

SECTION G

APPENDICES

APPENDIX 1

Archaeological Literature Review
for the Hana Highway

**An Archaeological Literature Review for the
Hana Highway, Route 360, Bridge Preservation Plan within
the Hana Highway Historic District,
Multiple Ahupuaa, Multiple Districts, Island of Maui,
Multiple TMKs (Zone 1: Sections 1-4 and Zone 2: Section 9)**

FINAL

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Management Summary

Reference	An Archaeological Literature Review for the Hana Highway, Route 360, Bridge Preservation Plan within the Hana Highway Historic District, Multiple Ahupuaa, Multiple Districts, Island of Maui, Multiple TMKs (Zone 1: Sections 1-4 and Zone 2: Section 9) (Folio et al. 2015)
Date	September 2015
Project Number (s)	Cultural Surveys Hawaii (CSH) Job Code: HANA HIGHWAY 1
Project Location	The current review covers the approximately 29 mile (47 km) long corridor along a portion of the Hana Highway Historic District, following Route 360, which extends from Hoalua Bridge near Huelo in the Makawao District to just above Kaihalulu Bay in Hana town.
Land Jurisdiction	State of Hawaii
Agencies	<u>Federal</u> <ul style="list-style-type: none"> Federal Highway Administration (FHWA) <u>State</u> <ul style="list-style-type: none"> Hawaii Department of Transportation (HDOT), Hawaii State Historic Preservation Division (SHPD)
Document Purpose	The purpose of this literature review is to provide a summary of the cultural historical background and provide information on existing archaeological conditions, as well as the potential for encountering sensitive sites in order to facilitate planning and budgeting considerations, and to convey any possible archaeological constraints for the proposed project. This literature review will not meet the requirements of an archaeological inventory level survey per the rules and regulations of SHPD/DLNR (HAR §13-276). The literature review report is sufficient to address potential archaeological site types and locations, and to allow for future work recommendations. If an inventory survey is required in areas of concern, the completed review would help to expedite that study.
Historic Preservation Regulatory Context	This project will likely be subject to Hawaii State historic preservation review legislation [Hawaii Revised Statutes (HRS) 6E-8/ Hawaii Administrative Rules (HAR) §13-13-275]. This document is intended to facilitate project planning and anticipate the requirements for the historic preservation review.

Recommendations	An archaeological inventory survey is strongly recommended for the proposed uses of this project. The proposed undertaking poses a potentially substantial impact to the integrity of previously recorded historic properties, as well as potential historic properties that have yet to be formally documented. An inventory survey would allow project planners to adopt formal mitigation steps in order to alleviate adverse impacts to historic properties. The scope of this survey should be established in consultation with the Hawaii State Historic Preservation Division.
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Table of Contents

Management Summary	i
Table of Contents	iii
Section 1 Introduction	1
1.1 Project Background	1
1.2 Scope of Work	1
1.3 Environmental Setting	2
1.3.1 Natural Environment	2
1.3.2 Built Environment	2
Section 2 Methods	7
2.1 Document Review	7
2.2 GIS Methods	7
Section 3 Background Research	8
3.1 Traditional and Historical Background	8
3.1.1 Introduction	8
3.1.1 The Hamakualoa District	9
3.1.1.1 Halehaku	9
3.1.1.1.1 Kamehameha's Victory	9
3.1.1.1.2 Heiau Remains	10
3.1.1.1.3 An Early Historic Account	11
3.1.1.1.4 The early 1900s	12
3.1.1.2 Huelo	12
3.1.1.3 Hanehoi	13
3.1.1.4 Hanawana	13
3.1.1.5 Puuomaile	13
3.1.1.6 Kailua	13
3.1.1.7 Papaaea	14
3.1.2 The Koolau District	14
3.1.2.1 East Makaiwa, including Mooloa, Kolea, Loiloa, Keopuka, Honomanu and Keanae	14
3.1.2.2 Kaaiea Stream	15
3.1.2.3 Kolea	16
3.1.2.4 Honomanu	16
3.1.2.4.1 The Koolau Ditch	16
3.1.2.5 Keanae	17
3.1.2.5.1 Pre-contact	17
3.1.2.5.2 Historic Period	18
3.1.2.6 Wailua Nui	19
3.1.2.7 Wailua Iki	21
3.1.2.8 Nahiku	22

3.1.3 The Hana District.....	24
3.1.3.1 Honomaele	24
3.1.3.2 Wakiu	24
3.1.3.3 Hana Town Vicinity: Kawaipapa to Wananalua.....	24
3.1.3.3.1 Moolelo of the Region.....	25
3.1.3.3.1.1 The Demi-god Maui.....	25
3.1.3.3.1.2 Mythical Lands of the Gods.....	25
3.1.3.3.1.3 Hua	26
3.1.3.3.1.4 Aikanaka	26
3.1.3.3.1.5 Kamehamehanui.....	27
3.1.3.3.1.6 The Battles of Kapalipilo	27
3.1.3.3.1.7 Kiha a Piilani.....	28
3.1.3.3.1.8 Kahekili	29
3.1.3.3.1.9 Kapueokahi Harbor	30
3.1.3.3.1.10 Kauiki.....	31
3.1.3.3.1.1 Kamehaikana.....	32
3.1.3.3.1.2 Pueokahi.....	32
3.1.3.3.1.3 The Legend of Kuula-kai	32
3.1.3.3.2 Western Contact	36
3.1.4 Construction of the Hana Belt Road.....	37
3.2 Previous Archaeological Research	40
3.2.1 Early Studies	40
3.2.2 Modern Archaeological Studies.....	53
3.2.2.1 East Maui and Hana Regional Studies	64
3.2.2.2 The Hana Belt Road.....	64
3.2.2.3 Hamakualoa District.....	65
3.2.2.4 Koolau District.....	68
3.2.2.4.1 Ke anae Vacinity	70
3.2.2.4.2 Nahiku Vacinity	74
3.2.2.5 Hana District	77
3.2.2.5.1 Piilanihale Heiau	77
3.2.2.5.2 Hana Airport and Vicinity.....	77
3.2.2.5.3 Waianapanapa State Park	78
3.2.2.5.4 Hana Town Area.....	84
3.3 Settlement Pattern and Predictive Model	89
3.3.1 Hamakualoa District	89
3.3.2 Koolau District.....	91
3.3.3 Hana District	92
Section 4 Summary and Interpretation	94
Section 5 Project Effect and Recommendations.....	95
Section 6 References Cited	96

