    0    0     0   18 1948    58
Growth Adj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  42  389     0    0   91   372    0    0     0   18 1948    58
Added Vol:     0  224     0    0  104   455    0    0     0    0    0    13
PasserByVol:   0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  42  613     0    0  195   827    0    0     0   18 1948    71
User Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:   42  613     0    0  195   827    0    0     0   18 1948    71
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  42  613     0    0  195   827    0    0     0   18 1948    71
PCE Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  42  613     0    0  195   827    0    0     0   18 1948    71
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment: 0.56 0.95  1.00 1.00 0.88  0.88 1.00 1.00  1.00 0.94 0.94  0.94
Lanes:      1.00 2.00  0.00 0.00 0.38  1.62 0.00 0.00  0.00 0.02 1.91  0.07
Final Sat.: 1060 3610     0    0  637  2703    0    0     0   32 3432   125
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.04 0.17  0.00 0.00 0.31  0.31 0.00 0.00  0.00 0.57 0.57  0.57
Crit Moves:                       ****                           ****
Green/Cycle: 0.31 0.31  0.00 0.00 0.31  0.31 0.00 0.00  0.00 0.58 0.58  0.58
Volume/Cap:  0.13 0.55  0.00 0.00 0.99  0.99 0.00 0.00  0.00 0.99 0.99  0.99
Delay/Veh:   17.5 20.6   0.0  0.0 48.6  48.6  0.0  0.0   0.0 31.2 31.2  31.2
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  17.5 20.6   0.0  0.0 48.6  48.6  0.0  0.0   0.0 31.2 31.2  31.2
LOS by Move:    B    C     A    A    D     D    A    A     A    C    C     C
HCM2kAvgQ:      1    6     0    0   17    17    0    0     0   31   31    31
*******************************************************************************
```

```
--------------------------------------------------------------------------------
                 AM Peak Hour - Future plus STMP plus IWD
                          Samoa Town Master Plan
                            County of Humboldt
--------------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #13 Hwy 255/Fifth St
********************************************************************************
Cycle (sec):        100              Critical Vol./Cap.(X):        0.580
Loss Time (sec):      6              Average Delay (sec/veh):        6.6
Optimal Cycle:       32              Level Of Service:                 A
********************************************************************************
Street Name:                  Hwy 255                         Fifth St
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Protected        Protected        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0    0    0    0    0    0    0    0    0    0
Y+R:         4.0  4.0  4.0  4.0  4.0  4.0  4.0  4.0  4.0  4.0  4.0  4.0
Lanes:       0  0  1  1  0   1  0  2  0  0   0  1  2  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:      0   30   30   70   45    0  317 1511    6    0    0    0
Growth Adj:  1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse:   0   30   30   70   45    0  317 1511    6    0    0    0
Added Vol:     0    0    0    9   23    0  476    0    0    0    0    0
PasserByVol:   0    0    0    0    0    0    0    0    0    0    0    0
Initial Fut:   0   30   30   79   68    0  793 1511    6    0    0    0
User Adj:    1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume:    0   30   30   79   68    0  793 1511    6    0    0    0
Reduct Vol:    0    0    0    0    0    0    0    0    0    0    0    0
Reduced Vol:   0   30   30   79   68    0  793 1511    6    0    0    0
PCE Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume:   0   30   30   79   68    0  793 1511    6    0    0    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900
Adjustment:  1.00 0.88 0.88 0.95 0.95 1.00 0.86 0.86 0.85 1.00 1.00 1.00
Lanes:       0.00 1.00 1.00 1.00 2.00 0.00 1.00 2.00 1.00 0.00 0.00 0.00
Final Sat.:    0 1670 1670 1805 3610    0 1641 3282 1615    0    0    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.02 0.02 0.04 0.02 0.00 0.48 0.46 0.00 0.00 0.00 0.00
Crit Moves:       ****      ****                ****
Green/Cycle: 0.00 0.03 0.03 0.08 0.11 0.00 0.83 0.83 0.83 0.00 0.00 0.00
Volume/Cap:  0.00 0.58 0.58 0.58 0.18 0.00 0.58 0.55 0.00 0.00 0.00 0.00
Delay/Veh:    0.0 55.8 55.8 50.8 40.9  0.0  2.9  2.7  1.4  0.0  0.0  0.0
User DelAdj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh:   0.0 55.8 55.8 50.8 40.9  0.0  2.9  2.7  1.4  0.0  0.0  0.0
LOS by Move:    A    E    E    D    D    A    A    A    A    A    A    A
HCM2kAvgQ:      0    2    2    2    1    0    9    8    0    0    0    0
********************************************************************************
```



```
--------------------------------------------------------------------------------
                 PM Peak Hour - Future plus STMP plus IWD
                          Samoa Town Master Plan
                            County of Humboldt
--------------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #13 Hwy 255/Fifth St
********************************************************************************
Cycle (sec):        100              Critical Vol./Cap.(X):        0.711
Loss Time (sec):      6              Average Delay (sec/veh):        8.5
Optimal Cycle:       43              Level Of Service:                 A
********************************************************************************
Street Name:                  Hwy 255                         Fifth St
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Protected        Protected        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0    0    0    0    0    0    0    0    0    0
Y+R:         4.0  4.0  4.0  4.0  4.0  4.0  4.0  4.0  4.0  4.0  4.0  4.0
Lanes:       0  0  1  1  0   1  0  2  0  0   0  1  2  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:2033
Base Vol:      0   45   45   57   45    0  428 2331    9    0    0    0
Growth Adj:  1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse:   0   45   45   57   45    0  428 2331    9    0    0    0
Added Vol:     0    0    0   28   76    0  224    0    0    0    0    0
PasserByVol:   0    0    0    0    0    0    0    0    0    0    0    0
Initial Fut:   0   45   45   85  121    0  652 2331    9    0    0    0
User Adj:    1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume:    0   45   45   85  121    0  652 2331    9    0    0    0
Reduct Vol:    0    0    0    0    0    0    0    0    0    0    0    0
Reduced Vol:   0   45   45   85  121    0  652 2331    9    0    0    0
PCE Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume:   0   45   45   85  121    0  652 2331    9    0    0    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900
Adjustment:  1.00 0.88 0.88 0.95 0.95 1.00 0.88 0.88 0.85 1.00 1.00 1.00
Lanes:       0.00 1.00 1.00 1.00 2.00 0.00 0.66 2.34 1.00 0.00 0.00 0.00
Final Sat.:    0 1670 1670 1805 3610    0 1096 3920 1615    0    0    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.03 0.03 0.05 0.03 0.00 0.59 0.59 0.01 0.00 0.00 0.00
Crit Moves:       ****      ****                ****
Green/Cycle: 0.00 0.04 0.04 0.07 0.10 0.00 0.84 0.84 0.84 0.00 0.00 0.00
Volume/Cap:  0.00 0.71 0.71 0.71 0.32 0.00 0.71 0.71 0.01 0.00 0.00 0.00
Delay/Veh:    0.0 64.8 64.8 63.9 42.0  0.0  3.9  3.9  1.4  0.0  0.0  0.0
User DelAdj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh:   0.0 64.8 64.8 63.9 42.0  0.0  3.9  3.9  1.4  0.0  0.0  0.0
LOS by Move:    A    E    E    E    D    A    A    A    A    A    A    A
HCM2kAvgQ:      0    3    3    3    2    0   15   15    0    0    0    0
********************************************************************************
```

APPENDIX 17

Segment-Specific Preliminary Construction and Non-Construction Costs

Engineers Opinion of Probable Construction Costs for Preliminary Transportation Access Plan Drawings Prepared by LACO dated July 26, 2013

Summary of Costs for all Segments

ROAD NAME	COST
Segment Number 1, New Navy Base Road - Bay Street to Hwy 255	$1,929,000
Segment Number 2, Bay Street - New Navy Base Road to Vance Ave	$978,000
Segment Number 3, Vance Ave - Bay Street to Samoa Pulp Lane	$2,336,000
Segment Number 4, Vance Ave - North of Samoa Pulp Lane	$1,094,000
Segment Number 5, Samoa Pulp Lane - New Navy Base Road to Vance Ave	$239,000
Segment Number 6, North Spur off Vance Ave	$746,000
Segment Number 7, South Spur off Vance Ave	$1,033,000
Grand Total (Estimated, rounded to nearest $1,000)	**$8,355,000**

Above table includes construction and non-construction costs for each segment

Construction and Non-Construction Costs

Total Construction Cost Estimate		**$4,883,200**
Non-Construction Cost Breakdown		
Land Acquisition	$135,000	
Environmental Documents	$244,000	
Plans, Specifications, and Estimate (PS&E)	$494,000	
Materials Testing	$51,000	
Construction Staking	$49,000	
Construction Engineering	$244,000	
Record Drawings	$33,000	
Street/Corner Monuments	$25,000	
Total Non-Construction Cost Estimate		**$1,275,000**
	Contingency 30%	$1,847,000
	Total Project Cost Estimate	**$8,005,000**
Additional Cost Allowances:		
PG & E Fees		$175,000
County Fees		$175,000
Grand Total (Estimated, rounded to nearest $1,000)		**$8,355,000**

Above table shows the breakdown and summary of construction and non-construction costs

LACO

Engineers Opinion of Probable Construction Costs for Preliminary Transportation Access Plan Drawings Prepared by LACO dated July 26, 2013

Segment Number 1, New Navy Base Road - Bay Street to Hwy 255

ITEM NO.	DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Mobilization	1	LS	$20,000	$20,000
2	Traffic Control	1	LS	$20,000	$20,000
3	Earth Work and Excavation	1	LS	$10,000	$10,000
4	Street Signs	4	EA	$500	$2,000
5	"No Parking" Sign	4	EA	$500	$2,000
6	Thermoplastic Striping	1	LS	$30,000	$30,000
7	Standard Pole Mounted Light	6	EA	$1,500	$9,000
8	Erosion and Sediment Control Implementation and monitoring	1	LS	$30,000	$30,000
9	Demolition (sawcutting, grinding, etc.)	1	LS	$5,000	$5,000
10	Future Signal at the intersection of New Navy Base Road/Cookhouse Drive	1	LF	$500,000	$500,000
11	Future Signal at the intersection of SR 255/New Navy Base Road	1	LF	$500,000	$500,000
12	Power Pole Relocation	4	EA	$12,000	$48,000
Total Construction Cost Estimate					**$1,176,000**
	Environmental Documents	5%			$58,800
	Plans, Specifications and Estimate (PS&E)	10%			$117,600
	Materials Testing	1%			$11,800
	Construction Staking	1%			$11,800
	Construction Engineering	5%			$58,800
	Record Drawings	LS	1	$4,500	$4,500
	Street/Corner Monuments	0.5%			$5,900
Total Non-Construction Cost Estimate					**$269,200**
	Sub Total of Cost Estimate				**$1,445,200**
	Contingency 30%				$433,600
	Total Project Cost Estimate				**$1,878,800**
Additional Cost Allowances					
	PG & E Fees				$25,000
	County Fees				$25,000
Grand Total (Estimated, rounded to nearest $1,000)					**$1,929,000**

Note: Above unit prices are based on the recent bids for road improvement projects in Humboldt County.