List of Figures

Figure 1. A portion of the U.S.G.S 7.5-minute topographic map of East Maui showing the Hana Highway, Route 360 corridor in red.	3
Figure 2. A portion of the U.S.G.S 7.5-minute topographic map of East Maui showing historic and modern bridge and culvert locations in relation to the Hana Highway, Route 360 corridor, depicted in red.	4
Figure 3. Maui Island Tax Map showing Hana Highway, Route 360 project corridor through Zones 1 and 2 in red.	5
Figure 4. A portion of the U.S.G.S 7.5-minute topographic map of East Maui showing the Hana Highway, Route 360 corridor in red relative to the local soil series (Natural Resources Conservation Service 2001).	6
Figure 5. East Maui, showing rainforests and sheer cliffs along the route of the roadway to Hāna (Sun 1978:10/08/78 A-11).	9
Figure 6. A portion of the U.S.G.S 7.5-minute topographic map, Haiku quadrangle, showing previous archaeological studies conducted in the Hamakualoa Region near the project corridor (shown in red).	66
Figure 7. A portion of the U.S.G.S 7.5-minute topographic map, Haiku quadrangle, showing previously identified historic properties located in the Hamakualoa Region near the project corridor, and in relation to historic bridges (labeled).	67
Figure 8. A portion of the U.S.G.S 7.5-minute topographic map, Keanae quadrangle, showing previous archaeological studies conducted in the northwestern portion of the Koolau District near the project corridor (shown in red).	68
Figure 9. A portion of the U.S.G.S 7.5-minute topographic map, Keanae quadrangle, showing documented previously identified historic properties located in the northwestern portion of the Koolau District near the project corridor (shown in red), and in relation to historic and modern bridges (labeled).	69
Figure 10. A portion of the U.S.G.S 7.5-minute topographic map, Keanae quadrangle, showing previous archaeological studies conducted in the Keanae vicinity near the project corridor (shown in red).	72
Figure 11. A portion of the U.S.G.S 7.5-minute topographic map, Keanae quadrangle, showing documented previously identified historic properties located in the Keanae vicinity near the project corridor (shown in red), and in relation to historic and modern bridges (labeled).	73
Figure 12. A portion of the U.S.G.S 7.5-minute topographic map, Nahiku quadrangle, showing previous archaeological studies conducted in the Nahiku vicinity near the project corridor (shown in red).	75
Figure 13. A portion of the U.S.G.S 7.5-minute topographic map, Nahiku quadrangle, showing documented previously identified historic properties in the Nahiku vicinity near the project corridor (shown in red), and in relation to historic bridges (labeled).	76
Figure 14. A portion of the U.S.G.S 7.5-minute topographic map, Hana quadrangle, showing previous archaeological studies between West Honomalee Ahupuaa and Waianapanapa State Park.	81
Figure 15. A portion of the U.S.G.S 7.5-minute topographic map, Hana quadrangle, showing documented previously identified historic properties located between West Honomalee	

Ahupuaa and Waianapanapa State Park near the project corridor (shown in red), and in relation to historic bridges (labeled).	82
Figure 16. Close-up of the U.S.G.S 7.5-minute topographic map, Hana quadrangle, showing documented previously identified historic properties in and around Waianapanapa State Park.	83
Figure 17. A portion of the U.S.G.S 7.5-minute topographic map, Hana quadrangle, showing previous archaeological studies in the Hana town area near the project area corridor (shown in red).	87
Figure 18. A portion of the U.S.G.S 7.5-minute topographic map, Hana quadrangle, showing documented previously identified historic properties in the Hana town area near the project area corridor (shown in red), and in relation to historic bridges (labeled).	88

List of Tables

Table 1. <i>Heiau</i> sites identified by Walker (1931) along the historic portion of Hana Highway. ...	41
Table 2. Previous archaeological studies conducted along Hana Highway, Route 360.	53

Section 1 Introduction

1.1 Project Background

At the request of Ms. Tonia Moy of Fung Associates, Inc., Cultural Surveys Hawaii, Inc. (CSH) conducted an archaeological literature review for Hana Highway, Route 360, extending approximately 29 miles (47 km) from Hoalua Bridge near Huelo in the Makawao District to just above Kaihalulu Bay in Hana town (Figure 1). This portion of the historic Hana Belt Road includes 43 historic bridges and 12 historic culverts, along with seven modern bridges (Figure 2). Hana Highway, Route 360 crosses multiple districts and multiple TMKs: Zone 1: Sections 1-4 and Zone 2: Section 9 (Figure 3).

This literature review was conducted to provide a summary of the cultural historical background and provide information on existing archaeological conditions, as well as the potential for encountering sensitive sites in order to facilitate planning and budgeting considerations, and to convey any possible archaeological constraints for the proposed project. This literature review will not meet the requirements of an archaeological inventory level survey per the rules and regulations of SHPD (HAR §13-276). The literature review report is sufficient to address potential archaeological site types and locations, and to allow for future work recommendations. If an inventory survey is required in areas of concern, the completed review would help to expedite that study.

1.2 Scope of Work

The scope of work for this review included:

1. Research on historic and archaeological background, including searches of historic maps, written records, and Land Commission Award documents. This research is focused on the specific project corridor, with background on the traditional district and individual *ahupuaa*, with special emphasis on settlement patterns;
2. Preparation of a literature review report that includes the following:
 - a. Traditional and historical background sections summarizing pre-contact and historic land use;
 - c. A previous archaeological research section summarizing previous archaeological findings and identified sites within the vicinity of the project corridor, including topographic maps of the project corridor depicting the previous archaeological study and site locations;
 - d. Recommendations based on all information generated that specify what steps should be taken to mitigate impact of development on archaeological resources with recommendations appropriate to the findings.

1.3 Environmental Setting

1.3.1 Natural Environment

Hana Highway, Route 360, is located on the windward side of the Island of Maui and traverses a portion of Hamakualoa District, the length of the Koolau District, and a portion of the Hana District. Given the length of the project corridor and diversity of environmental niches traversed, the vegetation is quite variable. The vast majority of the vegetation is exotic with Polynesian cultigens well represented. Dominant vegetation species present include guava (*Psidium guajava*), strawberry guava (*Psidium cattleianum*), Hibiscus (*Hibiscus* sp.), gingers (*Hedychium* species), bamboo (*Bambusa vulgaris*), Heliconias (*Heliconia* sp.), sugarcane, (*Saccharum officinarum*), and Coconut Palms (*Cocos nucifera*).

Rainfall along the project corridor is relatively high, averaging between 4000 and 5000 mm (150-190 inches) per year (Giambelluca et al. 1986:73), with elevation ranging from 1 to 1400 feet above mean sea level. Broad soil associations along the project corridor include the Hana-Makaalae-Kailua and Pauwela-Haiku associations (Figure 4). The Hana-Makaalae-Kailua association consists of moderately deep to deep, gently sloping to steep, well-drained soils that have a moderately fine to fine textured subsoil or underlying material located on intermediate uplands. The Pauwela-Haiku soil association consists of deep, gently sloping to moderately steep, well-drained soils that have a fine-textured subsoil located on low uplands (Foote et al. 1972: General Soil Map). Specific soils that occur along the project corridor consist of Pauwela clay, 7-15 % and 15-25 % slopes; Kailua silty clay, 3-25% slopes; Honolua silty clay, 7-15% slopes; Hana silty clay loam, 3-15% slopes; Hana very stony silty clay loam, 3-25% slopes; Hana extremely stony silty clay loam, 3-15% slopes; as well as rough mountainous terrain, rough broken land, stony alluvial land, and Makena extremely stony muck, 3-25% slopes (Foote et al. 1972:Maui Island Map Sheets).

1.3.2 Built Environment

Hana Highway was paved in 1962 and subsequently received only sporadic maintenance until 1982, when the state began repaving and improvements. The road is characterized by various narrow bridges and retaining walls, with large cuts made into the adjacent hillsides used to construct the road grade. The current use of the project corridor is for the highway, Route 360, and surrounding residential areas.