LACO

Engineers Opinion of Probable Construction Costs for Preliminary Transportation Access Plan Drawings Prepared by LACO dated July 26, 2013

Segment Number 2, Bay Street - New Navy Base Road to Vance Ave

ITEM NO.	DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Mobilization	1	LS	$10,000	$10,000
2	Shoring and Trench Safety	1	LS	$5,000	$5,000
3	Traffic Control	1	LS	$10,000	$10,000
4	Earth Work and Excavation	1	LS	$50,000	$50,000
5	12" CMP Storm Drain	200	LF	$60	$12,000
6	Bioswale	4,206	LF	$15	$63,090
7	Outlet/Drainage Control Structure	8	EA	$3,500	$28,000
8	0.3ft Asphalt concrete	1,495	TON	$135	$201,888
9	8-Inch Aggregate Base	1,645	CY	$30	$49,350
10	Stop Signs	1	EA	$500	$500
11	Street Signs	2	EA	$500	$1,000
12	"No Parking" Sign	8	EA	$200	$1,600
13	Thermoplastic Striping	1	LS	$20,000	$20,000
14	Standard Pole Mounted Light	2	EA	$1,500	$3,000
15	Erosion and Sediment Control Implementation and monitoring	1	LS	$25,000	$25,000
16	Demolition (sawcutting, grinding, etc.)	1	LS	$25,000	$25,000
17	Joint Utilities Trench	2,103	LF	$25	$52,575
18	Power Pole Relocation	3	EA	$12,000	$36,000
Total Construction Cost					**$579,000**
	Environmental Documents	5%			$29,000
	Plans, Specifications and Estimate (PS&E)	10%			$57,900
	Materials Testing	1%			$5,800
	Construction Staking	1%			$5,800
	Construction Engineering	5%			$29,000
	Record Drawings	LS	1	$4,500	$4,500
	Street/Corner Monuments	0.5%			$2,900
Non-Construction Cost Estimate					**$134,900**
	Sub Total				**$713,900**
	Contingency 30%				$214,200
	Total Project Cost Estimate				**$928,100**
Additional Cost Allowances					
	PG & E Fees				$25,000
	County Fees				$25,000
Grand Total (Estimated, rounded to nearest $1,000)					**$978,000**

Note: Above unit prices are based on the recent bids for road improvement projects in Humboldt County.

Project: Samoa Industrial Waterfront Preliminary Transportation Access Plan
Client: Humboldt Bay Harbor, Recreation and Conservation District
LACO Project No. 7591.00; July 26, 2013

Engineers Opinion of Probable Construction Costs for Preliminary Transportation Access Plan Drawings Prepared by LACO dated July 26, 2013

Segment Number 3, Vance Ave - Bay Street to Samoa Pulp Lane

ITEM NO.	DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Mobilization	1	LS	$10,000	$10,000
2	Shoring and Trench Safety	1	LS	$2,000	$2,000
3	Traffic Control	1	LS	$3,000	$3,000
4	Earth Work and Excavation	1	LS	$15,000	$15,000
5	12" CMP Storm Drain	450	LF	$60	$27,000
6	Bioswale	9,224	LF	$15	$138,360
7	6 ft. Tall Chain Link Fence	9,224	LF	$40	$368,960
8	Outlet Control Structure	18	EA	$1,500	$27,000
9	0.3ft Asphalt concrete	3,280	TON	$135	$442,752
10	8-Inch Aggregate Base	3,608	CY	$30	$108,228
11	Stop Signs	1	EA	$500	$500
12	Street Signs	1	EA	$500	$500
13	"No Parking" Sign	18	EA	$200	$3,600
14	Thermoplastic Striping	1	LS	$30,000	$30,000
15	Standard Pole Mounted Light	5	EA	$750	$3,750
16	Erosion and Sediment Control Implementation and monitoring	1	LS	$45,000	$45,000
17	Demolition (sawcutting, grinding, etc.)	1	LS	$50,000	$50,000
18	Power Pole Relocation	9	EA	$12,000	$108,000
19	Joint Utilities Trench	4,612	LF	$25	$115,300
Total Construction Cost Estimate					**$1,373,700**
	Land Acquisition	6.35	Acre	$11,000	$69,900
	Environmental Documents	5%			$68,700
	Plans, Specifications and Estimate (PS&E)	10%			$137,370
	Materials Testing	1%			$13,700
	Construction Staking	1%			$13,700
	Construction Engineering	5%			$68,700
	Record Drawings	LS	1	$6,000	$6,000
	Street/Corner Monuments	0.5%			$6,900
Non-Construction Cost Estimate					**$385,000**
	Sub Total				**$1,758,700**
	Contingency 30%				$527,600
	Total Project Cost Estimate				**$2,286,300**
Additional Cost Allowances					
	PG & E Fees				$25,000
	County Fees				$25,000
Grand Total (Estimated, rounded to nearest $1,000)					**$2,336,000**

Note: Above unit prices are based on the recent bids for road improvement projects in Humboldt County.

Project: Samoa Industrial Waterfront Preliminary Transportation Access Plan
Client: Humboldt Bay Harbor, Recreation and Conservation District
LACO Project No. 7591.00; July 26, 2013

Engineers Opinion of Probable Construction Costs for Preliminary Transportation Access Plan Drawings Prepared by LACO dated July 26, 2013

Segment Number 4, Vance Ave - North of Samoa Pulp Lane

ITEM NO.	DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Mobilization	1	LS	$10,000	$10,000
2	Shoring and Trench Safety	1	LS	$2,000	$2,000
3	Traffic Control	1	LS	$3,000	$3,000
4	Earth Work and Excavation	1	LS	$15,000	$15,000
5	12" CMP Storm Drain	200	LF	$45	$9,000
6	Outlet Control Structure	8	EA	$3,500	$28,000
7	Bioswale	3,576	LF	$15	$53,640
8	6 ft. Tall Chain Link Fence	3,576	LF	$40	$143,040
9	0.3ft Asphalt concrete	1,270	TON	$135	$171,450
10	8-Inch Aggregate Base	1,400	CY	$30	$42,000
11	Stop Signs	4	EA	$400	$1,600
12	Street Signs	2	EA	$500	$1,000
13	"No Parking" Sign	8	EA	$200	$1,600
14	Thermoplastic Striping	1	LS	$30,000	$30,000
15	Standard Pole Mounted Light	2	EA	$1,500	$3,000
16	Erosion and Sediment Control Implementation and monitoring	1	LS	$30,000	$30,000
17	Demolition (sawcutting, grinding, etc.)	1	LS	$5,000	$5,000
18	Joint Utilities Trench	1,788	LF	$25	$44,700
19	Power Pole Relocation	3	EA	$12,000	$36,000
Total Construction Cost Estimate					**$630,000**
	Land Acquisition	2.46	Acre	$11,000	$27,100
	Environmental Documents	5%			$31,500
	Plans, Specifications and Estimate (PS&E)	10%			$63,000
	Materials Testing	1%			$6,300
	Construction Staking	1%			$6,300
	Construction Engineering	5%			$31,500
	Record Drawings	LS	1	$4,500	$4,500
	Street/Corner Monuments	0.5%			$3,200
Non-Construction Cost Estimate					**$173,400**
	Sub Total				**$803,400**
	Contingency 30%				$241,000
	Total Project Cost Estimate				**$1,044,400**
Additional Cost Allowances					
	PG & E Fees				$25,000
	County Fees				$25,000
Grand Total (Estimated, rounded to nearest $1,000)					**$1,094,000**

Note: Above unit prices are based on the recent bids for road improvement projects in Humboldt County.