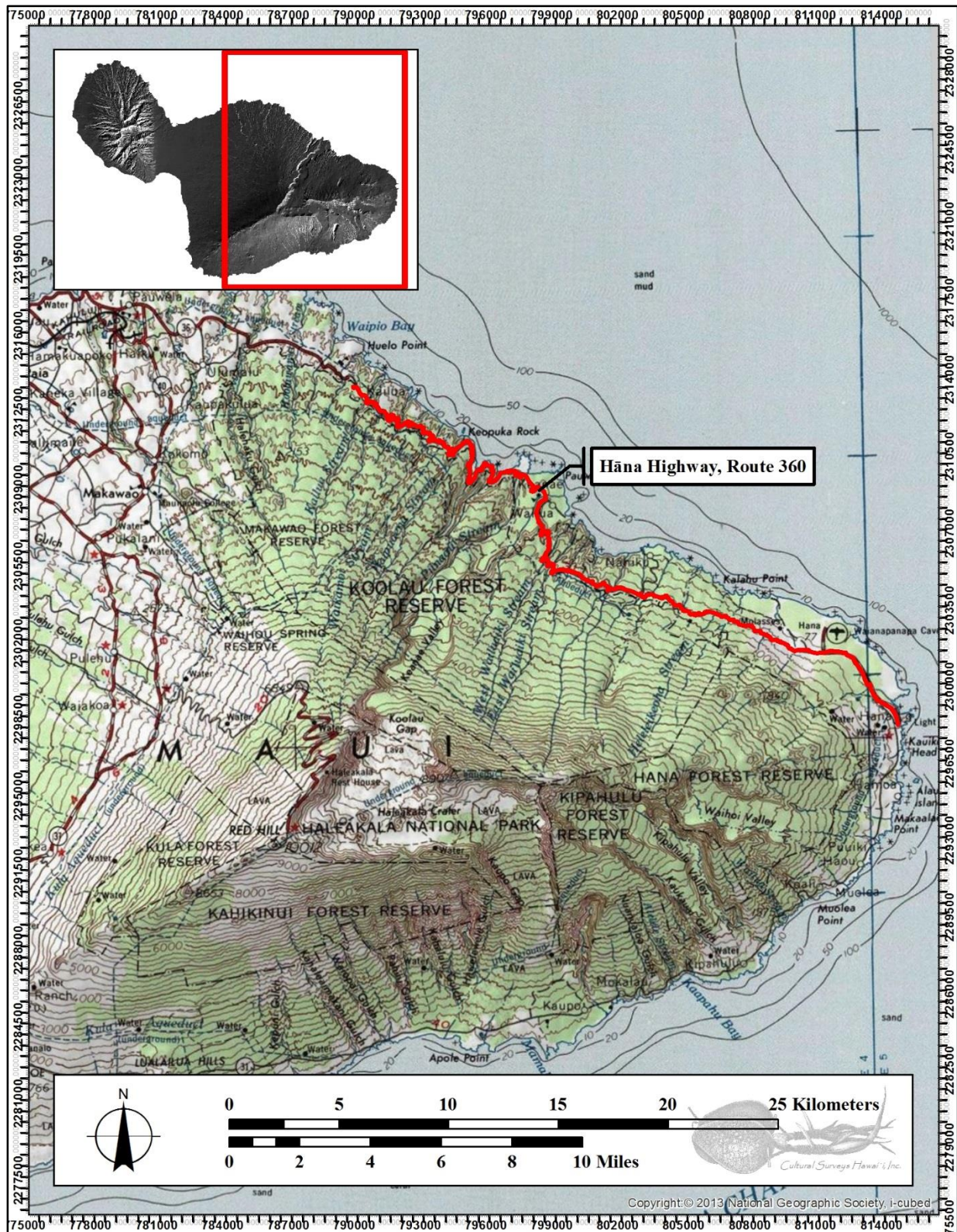
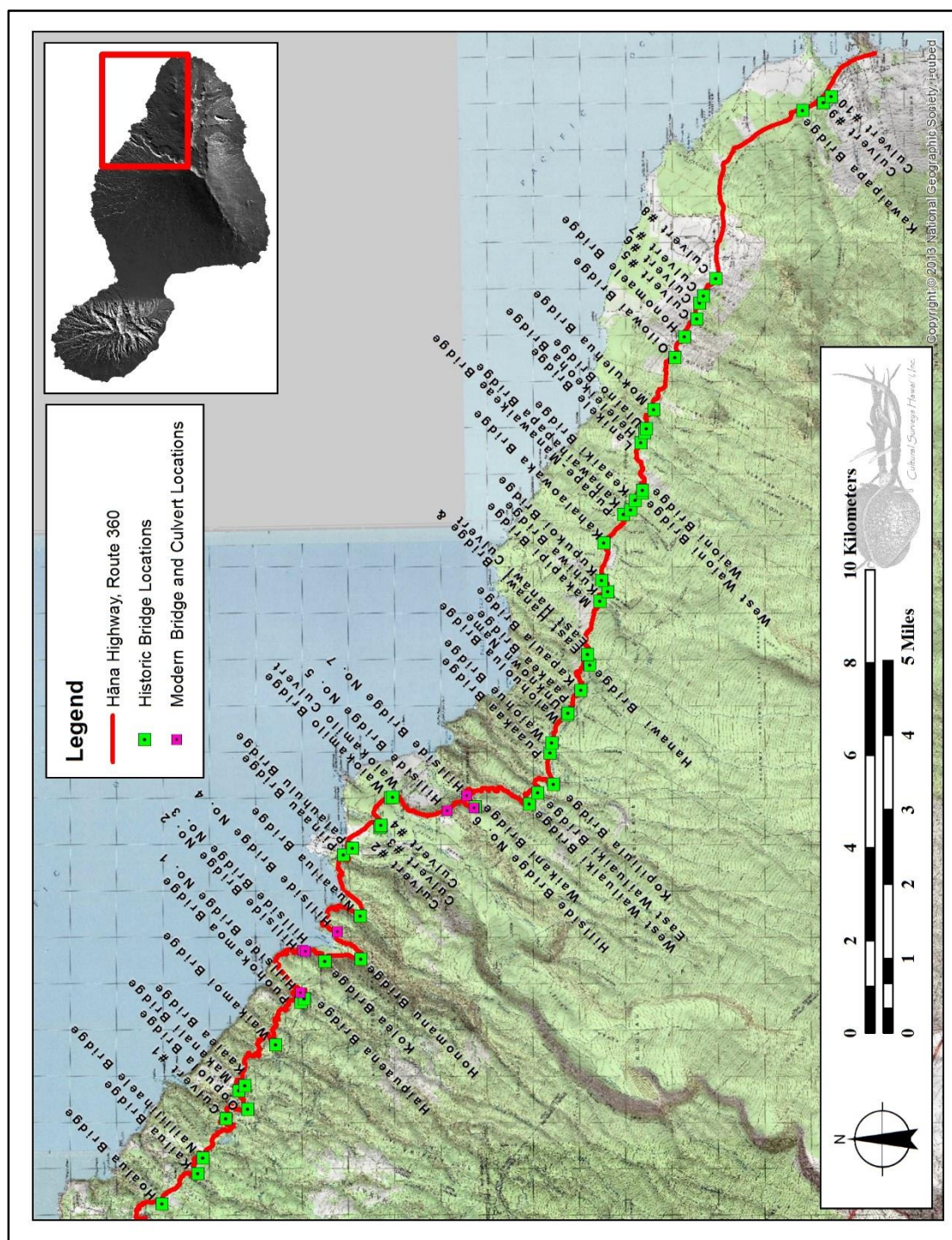


Figure 1. A portion of the U.S.G.S 7.5-minute topographic map of East Maui showing the Hana Highway, Route 360 corridor in red.



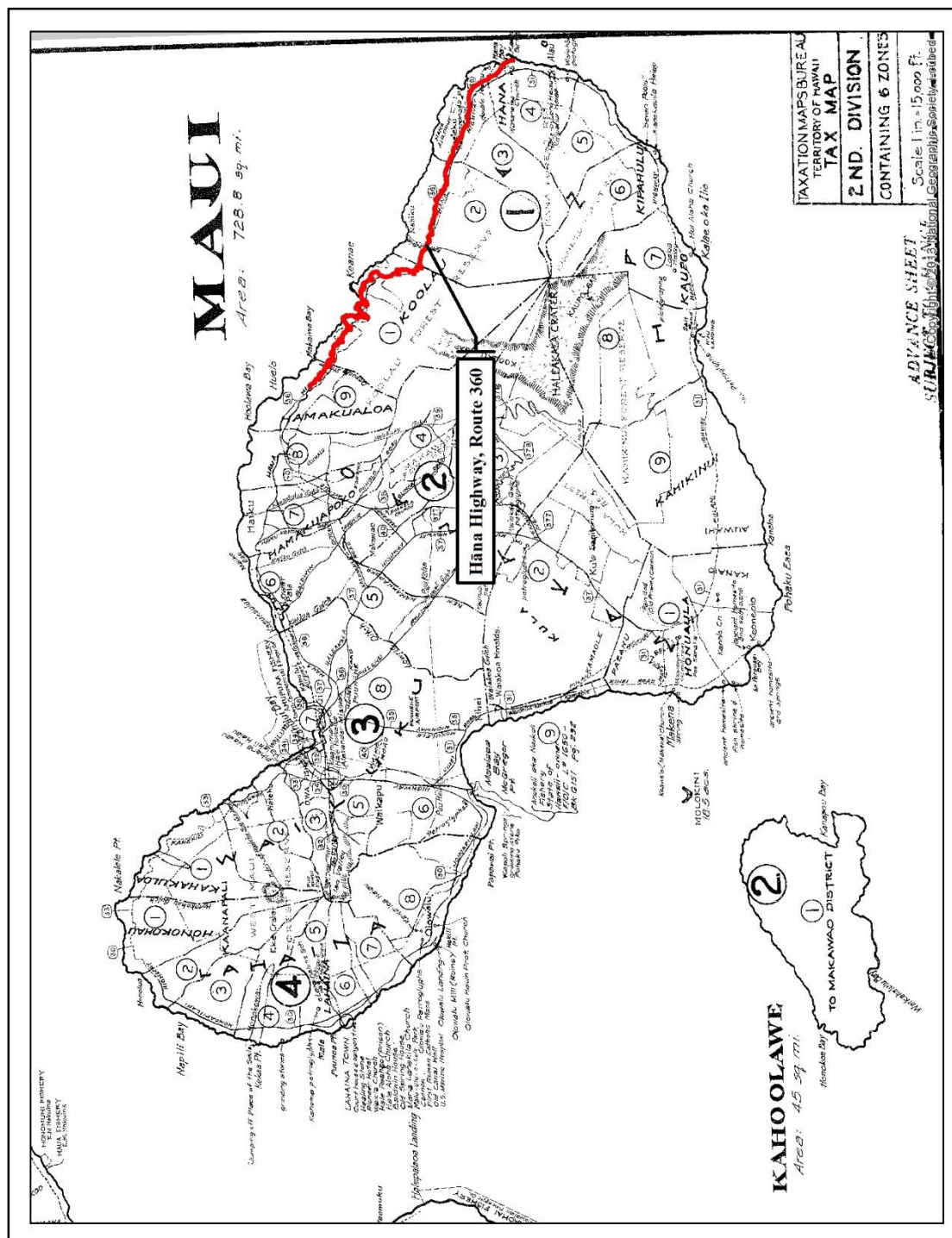


Figure 3. Maui Island Tax Map showing Hana Highway, Route 360 project corridor through Zones 1 and 2 in red.

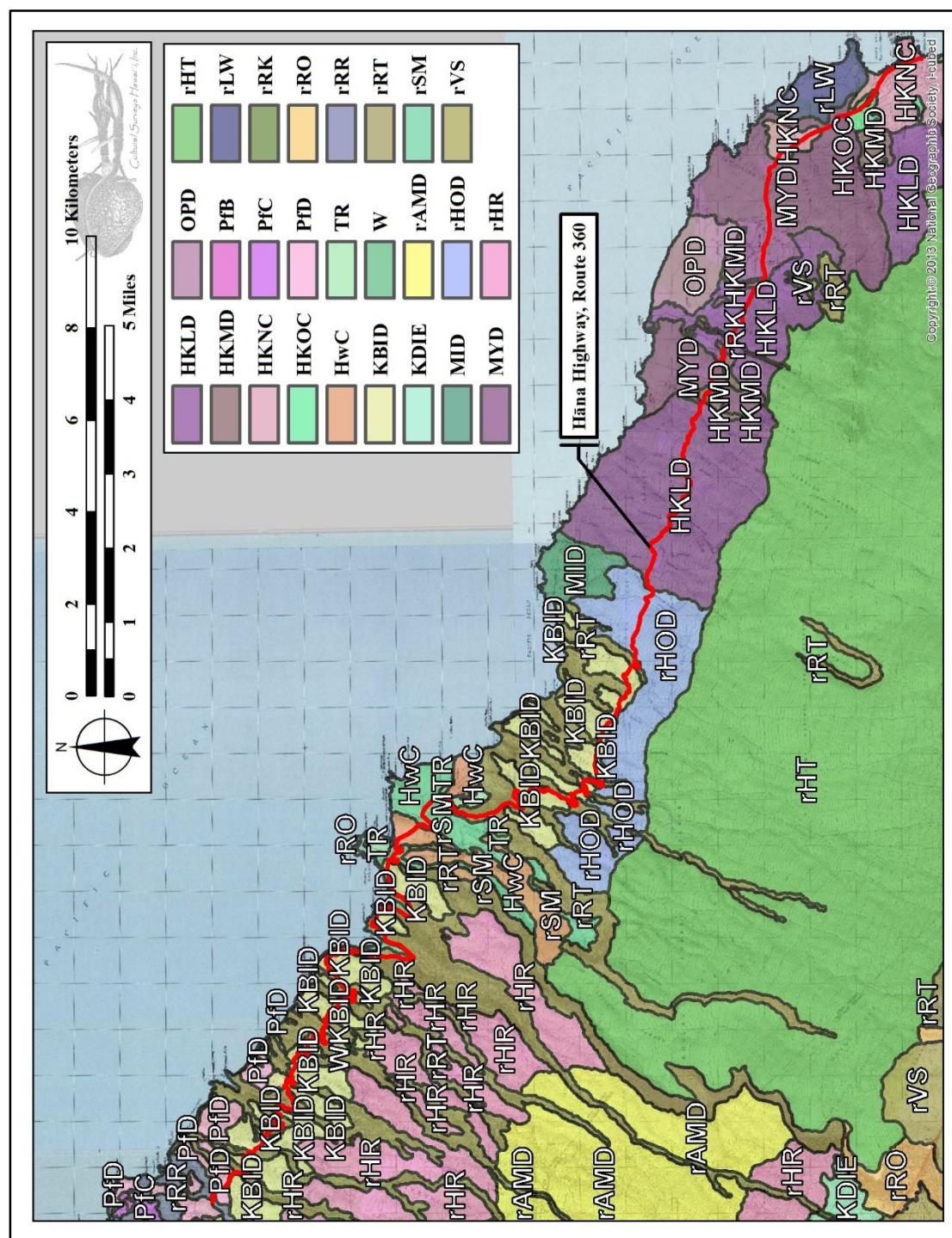


Figure 4. A portion of the U.S.G.S 7.5-minute topographic map of East Maui showing the Hana Highway, Route 360 corridor in red relative to the local soil series (Natural Resources Conservation Service 2001).