Project: Samoa Industrial Waterfront Preliminary Transportation Access Plan
Client: Humboldt Bay Harbor, Recreation and Conservation District
LACO Project No. 7591.00; July 26, 2013

Engineers Opinion of Probable Construction Costs for Preliminary Transportation Access Plan Drawings Prepared by LACO dated July 26, 2013

Segment Number 5, Samoa Pulp Lane - New Navy Base Road to Vance Ave

ITEM NO.	DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Mobilization	1	LS	$10,000	$10,000
2	Shoring and Trench Safety	1	LS	$2,000	$2,000
3	Traffic Control	1	LS	$3,000	$3,000
4	Earth Work and Excavation	1	LS	$15,000	$15,000
5	12" CMP Storm Drain		LF	$45	$0
6	Bioswale	448	LF	$15	$6,720
7	Outlet Control Structure		EA	$3,500	$0
8	0.3ft Asphalt concrete	159	TON	$135	$21,504
9	8-Inch Aggregate Base	175	CY	$30	$5,257
10	Stop Signs	1	EA	$400	$400
11	Street Signs	1	EA	$500	$500
12	"No Parking" Sign	0	EA	$200	$0
13	Thermoplastic Striping	1	LS	$10,000	$10,000
14	Standard Pole Mounted Light	1	EA	$1,500	$1,500
15	Erosion and Sediment Control Implementation and monitoring	1	LS	$10,000	$10,000
16	Demolition (sawcutting, grinding, etc.)	1	LS	$5,000	$5,000
17	Joint Utilities Trench	224	LF	$25	$5,600
18	Power Pole Relocation	1	EA	$12,000	$12,000
Total Construction Cost Estimate					**$108,500**
	Environmental Documents	5%			$5,425
	Plans, Specifications and Estimate (PS&E)	15%			$16,275
	Materials Testing	3%			$3,300
	Construction Staking	1%			$1,100
	Construction Engineering	5%			$5,400
	Record Drawings	LS	1	$4,500	$4,500
	Street/Corner Monuments	0.5%			$500
Non-Construction Cost Estimate					**$36,500**
	Sub Total				**$145,000**
	Contingency 30%				$43,500
	Total Project Cost Estimate				**$188,500**
Additional Cost Allowances					
	PG & E Fees				$25,000
	County Fees				$25,000
Grand Total (Estimated, rounded to nearest $1,000)					**$239,000**

Note: Above unit prices are based on the recent bids for road improvement projects in Humboldt County.

LACO

Project: Samoa Industrial Waterfront Preliminary Transportation Access Plan
Client: Humboldt Bay Harbor, Recreation and Conservation District
LACO Project No. 7591.00; July 26, 2013

Engineers Opinion of Probable Construction Costs for Preliminary Transportation Access Plan Drawings Prepared by LACO dated July 26, 2013

Segment Number 6, North Spur off Vance Ave

ITEM NO.	DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Mobilization	1	LS	$10,000	$10,000
2	Shoring and Trench Safety	1	LS	$2,000	$2,000
3	Traffic Control	1	LS	$3,000	$3,000
4	Earth Work and Excavation	1	LS	$15,000	$15,000
5	12" CMP Storm Drain	50	LF	$45	$2,250
6	Outlet Control Structure	1	EA	$3,500	$3,500
7	Bioswale	1,744	LF	$15	$26,160
8	6 ft. Tall Chain Link Fence	1,744	LF	$40	$69,760
9	0.3ft Asphalt concrete	620	TON	$135	$83,712
10	8-Inch Aggregate Base	682	CY	$30	$20,463
11	Stop Signs	4	EA	$400	$1,600
12	Street Signs	4	EA	$500	$2,000
13	"No Parking" Sign	8	EA	$200	$1,600
14	Thermoplastic Striping	1	LS	$28,000	$28,000
15	Standard Pole Mounted Light	1	EA	$750	$750
16	Erosion and Sediment Control Implementation and monitoring	1	LS	$45,000	$45,000
17	Demolition (sawcutting, grinding, etc.)	1	LS	$50,000	$50,000
18	Joint Utilities Trench	872	LF	$25	$21,800
19	Power Pole Relocation	3	EA	$12,000	$36,000
Total Construction Cost					**$422,600**
	Land Acquisition	1.20	Acre	$11,000	$13,200
	Environmental Documents	5%			$21,130
	Plans, Specifications and Estimate (PS&E)	10%			$42,260
	Materials Testing	1%			$4,200
	Construction Staking	1%			$4,200
	Construction Engineering	5%			$21,100
	Record Drawings	LS	1	$4,500	$4,500
	Street/Corner Monuments	0.5%			$2,100
Non-Construction Cost Estimate					**$112,700**
	Sub Total				**$535,300**
	Contingency 30%				$160,600
	Total Project Cost Estimate				**$695,900**
Additional Cost Allowances					
	PG & E Fees				$25,000
	County Fees				$25,000
Grand Total (Estimated, rounded to nearest $1,000)					**$746,000**

Note: Above unit prices are based on the recent bids for road improvement projects in Humboldt County.

LACO

Project: Samoa Industrial Waterfront Preliminary Transportation Access Plan
Client: Humboldt Bay Harbor, Recreation and Conservation District
LACO Project No. 7591.00; July 26, 2013

Engineers Opinion of Probable Construction Costs for Preliminary Transportation Access Plan Drawings Prepared by LACO dated July 26, 2013

Segment Number 7, South Spur off Vance Ave

ITEM NO.	DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Mobilization	1	LS	$10,000	$10,000
2	Shoring and Trench Safety	1	LS	$2,000	$2,000
3	Traffic Control	1	LS	$5,000	$5,000
4	Earth Work and Excavation	1	LS	$15,000	$15,000
5	12" CMP Storm Drain	150	LF	$45	$6,750
6	Outlet Control Structure	6	EA	$3,500	$21,000
7	Bioswale	3,290	LF	$15	$49,350
8	6 ft. Tall Chain Link Fence	3,290	LF	$40	$131,600
9	0.3ft Asphalt concrete	1,170	TON	$135	$157,920
10	8-Inch Aggregate Base	1,287	CY	$30	$38,603
11	Stop Signs	1	EA	$400	$400
12	Street Signs	2	EA	$500	$1,000
13	"No Parking" Sign	6	EA	$200	$1,200
14	Thermoplastic Striping	1	LS	$28,000	$28,000
15	Standard Pole Mounted Light	2	EA	$750	$1,500
16	Erosion and Sediment Control Implementation and monitoring	1	LS	$45,000	$45,000
17	Demolition	1	LS	$2,000	$2,000
18	Joint Utilities Trench	1,645	LF	$25	$41,125
19	Power Pole Relocation	3	EA	$12,000	$36,000
Total Construction Cost					**$593,400**
	Environmental Documents	5%			$29,670
	Plans, Specifications and Estimate (PS&E)	10%			$59,340
	Materials Testing	1%			$5,900
	Construction Staking	1%			$5,900
	Construction Engineering	5%			$29,700
	Record Drawings	LS	1	$4,500	$4,500
	Street/Corner Monuments	0.5%			$3,000
Non-Construction Cost Estimate					**$138,000**
	Sub Total				**$731,400**
	Contingency 30%				$219,400
	Total Project Cost Estimate				**$950,800**
Additional Cost Allowances					
	PG & E Fees				$25,000
	County Fees				$25,000
Grand Total (Estimated, rounded to nearest $1,000)					**$1,001,000**

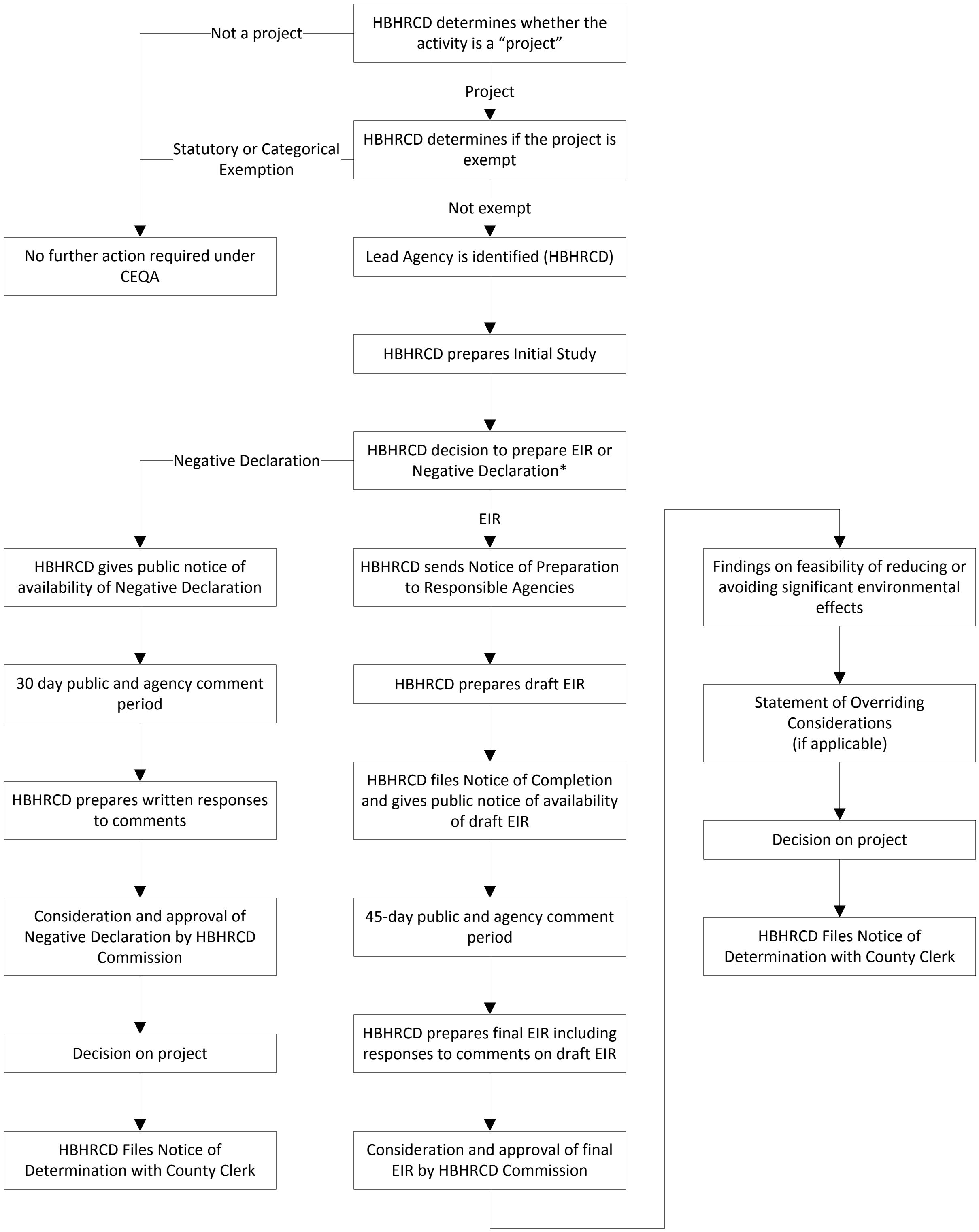
Note: Above unit prices are based on the recent bids for road improvement projects in Humboldt County.