Section 2 Methods

2.1 Document Review

Document research consisted of a detailed review of all previous archaeological work conducted in the general project area. In addition, a variety of resources devoted to historical perspectives of the region and traditional stories and accounts were reviewed. Research venues included the CSH Maui office archives, the State Historic Preservation Division of the Department of Land and Natural Resources (Maui Office), and private collections. All relevant Land Commission Awards (LCAs) were inspected using resources of Waihona Aina, Corporation (Waihona ‘Aina 2002) and previous archaeological studies.

Diacritical marks and okinas have been omitted from traditional words and place names in this report for the purpose of project consistency.

2.2 GIS Methods

Historic and previous archaeology project area location maps were geo-referenced (UTM, Zone 4 North, NAD 1983 [Hawaii] Datum) in relation to previously rectified Maui County TMK maps and a digital raster graphic (DRG) of the 1992 Haiku, Keanae, Nahiku, and Hana 7.5-minute USGS topographic quadrangles. Using user-identified points common to each map (landmarks, property boundaries, street intersections, etc.), ESRI ArcGIS software (version 10.2) overlays the non-georeferenced maps onto the previously rectified data. Because historic cartographic methods were not as accurate as those used to produce modern surveyed maps and GIS maps, the project area boundary depicted on geo-referenced historic maps included as a part of this report should be considered approximate and used for reference information only.

Section 3 Background Research

3.1 Traditional and Historical Background

3.1.1 Introduction

The Hana region of Maui was known as “one of the most isolated places in these islands, remote and difficult to access” (Bishop 1861). Because of the many treacherous ravines and unpredictable flooding, Native Hawaiians usually rode on horseback to a point before Keanae, then completed the journey to Hana by canoe (Figure 5). The Koolau district was accessible only by footpath until 1927, when the belt road was completed to Hana (Linnekin 1985). Protestant missionary duty in the Hana district was one of the most severe in the Hawaiian Islands. Before the establishment of the Hana Protestant mission in 1837, missionaries reached East Maui no more than once or twice a year. From the early writings of the Protestant missionaries in the Sandwich Islands, it appears that the first excursion to Hana by a Protestant teacher was made in 1823:

A similar adventure is related by Honorii [Native assistant to the missionaries], in a late visit to the eastern part of the island of Mowee, whither he went in the company of Keoua, wife of Governor Adams. That part of the island [Hana] had never been visited by missionaries, and Honorii took occasion to preach to them Jesus Christ. He found them wholly uninstructed, and exceedingly attached to their idols, and disposed to resist every argument in favor of a change in their religion. Before he left the place, he ascended a neighboring hill which overhangs the sea on the top of which were several huge stones erected, covered with tapa (native cloth), and dignified with the appellation of gods. With the aid of some of his company, he succeeded in displacing them from their beds, and rolled them into the sea. (Richards 1825:141)

According to archaeologists, the geologically younger region of East Maui was once far more densely populated than at present (Kirch 1996:72). The fertile volcanic soils in the region of Hana included extensive tracts of dryland sweet potato (*Ipomoea batatas*) augmented by dryland taro, yams (*Dioscorea* spp.), sugar cane (*Saccharum officinarum*), and breadfruit. Irrigated taro was raised in *loi* fields in the narrow valleys. In the period of time prior to contact with the west [prior to 1778], the irrigated taro fields of the Keanae Peninsula, the *heiau* at Waianapanapa, and the Piilanihale Heiau were each major edifices displaying the importance of the district of Hana (Kirch 1996:69-71).

The overall roadway corridor of the present project area is located along the northeastern coast of Maui, extending from Huelo to Hana. This traditional cultural study area includes a large number of *ahupuaa* (traditional land divisions). The historical literature incorporated into this report includes primary Hawaiian language resources; including the writings of informants who were often witnesses to some of the histories being described. Descriptions of traditional cultural practices and folklore in this section are arranged geographically, from west to east.



Figure 5. East Maui, showing rainforests and sheer cliffs along the route of the roadway to Hāna (Sun 1978:10/08/78 A-11).

3.1.1 The Hamakualoa District

Hamakualoa is a coastal region where gently sloping *kula* lands intersected by small gulches come down to the sea along the northern coast line of East Maui. East of Maliko Stream, the number of named *ahupuaa* is evidence of dense habitation along this coast. According to Maly, wetland taro *loi* developments were evident where the stream of Kuiaha met the sea. Irrigated taro patches were located where the streams of Hoolawa, Waipio, Hanehoi, Hoalua, Kailua and Nailiilihaele flow in the gulches of Keanae. Here, stream taro was probably planted along the watercourses well up into the higher *kula* land and forest taro throughout the lower forest zone. The slopes between gulches were planted with breadfruit, banana, sugar cane, arrowroot, and yams. The interior forests would have been planted with *awa* (K. a. O. Maly 2006:7-8).

3.1.1.1 Halehaku

3.1.1.1.1 Kamehameha's Victory

By the close of the year A.D.1785 or the beginning of A.D.1786, Kamehameha had defeated a number of Hawaii chiefs for supremacy of the island of Hawaii. Kamehameha then set his sights

on Hana, and assembled an expedition to retake the districts of Hana and Kipahulu, knowing that the governor of Maui, Kahekili, was currently at war on Oahu. According to Kamakau, Kamehameha's fleet landed at the shore from Hamoa to Kawaipapa (S. M. Kamakau 1992:148). The eldest son of Kahekili, Kalanikupule was sent to rout the invaders from Hamakualoa. Led by the warrior Kamohomoho, the battle commenced at a small hill (Puukoa) situated on the *makai* side of Puumaile at Hanawana at Hoalua, where the Maui forces were victorious. This caused Kamehameha to beach his forces at Halehaku and force an additional attack alongside of a main road. Kamehameha routed the Maui forces and confronted them with the cannon Lopaka. With men to haul the cannon and operate it accurately, Kamehameha consolidated his victories and drove the Maui forces to the west. The summit known as Kapuaio Kamehameha in traditional times is located inland within the Halehaku Ahupuaa, in the *moku* of Hamakualoa.

Of this site, Fornander states:

About 1790, the chief Kamehameha of Hawaii Island gathered a large force of men and canoes to attack the island of Maui. Kamehameha's campaign of war in Hamakualoa centered on a battle at a fortified position at Puukoa on Hanawana, which was attacked and taken by Kamehameha, who had brought his battle fleet around to the northern coast of Maui from Hana. The hill is known as "Kapuai-o-Kamehameha," to the west of Halehaku Stream, is where he camped for the night after taking Puukoa. Kamehameha engaged Kapakahili in battle the following morning. In time, the Maui forces were routed and fled to Kokomo; further inland, where a final stand was made. Kapakahili was killed at Hamakualoa, the Maui men fled and dispersed, and the road to Wailuku lay open to Kamehameha. (Fornander 1880b:236)

In this manner, the Maui forces were cornered in Iao; the mountain pass behind Wailuku in west Maui. Here there was a great slaughter. During this fight, Kalanikupule and other Maui chiefs escaped to Oahu (S. M. Kamakau 1992:148).

3.1.1.1.2 *Heiau Remains*

On a bluff above Halehaku Bay in the *moku* of Hamakualoa, at the edge of the pineapple fields, is Walker Site 66, a good sized *heiau* partly destroyed to plant pineapples. The north side measured 128 feet and the east side 120. At a point 68 feet from the northeast corner a wall ran back dividing the *heiau* into two divisions. The back measured 115 feet. The north and west sides had been terraced in two or three steps. The height of the front wall facing was four feet. No coral or pebbles were seen (Walker 1931:156). On the shore at Halehaku Bay, about 50 yards from the sea, is Piilani Heiau (Walker Site 67), a massive structure of beach rocks terraced on the front to a height of 10 feet. It extends parallel to the shore for 150 feet. The greatest width is 60 feet. The interior was probably paved, but as it was seen in the 1930s it was heavily overgrown with grass and bushes. A terrace two feet high forms the back against the hill. Numerous enclosures at the base of the hill indicates a good sized village site, now mostly gone (Walker 1931:157). The summit known as Kapuai o Kamehameha in traditional times is located inland within the Halehaku Ahupuaa.

3.1.1.1.3 An Early Historic Account

In early historic times, Protestant missionaries made a tour of the island of Maui, and described a stop at Halehaku in 1828, as well as the condition of the native people in Wailua and Hana (Richards et al. 1829:249).

About one o'clock, p.m., we reached the place, where we had left our furniture for traveling. From this place to the sea, we walked, in a new direction, over some of the most beautiful land we ever saw. The greater part of it is uncultivated, but a New England farmer would make it like the Garden of Eden. The timber, which is plenty, is mostly of the Kui, [Kukui] or lamp tree. It yields a nut, nearly as large as a butternut, from which oil, of an excellent quality, is easily extracted. The natives open the nut, string the meats on a small stick, and set the upper one on fire. They burn with great freedom, and give a good light. As we proceeded, our attendants pointed out several places, where hostile armies had met in battle. At five o'clock, p.m., we reached Halehaku, a small village at the sea shore. Here, we found the princess [Nahienaena], and a large school, waiting our arrival. Commenced examining the school, but were soon interrupted by the rain.

[August] 23 [1828]. Examined the remainder of the school, and proceeded on our way. This day, we came to a pavement, said to have been built by Kehapilani [Kiha-a-Piilani], a king contemporary with Uni, [Umi a Liloa] an ancient king of Hawaii. He is said to have built it, that his name "might not roll out." It extends more than thirty miles, and is a work of considerable magnitude. This pavement afforded us no considerable assistance in traveling, as we ascended and descended a great number of steep and difficult paries [a word in common use for a very steep hill. The missionaries add the s to make the plural]. In the vallies there ran brooks, some of them of considerable size. Several miles of our way lay through a wood. The soil was exceedingly rich; the trees, many of which were large, were covered with vines, of a most luxuriant growth; be we looked in vain for the "fruit of the vine," which, weary and hungry as we were, would have been exceedingly refreshing. About five o'clock, P.M., we reached Honomanu, where we examined a small school. Here the princess concluded to spend the Sabbath. We went on board the canoe, and rowed a few miles, avoiding some difficult paries. After landing, we walked a few miles further, to Wailua, where we put up for the Sabbath. Before we arrived, it rained violently, and we were thoroughly drenched; a thing which had not befallen us for many months.

Sabbath, [August] 24 [1828]. Very early this morning, the horns, summoning the people to the house of God, were heard in every direction; and we soon perceived, that the call had not been heard with indifference. At the early hour, the house was thronged with attentive worshippers; and Mr. Richards addressed them, from the Saviour's words to Nicodemus, "Except a man be born again, he cannot see the kingdom of God." In the afternoon, on account of the rain, fewer were present, though the congregation was respectable.