LACO

APPENDIX 18

CEQA Process Flowchart

CEQA Process Flowchart



* or Mitigated Negative Declaration

Adapted from Appendix A: CEQA Process Flowchart (ACEC, 2010)

APPENDIX 19

Signed Preliminary Environmental Screening for Non-Infrastructure Projects and Categorical Exclusion

ATTACHMENT A

Preliminary Environmental Screening for Non-Infrastructure Projects [PES(NI)] Form

Federal Project No.: HP21L-6302(002)
(Federal Program Prefix-Project No., Agreement No.)

To: Suzanne Theiss, Senior Transportation Engineer
(District Local Assistance Engineer)

Department of Transportation, District 1
(District)

PO Box 3700, Eureka, CA 95502
(Address)

Suzanne.Theiss@dot.ca.gov
(E-mail Address)

From: Humboldt Bay Harbor, Recreation & Conservation District
(Local Agency)

Ryan Wells, Associate Planner, LACO Associates (Agent), 707-443-5054
(Project Manager's Name and Telephone No.)

21 W. 4th Street, Eureka, CA 95501
(Address)

wellsr@lacoassociates.com
(E-mail Address)

Is this Project "ON" the State Highway System?
☐ Yes
☒ No

IF YES, STOP HERE and contact the District Local Assistance Engineer regarding the completion of other environmental documentation.

Federal Statewide Transportation Improvement Program (FSTIP):
http://www.dot.ca.gov/hq/transprog/oftmp.htm

9/2/2011
(Current FSTIP Approval Date)

Attached
(Attach approved FSTIP listing)

Construction Programming for FSTIP

$2010/11 *(Fiscal Year)* $258,000 *(Dollars)*

Detailed Project Description: *(Use Continuation Sheet if necessary)*

The Samoa Industrial Waterfront Transportation Access Plan (Plan) is a planning-level site reconnaissance, outreach, and report preparation effort to identify a Preferred Alternative Route for the future development of an enhanced commercial and industrial transportation route, providing connectivity between waterfront properties and infrastructure on the Samoa Peninsula in Humboldt County, California, and major inland transportation networks including the National Highway System. Historically a hub of industrial activity associated with the local timber and maritime economies of past generations, the Samoa Peninsula has undergone significant decline in utility and prominence as a key transportation node for North Coast industrial commerce. The goal of the Plan will be to prepare a "road map" for future public funding solicitations to support the future development of a road (and potentially rail) system that better accommodates shipping to and from the Samoa Peninsula/Humboldt Bay waterfront. Development of the Plan involves coordinating two outreach events for property owners and local, state, and federal agencies; holding meetings with individual stakeholders; conducting field surveys to evaluate existing conditions for biological resources, geology, hydrology, utilities systems, and transportation infrastructure; and requesting a records search for cultural and historic resources from outside agencies. The resulting Plan will identify the Preferred Alternative Route across seven distinct road segments, as shown in Figure 1 (see attached); each segment will be described and reviewed individually as a potential distinct project for future development. Based on the existing site conditions, projected road improvement/construction costs, Humboldt Bay Harbor, Recreation & Conservation District priorities, and property owner interest, among other factors, the seven segments will be prioritized for future funding opportunities. Potential future construction for each segment would undergo independent site review, project-specific field surveys, and compliance with NEPA requirements.

SECTION A: Does project involve any of the following:

Check "Yes", "No" or "TBD" as appropriate. Use "TBD" when there is insufficient information in the project description to provide a definitive "Yes" or "No" response. List all "TBD" items on the PES(NI) Continuation sheet for further research.

Yes	No	TBD	
☐	☒	☐	1. Any ground disturbing activities? (e.g., digging of post holes)
☐	☒	☐	2. Any infrastructure elements?
☐	☒	☐	3. Installation of permanent data collection devices?
☐	☒	☐	4. Installation or posting of signs?
☐	☒	☐	5. Grading, clearing or grubbing of vegetation?
☐	☒	☐	6. Electric vehicle charging station(s)?
☐	☒	☐	7. Installation of fare boxes?
☐	☒	☐	8. Pavement striping or painting?
☐	☒	☐	9. Installation of bike cages or racks?

☐ ☒ ☐ 10. Currently planned future construction?
☐ ☒ ☐ 11. Potential to generate public controversy?
☐ ☒ ☐ 12. Any planting of flowers or any plant species?

☐ ☒ ☐ 13. Inconsistency with any plans and goals adopted by the community?
☐ ☒ ☐ 14. Part of a larger project?
☐ ☒ ☐ 15. Activity or action occurring within a Historic District?
☐ ☒ ☐ 16. Establishment of temporary parking facility? *(outdoor event, etc.)*
☐ ☒ ☐ 17. Temporally reducing available parking? *(outdoor event , etc.)*
☐ ☒ ☐ 18. Temporally encroaching on state or federal lands? *(outdoor event, etc.)*
☐ ☒ ☐ 19. Temporally encroaching on tribal lands? *(outdoor event , etc.)*
☐ ☒ ☐ 20. Use of a publicly owned public park? *(outdoor event, etc.)*
☐ ☒ ☐ 21. Potential to affect access to properties or roadways? *(outdoor event, etc.)*
☐ ☒ ☐ 22. Potential to disrupt neighborhoods/communities?
☐ ☒ ☐ 23. Potential to disproportionately affect low-income and minority populations?
☐ ☒ ☐ 24. Development of Plans that involve major decisions that would lead to irretrievable commitment of resources, present or future construction, or ground disturbance?
☐ ☒ ☐ 25. Creation of Programs that involve major decisions that would lead to irretrievable commitment of resources, present or future construction, or ground disturbance?
☐ ☒ ☐ 26. Conducting planning and research that involve major decisions that would lead to irretrievable commitment of resources, present or future construction, or ground disturbance?
☐ ☒ ☐ 27. Implementation of maintenance plans and projects?
☐ ☒ ☐ 28. Creation of regional bike and trail maps?
☐ ☒ ☐ 29. Historic and scenic site acquisition?

SECTION B: Preliminary NEPA Class of Action

Based on the results of this preliminary environmental screening, the recommended NEPA Class of Action for the proposed project is a Categorical Exclusion (CE) under **SAFETEA-LU Section 6004 (23 U.S.C. 326).** ☒ **Yes** ☐ **No**

If "yes", check applicable activity below:

☒ 23 CFR 771.117(c): *(Check one that is most applicable)*

- ☒ (1) Activities which do not involve or lead directly to construction.
- ☐ (5) Transfer of Federal lands pursuant to 23 U.S.C. 317 when the subsequent action is not an FHWA action.
- ☐ (11) Determination of payback under 23 CFR part 480 for property previously acquired with Federal-aid participation.
- ☐ (16) Program administration, technical assistance activities, and operating assistance to transit authorities to continue existing service or increase service to meet routine changes in demand.
- ☐ (17) The purchase of vehicles by the applicant where the use of these vehicles can be accommodated by existing facilities or by new facilities which themselves are within a CE.
- ☐ (20) Promulgation of rules, regulations, and directives.

Project is a CE for a "non-infrastructure" highway project under **SAFETEA-LU Section 6005(23 U.S.C. 327)**

☐ Yes ☐ No ***(Use only if project does not qualify under Section 6004)***

The project does not involve the following **Unusual Circumstances identified under 23 CFR 771.117(b)**

Affirm each of the following by placing a check mark in the preceding box. Use of the PES(NI) will not be possible if all statements cannot be positively affirmed.

- ☒ Significant environmental impacts
- ☒ Substantial controversy on environmental grounds
- ☒ Significant impact on properties protected by Section 4(f) of the DOT Act or Section 106 of the National Preservation Act, or
- ☒ Inconsistencies with any Federal, State or local law, requirement or administration determination relating to the environmental aspects of the action.

Affirm each of the following by placing a check mark in the preceding box. Use of the PES(NI) will not be possible if all statements cannot be positively affirmed.

☒ **Air Quality**: Project is exempt from conformity per 40 CFR 93.126, Table 2, because it is an activity which does not involve or lead directly to construction. ☒
☒ **Noise:** Project will not generate any long or short term noise to sensitive receptors.
☒ **Water, Wetland, Floodplains:** Project will not impact waters, wetlands or floodplains.
☒ **Biology:** Project is one of the types covered by the ***Non-Infrastructure Project Natural Environmental Study – No Effect memo, dated June 21, 2011.*** ☒
☒ **Cultural Resources:** Project is one of the types covered by the ***Undertakings exempt from further review memo, dated June 13, 2011.***
☒ **Sec 4(f):** Project does not use a Section 4(f) property or result in the temporary occupancy of a Section 4(f) project.
☒ **Coastal Zone:** Project is not in a Coastal Zone or qualifies for an exemption.
☒ **Relocation:** Project does not involve any relocations.
☒ **Hazardous Waste and Materials:** Project does not involve the generation or disposal of any hazardous waste or excess material.

Local Agency Project Engineer Signature

This Preliminary Environmental Screening – Non-Infrastructure [PES(NI)] form was prepared by me or under my direct supervision. The screening concluded that the project is of a non-infrastructure nature, involving no disruption to the ground or natural environment.

	June 7, 2013	(707) 443-5054
(Signature of Local Agency)	*(Date)*	*(Telephone No.)*

Caltrans District Senior Environmental Planner (or Designee) and DLAE Signatures

Based on the information provided on the PES(NI) , I concur that the project will involve no disturbance to the ground or natural environment, that the actions is covered under both Attachments C & D of this Office Bulletin, that the recommended NEPA Class of Action is a Categorical Exclusion pursuant to the National Environmental Policy Act as specified above, and that the project is in compliance with all other applicable environmental laws, regulations and Executive orders.

	06/10/13	(707) 445-6410
(Signature of Senior Environmental Planner or Designee)	*(Date)*	*(Telephone No.)*
Brandon Larson		
(Print Name)		
	6/10/13	707/445-6399
(Signature of District Local Assistance Engineer or Designee)	*(Date)*	*(Telephone No.)*
Suzanne Theiss		
(Print Name)		

Continuation of Project Description (if necessary):

Clarification of all "TBD" responses identified under Section A:

(Once clarification is obtained and provided below, change response from TBD to either "Yes" or "No" as applicable, and cross-reference discussion below.)

CATEGORICAL EXEMPTION/CATEGORICAL EXCLUSION DETERMINATION FORM

01-HBRC-CR-0			HP21L-6302(002)
Dist.-Co.-Rte. (or Local Agency)	P.M./P.M.	E.A/Project No.	Federal-Aid Project No. (Local Project)/Project No.

PROJECT DESCRIPTION: (Briefly describe project including need, purpose, location, limits, right-of-way requirements, and activities involved in this box. *Use Continuation Sheet, if necessary.)*

Non infrastructure scoping study being done by the Humboldt Bay Harbor , Recreation $ Conservation District.

CEQA COMPLIANCE *(for State Projects only)*

Based on an examination of this proposal and supporting information, the following statements are true and exceptions do not apply (See 14 CCR 15300 et seq.):

- This project falls within exempt class 3, 4, 5, 6 and/or 11, and it does not impact an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law.
- There will not be a significant cumulative effect by this project and successive projects of the same type in the same place, over time.
- There is not a reasonable possibility that the project will have a significant effect on the environment due to unusual circumstances.
- This project does not damage a scenic resource within an officially designated state scenic highway.
- This project is not located on a site included on any list compiled pursuant to Govt. Code § 65962.5 ("Cortese List").
- This project does not cause a substantial adverse change in the significance of a historical resource.

CALTRANS CEQA DETERMINATION (Check one)

☐ **Exempt by Statute.** (PRC 21080[b]; 14 CCR 15260 et seq.)

Based on an examination of this proposal, supporting information, and the above statements, the project is:

☐ **Categorically Exempt. Class** . (PRC 21084; 14 CCR 15300 et seq.)

☐ **Categorically Exempt. General Rule exemption.** [This project does not fall within an exempt class, but it can be seen with certainty that there is no possibility that the activity may have a significant effect on the environment (CCR 15061[b][3].)

Print Name: Environmental Branch Chief
NA
Signature　　　Date

Print Name: Project Manager/DLA Engineer
NA
Signature　　　Date

NEPA COMPLIANCE

In accordance with 23 CFR 771.117, and based on an examination of this proposal and supporting information, the State has determined that this project:

- does not individually or cumulatively have a significant impact on the environment as defined by NEPA and is excluded from the requirements to prepare an Environmental Assessment (EA) or Environmental Impact Statement (EIS), and
- has considered unusual circumstances pursuant to 23 CFR 771.117(b).

CALTRANS NEPA DETERMINATION (Check one)

☒ **23 USC 326:** The State has determined that this project has no significant impacts on the environment as defined by NEPA, and that there are no unusual circumstances as described in 23 CFR 771.117(b). As such, the project is categorically excluded from the requirements to prepare an environmental assessment or environmental impact statement under the National Environmental Policy Act. The State has been assigned, and hereby certifies that it has carried out the responsibility to make this determination pursuant to Chapter 3 of Title 23, United States Code, Section 326 and a Memorandum of Understanding dated June 07, 2013, executed between the FHWA and the State. The State has determined that the project is a Categorical Exclusion under:

- ☒ **23 CFR 771.117(c): activity (c)(_1_)**
- ☐ **23 CFR 771.117(d): activity (d)(___)**
- ☐ **Activity ___ listed in Appendix A of the MOU between FHWA and the State**

☐ **23 USC 327:** Based on an examination of this proposal and supporting information, the State has determined that the project is a CE under 23 USC 327.

Brandon Larsen
Print Name: Environmental Branch Chief
Signature　　　Date

Suzanne Theiss
Print Name: Project Manager/DLA Engineer
Signature　　　Date 6/10/13

Date of Categorical Exclusion Checklist completion: 06/10/13 Date of ECR or equivalent : NA

Briefly list environmental commitments on continuation sheet. Reference additional information, as appropriate (e.g., CE checklist, additional studies and design conditions).

June 7, 2013

CATEGORICAL EXEMPTION/CATEGORICAL EXCLUSION DETERMINATION FORM
Continuation Sheet

01-HBRC-CR-0			HP21L-6302(002)
Dist.-Co.-Rte. (or Local Agency)	P.M./P.M.	E.A/Project No.	Federal-Aid Project No. (Local Project)/Project No.

Continued from page 1:

The Samoa Industrial Waterfront Transportation Access Plan (Plan) is a planning-level site reconnaissance, outreach, and report preparation effort to identify a Preferred Alternative Route for the future development of an enhanced commercial and industrial transportation route, providing connectivity between waterfront properties and infrastructure on the Samoa Peninsula in Humboldt County, California, and major inland transportation networks including the National Highway System. Historically a hub of industrial activity associated with the local timber and maritime economies of past generations, the Samoa Peninsula has undergone significant decline in utility and prominence as a key transportation node for North Coast industrial commerce. The goal of the Plan will be to prepare a "road map" for future public funding solicitations to support the future development of a road (and potentially rail) system that better accommodates shipping to and from the Samoa Peninsula/Humboldt Bay waterfront. Development of the Plan involves coordinating two outreach events for property owners and local, state, and federal agencies; holding meetings with individual stakeholders; conducting field surveys to evaluate existing conditions for biological resources, geology, hydrology, utilities systems, and transportation infrastructure; and requesting a records search for cultural and historic resources from outside agencies. The resulting Plan will identify the Preferred Alternative Route across seven distinct road segments, as shown in Figure 1 (see attached); each segment will be described and reviewed individually as a potential distinct project for future development. Based on the existing site conditions, projected road improvement/construction costs, Humboldt Bay Harbor, Recreation & Conservation District priorities, and property owner interest, among other factors, the seven segments will be prioritized for future funding opportunities. Potential future construction for each segment would undergo independent site review, project-specific field surveys, and compliance with NEPA requirements.

Categorical Exclusion Checklist

Dist/Co/Rte/PM: 01/HBRC/CR/0	**Fed. Aid No. (Local Project):**	**EA/Project No.:** HP21L-6302(002)

SECTION 1: TYPE OF CE: Use the information in this section to determine the applicable CE and corresponding activity for this project.

1. Project is a CE under CE Assignment 23 USC 326. ☒ Yes ☐ No

If "yes", check applicable activity in one of the three tables below (activity must be listed in 23 CFR 771.117 (c) or (d) list or included in activities listed in Appendix A of the CE Assignment MOU to be eligible for 23 USC 326).

Activity Listed in 23 CFR 771.117(c)	
1 ☒	Activities which do not involve or lead directly to construction such as planning and research activities; grants for training; engineering to define the elements of a proposed action or alternatives so that social, economic, and environmental effects can be assessed; and Federal-aid system revisions which establish classes of highways on the Federal-aid highway system.
2 ☐	Approval of utility installations along or across a transportation facility.
3 ☐	Construction of bicycle and pedestrian lanes, paths, and facilities.
4 ☐	Activities included in the State's *highway safety plan* under 23 USC 402.
5 ☐	Transfer of Federal lands pursuant to 23 USC 107(d) and/or 23 USC 317 when the land transfer is in support of an action that is not otherwise subject to FHWA review under NEPA.
6 ☐	The installation of noise barriers or alterations to existing publicly owned buildings to provide for noise reduction.
7 ☐	Landscaping.
8 ☐	Installation of fencing, signs, pavement markings, small passenger shelters, traffic signals, and railroad warning devices where no substantial land acquisition or traffic disruption will occur.
9[1]	The following actions for transportation facilities damaged by an incident resulting in an emergency declared by the Governor of the State and concurred in by the Secretary, or a disaster or emergency declared by the President pursuant to the Robert T. Stafford Act (42 USC 5121)[2]:
☐	(i) Emergency repairs under 23 USC 125;
☐	(ii) The repair, reconstruction, restoration, retrofitting, or replacement of any road, highway, bridge, tunnel, or transit facility (such as a ferry dock or bus transfer station), including ancillary transportation facilities (such as pedestrian/bicycle paths and bike lanes), that is in operation or under construction when damaged and the action: (A) Occurs within the existing right-of-way and in a manner that substantially conforms to the preexisting design, function, and location as the original (which may include upgrades to meet existing codes and standards as well as upgrades warranted to address conditions that have changed since the original construction); and (B) Is commenced within a 2-year period beginning on the date of the declaration.
10 ☐	Acquisition of scenic easements.
11 ☐	Determination of payback under 23 USC 156 for property previously acquired with Federal-aid participation.
12 ☐	Improvements to existing rest areas and truck weigh stations.
13 ☐	Ridesharing activities.
14 ☐	Bus and rail car rehabilitation.
15 ☐	Alterations to facilities or vehicles in order to make them accessible for elderly and handicapped persons.
16 ☐	Program administration, technical assistance activities, and operating assistance to transit authorities to continue existing service or increase service to meet routine changes in demand.
17 ☐	The purchase of vehicles by the applicant where the use of these vehicles can be accommodated by existing facilities or by new facilities which themselves are within a CE.
18 ☐	Track and railbed maintenance and improvements when carried out within the existing right-of-way.

[1] On the CE form, distinguish between c9i or c9ii

[2] Include copy of the emergency declaration in the file

Categorical Exclusion Checklist (continued)

Dist/Co/Rte/PM: 01/HBRC/CR/0	**Fed. Aid No. (Local Project):** **EA/Project No.:** HP21L-6302(002)
19 ☐	Purchase and installation of operating or maintenance equipment to be located within the transit facility and with no significant impacts off the site.
20 ☐	Promulgation of rules, regulations, and directives.
21 ☐	Deployment of electronics, photonics, communications, or information processing used singly or in combination, or as components of a fully integrated system, to improve the efficiency or safety of a surface transportation system or to enhance security or passenger convenience. Examples include, but are not limited to, traffic control and detector devices, lane management systems, electronic payment equipment, automatic vehicle locaters, automated passenger counters, computer-aided dispatching systems, radio communications systems, dynamic message signs, and security equipment including surveillance and detection cameras on roadways and in transit facilities and on buses.
	Activity Listed in Examples in 23 CFR 771.117(d)
1 ☐	Modernization of a highway by resurfacing, restoration, rehabilitation, reconstruction, adding shoulders, or adding auxiliary lanes (e.g., parking, weaving, turning, climbing).
2 ☐	Highway safety or traffic operations improvement projects including the installation of ramp metering control devices and lighting.
3 ☐	Bridge rehabilitation, reconstruction or replacement or the construction of grade separation to replace existing at-grade railroad crossings.
4 ☐	Transportation corridor fringe parking facilities.
5 ☐	Construction of new truck weigh stations or rest areas.
6 ☐	Approvals for disposal of excess right-of-way or for joint or limited use of right-of-way, where the proposed use does not have significant adverse impacts.
7 ☐	Approvals for changes in access control.
8 ☐	Construction of new bus storage and maintenance facilities in areas used predominantly for industrial or transportation purposes where such construction is not inconsistent with existing zoning and located on or near a street with adequate capacity to handle anticipated bus and support vehicle traffic.
9 ☐	Rehabilitation or reconstruction of existing rail and bus buildings and ancillary facilities where only minor amounts of additional land are required and there is not a substantial increase in the number of users.
10 ☐	Construction of bus transfer facilities (an open area consisting of passenger shelters, boarding areas, kiosks and related street improvements) when located in a commercial area or other high activity center in which there is adequate street capacity for projected bus traffic.
11 ☐	Construction of rail storage and maintenance facilities in areas used predominantly for industrial or transportation purposes where such construction is not inconsistent with existing zoning and where there is no significant noise impact on the surrounding community.
12 ☐	Acquisition of land for hardship or protective purposes. Hardship and protective buying will be permitted only for a particular parcel or a limited number of parcels. These types of land acquisition qualify for a CE only where the acquisition will not limit the evaluation of alternatives, including shifts in alignment for planned construction projects, which may be required in the NEPA process. No project development on such land may proceed until the NEPA process has been completed. (i) Hardship acquisition is early acquisition of property by the applicant at the property owner's request to alleviate particular hardship to the owner, in contrast to others, because of an inability to sell his property. This is justified when the property owner can document on the basis of health, safety or financial reasons that remaining in the property poses an undue hardship compared to others. (ii) Protective acquisition is done to prevent imminent development of a parcel which may be needed for a proposed transportation corridor or site. Documentation must clearly demonstrate that development of the land would preclude future transportation use and that such development is imminent. Advance acquisition is not permitted for the sole purpose of reducing the cost of property for a proposed project
	Activity Listed in Appendix A of the CE Assignment MOU for State Assumption of Responsibilities for Categorical Exclusions
1 ☐	Construction, modification, or repair of storm water treatment devices (e.g., detention basins, bioswales, media filters, infiltration basins), protection measures such as slope stabilization and other erosion control measures throughout California.
2 ☐	Replacement, modification, or repair of culverts or other drainage facilities.
3 ☐	Projects undertaken to assure the creation, maintenance, restoration, enhancement, or protection of habitat for fish, plants, or wildlife (e.g., revegetation of disturbed areas with native plant species; stream or river bank revegetation; construction of new, or maintenances of existing fish passage conveyances or structures; restoration or creation of wetlands).

Categorical Exclusion Checklist (continued)

Dist/Co/Rte/PM: 01/HBRC/CR/0	**Fed. Aid No. (Local Project):**	**EA/Project No.:** HP21L-6302(002)

4 ☐	Routine repair of facilities due to storm damage, including permanent repair, to return the facility to operational condition that meets current standards of design and public health and safety without expanding capacity (e.g., slide repairs, construction or repair of retaining walls).
5 ☐	Routine seismic retrofit of facilities to meet current seismic standards and public health and safety standards without expansion of capacity.
6 ☐	Air space leases that are subject to Subpart D, Part 710, title 23, Code of Federal Regulations.
7 ☐	Drilling of test bores/soil sampling to provide information for preliminary design and for environmental analyses and permitting purposes.

2. Project is a CE for a highway project under NEPA Assignment 23 USC 327. ☐ Yes ☐ No
(Use only if project does not qualify under CE Assignment 23 USC 326 [activities not included in three previous lists above].)

3. Exceptions to Categorical Exclusions/Unusual Circumstances (23 CFR 771.117[b]).

FHWA regulation 23 CFR 771.117(b) provides that any action which normally would be classified as a CE but could involve *unusual circumstances* requires the Department to conduct appropriate environmental studies to determine if the CE classification is proper. Unusual circumstances include actions that involve:

- Significant environmental impacts;
- Substantial controversy on environmental grounds;
- Significant impact on properties protected by section 4(f) of the DOT Act or section 106 of the National Historic Preservation Act; or
- Inconsistencies with any Federal, State, or local law, requirement or administrative determination relating to the environmental aspects of the action.

All of the above unusual circumstances have been considered in conjunction with this project. (Please select one.)

☒ Checking this box certifies that **none of the above conditions apply** and that the project qualifies for a Categorical Exclusion.

☐ Checking this box certifies that unusual circumstances **are involved.** However, the appropriate studies/analysis have been completed, and it has been determined that the CE classification is still appropriate.

SECTION 2: Compliance with FHWA NEPA policy to complete all other applicable environmental requirements[3] prior to making the NEPA determination:

During the environmental review process for which this CE was prepared, all applicable environmental requirements were evaluated. Outcomes for the following requirements are identified below and fully documented in the project file.

Air Quality

☒ Air Quality Conformity Findings Checklist has been completed and project meets all applicable AQ requirements.
☐ For 23 USC 327 projects, list date of FHWA concurrence on conformity determination: ____

Cultural Resources

☒ Section 106 compliance is complete-select appropriate finding:
☐ Screened Undertaking ☐ No Historic Properties Affected ☐ No Adverse Effect ☐ Adverse Effect/MOA

Noise

23 CFR 772
☒ Is this a Type 1 project? ☐ Yes; ☒ No (skip this section.)
☐ Future noise levels with project either approach or exceed NAC or result in a substantial increase
If yes, ☐ Abatement is reasonable and feasible ☐ Abatement is not reasonable or feasible

[3] Please consult the SER for a complete list of applicable laws, statutes, regulations, and executive orders that must be considered before completing the CE.

Categorical Exclusion Checklist (continued)

Dist/Co/Rte/PM: 01/HBRC/CR/0 **Fed. Aid No. (Local Project):** **EA/Project No.:** HP21L-6302(002)

Waters, Wetlands

- Section 404 of the Clean Water Act

  Impacts to Waters of the US: ☐ Yes ☒ No

  If yes, approval anticipated:

  ☐ Nationwide Permit ☐ Individual Permit ☐ Regional General Permit ☐ Letter of Permission
- Wetland Protection (Executive Order #11990)

  ☐ No wetland impact

  ☐ Wetland Impact; Only Practicable Alternative Finding is included in a separate document in the project file
- Section 401 of the Clean Water Act

  ☐ Exemption ☐ Certification

Floodplains

- Floodplains (Executive Order #11988)

  ☒ No Floodplain Encroachment ☐ No Significant Encroachment ☐ Significant Encroachment

Biology

☒ No Section 7 Needed

- Section 7 (Federal Endangered Species Act) Consultation Findings (Effect determination)

  ☒ No Effect ☐ Not Likely to Adversely Affect with FWS/NOAA Concurrence Date: _____

  ☐ Likely to Adversely Affect with Biological Opinion Date: _____
- Essential Fish Habitat (Magnuson-Stevens Act) Findings (Effect determination):

  ☒ No Effect ☐ No Adverse Effect ☐ Adverse Effect and consultation with NOAA Fisheries

Section 4(f) Transportation Act (23 CFR 774)

- Section 4(f) regulation was considered as a part of the review for this project and a determination was made:

  ☒ Section 4(f) does not apply

  (Project file includes documentation that property is not a Section 4(f) property, that project does not use a Section 4(f) property, or that the project meets the criteria for the temporary occupancy exception.)

  ☐ Section 4(f) applies

  ☐ De Minimis

  ☐ Programmatic: Type _____ (List one of the five appropriate categories as defined in 23 CFR 774.3)

  ☐ Individual: ☐ Legal Sufficiency Review complete ☐ HQ Coordinator Review Complete

  Section 6(f)—Was the above property purchased with grant funds from the Land and Water Conservation Fund?

  ☐ No, Section 6(f) does not apply. No additional documentation required.

  ☐ Yes ☐ Documentation of approval from National Park Service Director (through California State Parks) has been received for the conversion/and replacement of 6(f) property.

Coastal Zone

Coastal Zone Management Act of 1972

☐ Not in Coastal Zone ☒ Qualifies for Exemptions ☐ Qualifies for Waiver ☐ Coastal Permit Required

☐ Consistent with Federal State and Local Coastal Plans ☐ Federal Consistency Determination

Relocation and Right of Way

☒ No Relocations

☐ Project involves _____ (#) relocations and will follow the provisions of the Uniform Relocation Act.

☐ No right of way acquisitions or easements.

☐ Project involves _____ (#) acquisitions and _____ (#) easements.

Hazardous Waste and Materials

- Are hazardous materials or contamination exceeding regulatory thresholds (as set by U.S. EPA, Cal EPA, County Environmental Health, etc) present? ☐ Yes ☒ No
- If yes, is the nature and extent of the hazardous materials or contamination fully known? ☐ Yes ☐ No

  If no, briefly discuss the plan for securing information:

Categorical Exclusion Checklist (continued)

Dist/Co/Rte/PM:	01/HBRC/CR/0	**Fed. Aid No. (Local Project):**		**EA/Project No.:**	HP21L-6302(002)

SECTION 3: Certification

Based on the information obtained during environmental review process and included in this checklist, the project is determined to be a Categorical Exclusion pursuant to the National Environmental Policy Act and is in compliance with all other applicable environmental laws, regulations, and Executive Orders.

Prepared by: Brandon Larsen

Title: Senior Environmental Planner

Signature: Bran Lar Date: 06/10/13

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: MARGARET BUSS
OFFICE CHIEF, LOCAL ASSISTANCE
DIVISION OF ENVIRONMENTAL ANALYSIS

Date: November 7, 2011

From: GREGG ERICKSON
Chief, Biology & Technical Assistance Office
Division of Environmental Analysis

Subject: **Amendment - Non-Infrastructure Project Natural Environmental Study – No Effect Memo**

Additional Undertaking added, per this amendment.

There have been an increasing number of non-infrastructure projects eligible for federal-aid highway funds. These non-infrastructure projects are part of the Safe Routes to Schools (SRTS), Transportation Enhancement, and Congestion Mitigation and Air Quality programs. These projects will not involve engineering design, right of way, ground disturbance or construction.

The Office of Biological and Technical Assistance have determined in advance that the non-infrastructure classes of non-construction related undertakings do not have the potential to affect natural resources. Projects listed below will have no effect or impact on natural resources including but not limited to; state or federally listed species; designated critical habitat, state or federally recognized sensitive habitats, or potential waters of the state or U.S. Furthermore, these activities will not require any permits associated with natural resource laws, regulations, or policies. Therefore, the activities listed below may be considered exempt without further review related to natural resources. Should the description of these undertakings change or involve other activities, additional review will be necessary to assess the effects to natural resources.

List of Non-infrastructure Classes of Non-construction Undertakings

1. Ridesharing activities, including purchase of vehicles, but not including establishment of park-and-ride lots.
2. Program administration, technical assistance activities, and operating assistance to transit authorities to continue existing service or increased service to meet routine changes in demand.
3. Freeway service patrol.
4. Conversion of vehicles to alternative fuels.
5. Alteration of vehicles to make them accessible for the elderly or persons with disabilities
6. Contracts to hire media organizations to produce non-English language commercials.
7. Purchase of transit fare boxes.
8. Upgrading diesel powered vehicles.
9. Purchase of transit buses.
10. Classroom training.
11. Software development.
12. Purchase of CNG or alternative fuel vehicles
13. Purchase of School Buses
14. Computer Purchases

15. Safety Education for Pedestrians and bicyclists
16. Virtual museums
17. Educational outreach
18. HSIP safety awareness and public outreach
19 Traffic data collection and analysis
20. Purchase Crossing guard uniforms
21. Purchase Cones
22. Preparation of Crossing Plans
23. Publicity
24. Staff Time
25. Public awareness campaigns and outreach to press and community leaders
26. Traffic education and enforcement in the vicinity of schools
27. Student sessions on bicycle and pedestrian safety
28. Conducting school traffic safety rodeos or bicycle rodeos
29. Training volunteers and managers of safe routes to school programs
30. Modest incentives for SRTS contests, and incentives that encourage more walking and bicycling over time
31. Creation of safety and educational tokens that also advertise the program.
32. Photocopying, duplicating, and printing costs, including CDs, DVDs, etc.
33. Mailing costs.
34. Costs for data gathering, analysis, and evaluation reporting at the local project level.
35. Pay for substitute teacher if needed to cover for faculty attending SRTS functions during school hours.
36. Costs for additional law enforcement or equipment needed for enforcement activities.
37. Equipment and training needed for establishing crossing guard programs.
38. Stipends for parent or staff coordinators.
39. Costs to engage the services of a consultant (either non-profit or for-profit) to manage a SRTS program as described in the prior bullet.
40. Implementation of walking school bus program
41. Walkability/bikeability audits
42. Conducting an effective traffic enforcement activity
43. Plans and Programs that do not involve major decisions that would lead to irretrievable commitment of resources, present or future construction, or ground disturbance, such as the installation of new sign posts.

c: Pettler

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: MARGARET BUSS
Chief, Division of Local Assistance
Office of NEPA Delegation and Environmental Compliance

Date: June 13, 2011

File: Cultural

From: Anmarie Medin
Chief
Cultural Studies Office

Subject: Undertakings exempt from further review

As you know, Attachment 2 of the Programmatic Agreement for Section 106 of the National Historic Preservation Act (PA) implemented January 1, 2004 identifies classes of screened undertakings. Certain ground-disturbing activities with minimal potential to affect historic properties may be screened by California Department of Transportation (Caltrans) Professionally Qualified Staff (PQS) in the appropriate cultural resources discipline. PQS may determine that one or more such activity has no potential to affect historic properties, and therefore is not subject to further review under the PA.

Separate from this list of screened undertakings, there are a number of non construction-related actions that may use federal aid highway funding and therefore meet the broad definition of an undertaking set forth in 36 CFR Part 800 (the regulations implementing Section 106) but have been determined by Cultural Studies Office PQS to have no potential to affect historic properties

1. Ridesharing activities, including purchase of vehicles, but not including establishment of park-and-ride lots.
2. Program administration, technical assistance activities, and operating assistance to transit authorities to continue existing service or increased service to meet routine changes in demand.
3. Freeway service patrol.
4. Conversion of vehicles to alternative fuels.
5. Alteration of vehicles to make them accessible for the elderly or persons with disabilities
6. Contracts to hire media organizations to produce non-English language commercials.
7. Purchase of transit fare boxes.
8. Upgrading diesel powered vehicles.
9. Purchase of transit buses.
10. Classroom training.

11. Software development.
12. Purchase of CNG or alternative fuel vehicles
13. Purchase of school buses
14. Computer purchases
15. Safety education for pedestrians and bicyclists
16. Virtual museums
17. Educational outreach
18. HSIP safety awareness and public outreach
19 Traffic data collection and analysis
20. Purchase crossing guard uniforms
21. Purchase cones
22. Preparation of crossing plans
23. Publicity
24. Staff time
25. Public awareness campaigns and outreach to press and community leaders
26. Traffic education and enforcement in the vicinity of schools
27. Student sessions on bicycle and pedestrian safety
28. Conducting school traffic safety rodeos or bicycle rodeos
29. Training volunteers and managers of safe routes to school programs
30. Modest incentives for SRTS contests, and incentives that encourage more walking and bicycling over time
31. Creation of safety and educational tokens that also advertise the program.
32. Photocopying, duplicating, and printing costs, including CDs, DVDs, etc.
33. Mailing costs.
34. Costs for data gathering, analysis, and evaluation reporting at the local project level.
35. Pay for substitute teacher if needed to cover for faculty attending SRTS functions during school hours.
36. Costs for additional law enforcement or equipment needed for enforcement activities.
37. Equipment and training needed for establishing crossing guard programs.
38. Stipends for parent or staff coordinators.
39. Costs to engage the services of a consultant (either non-profit or for-profit) to manage an SRTS program as described in the prior bullet.
40. Implementation of walking school bus program
41. Walkability/bikeability audits
42. Preparation of SRTS mapping
43. Conducting an effective traffic enforcement activity at a railway-highway crossing
44. Development of a transportation safety plan.
45. Improvement in the collection and analysis of data

46. Planning integrated interoperable emergency communications equipment, operational activities or traffic enforcement activities (including law enforcement assistance) relating to work zone safety.
47. Conducting road safety audits

Because Caltrans PQS staff have determined in advance that the above-listed activities do not have potential to affect historic properties, these activities may be considered exempt from Section 106 without further review by PQS. The provisions of this memo apply only when the federally-funded undertaking is limited to one or more of the activities listed above. Additional review by District PQS will be required if the undertaking involves any activities that are not listed herein, including those listed as screened activities in Attachment 2 of the PA.

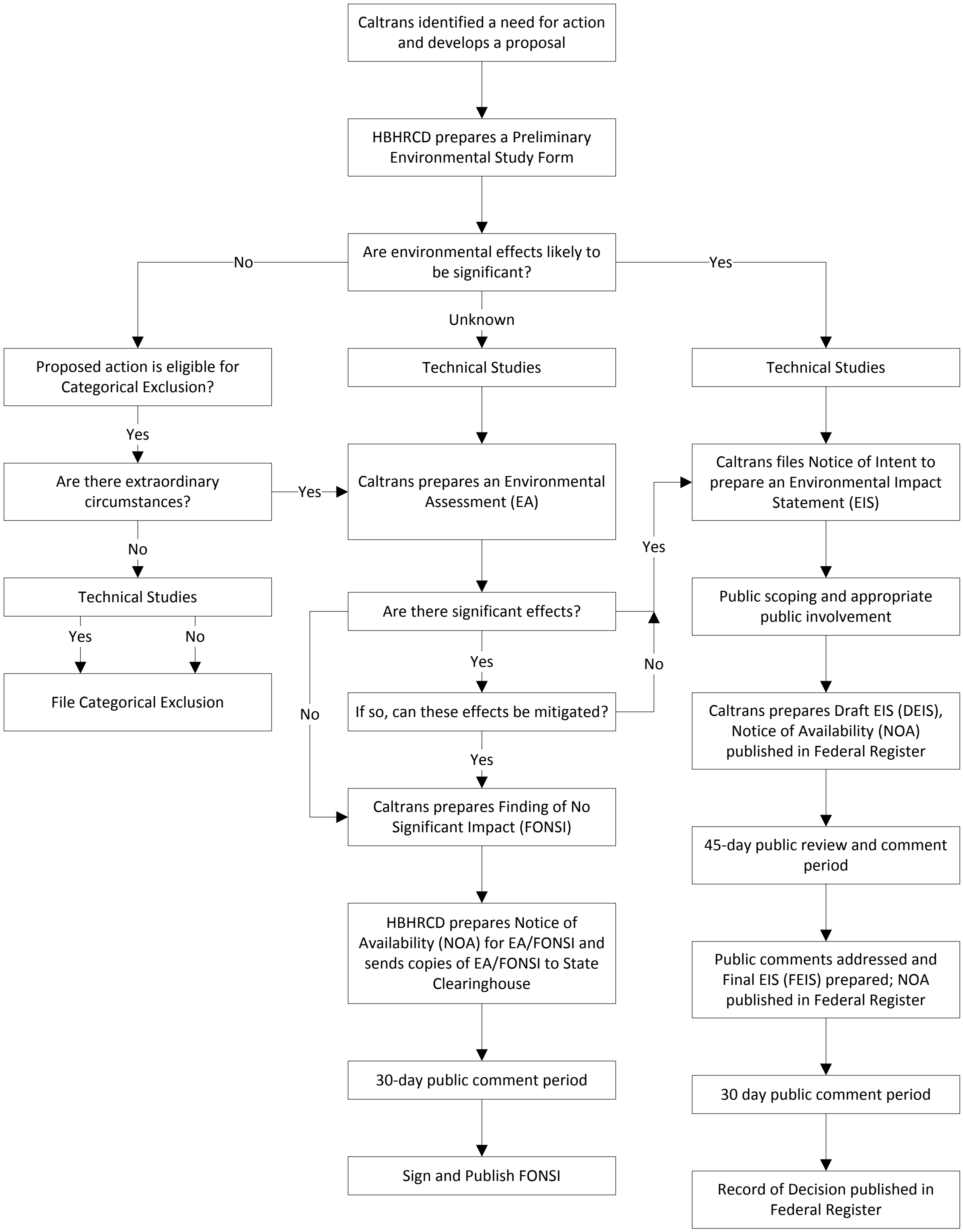
This supersedes the memorandum on this subject dated January 16, 2006 (King to Abbott). If you have any questions, please contact Jill Hupp at (916) 654-3567 or jill_hupp@dot.ca.gov.

c: Jill Hupp; Germaine Belanger

APPENDIX 20

NEPA Process Flowchart

NEPA Process Flowchart



* Adapted from *A Citizen's Guide to the NEPA* (CEQ, 2007)

December 5, 2013

7591.00

Humboldt Bay Harbor, Recreation & Conservation District
601 Startare Drive
Eureka, California 95501

Attention: Jack Crider, CEO

Subject: Submittal of Final Draft
Samoa Industrial Waterfront Preliminary Transportation Access Plan

Dear Jack:

LACO Associates is pleased to submit this final draft of the Samoa Industrial Waterfront Preliminary Transportation Access Plan (Plan) for your review and comment. This submittal includes updates from previous administrative drafts of the Plan, as well as from comments received during the most recent public and agency review period. During this last review period, LACO received and has addressed comments from Pacific Gas & Electric Company, California Coastal Commission, and Caltrans.

LACO is looking forward to our presentation of the final Plan to the HBHRCD Board of Commissioners and the public on December 5, 2013. We have also scheduled presentations to County of Humboldt Public Works staff, the Humboldt County Association of Governments Board of Directors and staff, and Caltrans staff, and are working to schedule a meeting with City of Eureka Community Development and Public Works staff.

Please feel free to contact me with any questions.

Sincerely,
LACO Associates

T. Scott Kelly
Project Manager

RAW

cc: Mike Wilson, HBHRCD Commissioner
George Williamson, Planwest Partners

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