[August] 25 [1828]. Early this morning, we examined the schools [at Wailua], which were large. About 10 o'clock, A.M., the princess arrived, and addressed the people; after which, we proceeded on our way. We went by water, six or eight miles, when we landed, and walked about ten miles, on the broken lava, till we reached the plain of Hana. Here we found nearly a thousand scholars, most of whom appeared well. This is a most charming district. The people are numerous, well fed, and appear fairer, and more robust, than at any place we have yet seen. Here would be an excellent place for a missionary station.

[August] 26 [1828]. After breakfast, we set off in our canoe, and after rowing about 10 miles, we reached Hipahulu [Kipahulu], where we examined another large school, and staid [sic] overnight. The country around is very rough.

[August] 27 [1828]. Proceeded on our way, about five miles, by water, and three by land brought us to Kaupo, where we examined another very large school. (Richards et al. 1829:249)

3.1.1.1.4 The early 1900s

The Halehaku Gulch is 250 feet wide and is crossed by the siphons of the Lowrie Irrigation Canal, which originated in Kailua and was constructed between the Kailua reservoir and Huelo in 1900 by the Spreckelsville Plantation (Thayer 1900:154-157). The water of this canal is tapped at the 457-foot elevation of Kailua Gulch just above a reservoir, after which the water enters an 800-foot-long tunnel. In 1900, Thayer reported that the roadway ceased at Kailua, and that continuing on to Hana was only possible by a trail. A reservoir was built at Papaea, in the region where Kiha a Piilani began the construction of his *ala loa* [long road] (Pukui et al. 1974:179).

3.1.1.2 Huelo

The pre-Contact settlement of Huelo included the construction of a *heiau* at Huelo. According to a survey of Maui *Heiau* by StokesStokes (1916:3), there was once a *heiau* of an unrecalled name located 200 feet north of the Huelo School, *makai* of the road, which had been reported demolished by the Maui Sugar Company, according to the informant Smythe.

In the 1850s, the Kaulanapueo Protestant church was constructed of stone as an outstation of the Pookela Church of Makawao. The church was located *makai* of the Hana Highway in a community known as Huelo. The Kaulanapueo Protestant Church was established in 1853 and today remains open for worship, with services in the Hawaiian language. The church walls are made of stone. A school here was examined by Protestant missionaries in 1828 (Armstrong 1838:248). The Kaulanapueo Protestant Church was constructed as an outstation of the Pookela Church of Makawao.

Huelo Village was once a sugar plantation community. The Huelo Sugar Mill Company was founded in 1878 as a business development of C. Brewer & Co., Ltd. William Turner was the first manager for the Huelo Plantation. A pioneer banker in the Territory of Hawaii, Charles R. Bishop, advanced C. Brewer & Company enough cash to save the Huelo Sugar Mill Company when the price of sugar was affected by a fire at the Bay Sugar Refinery of San Francisco (Nellist 1925:70; Shuck 1897). Operations of the Huelo Sugar Mill Company were concluded in 1894 (Kaukali and Subica 2010:84).

In 1900, the Maui Sugar Company of Huelo was founded, and beginning in 1902, was managed by Jackson R. Myers (Siddall 1917:203).

3.1.1.3 Hanehoi

Stokes (1916a:3) recorded the existence of a *heiau* at Hanehoi named Hinalekahi, which was located below the old ditch on the east side of the gulch west of the Kailua Protestant church. It was reported that nearly all of the *heiau* was destroyed when the ditch broke. The portion remaining is reported to have been the single, high terrace (some 20 feet tall). The informant for Stokes, Jonas Kaea, stated the *heiau* had been used for sacrifices.

3.1.1.4 Hanawana

At Hanawana, Walker recorded two *heiau* as having been destroyed. They were named Honomauulua and Halepaahau (Walker 1931:151).

3.1.1.5 Puuomaile

The *makai* side of Puuomaile was the scene of the battle between Kamehameha's army from Hawaii Island and that of the Maui chief Kalanikupule (See Section 3.1.1.1.1 *Kamehameha's Victory*). The warrior Kapa-kahili commanded the Maui forces, but he was defeated by Kamehameha. The armies of Kapa-kahili were routed, and when they fled the battle, they were pursued and caught. As the Maui forces attempted to climb Opaepilau Gulch, they were overtaken and killed off by Kamehameha (Samuel Manaiakalani Kamakau 1992:148).

3.1.1.6 Kailua

In the early 1870s, the third, and last Catholic mission chapel in the Keanae district was located close to Kailua, about midway between Keanae and Peahi. It was a very small chapel dedicated to St. Augustine. It was built by Father James Beissel. In the course of many years, it has undergone much patching up, but basically it is the same old church, standing alone, close to the road (Schoofs 1978:289).

Both the Hamakua Ditch Company (precursor of the East Maui Irrigation Company), and the Haiku Sugar Company, managed by Samuel T. Alexander, commenced the construction of a ditch to acquire the water between the Honopou and Nailiilihaele streams. This project to construct the Hamakua Ditch took place in 1876.

The digging of the Hamakua Ditch was a work of no small magnitude. A large gang of men, sometimes numbering two hundred, was employed in the work, and the providing of food, shelter, tools, etc., was equal to the care of a regiment of soldiers on the march. All the heavy timbers for flumes, etc., were painfully dragged up hill and down, and in and out of deep gulches, severely taxing the energies and strength of man and beast (Thrum 1918:197).

In the early 1920s, County engineer Paul Low divided the construction of the remaining sections of the Hana Belt Road into two: the Kailua to Keanae section, which measured 11.67 miles, and the Keanae to Wailua Iki section, which measured 5.66 miles. Construction from Kailua to Keanae was accomplished between 1923 and 1925. During the early 1920s, when the County Board of Supervisors were working to reduce construction costs for the Hana Belt road, planning included the use of a workforce of 50 prison laborers, to be housed in a prison labor camp to be

constructed at a site east of Kailua. By 1923, the prison labor camp east of Kailua was ready (Duensing 2007:132).

3.1.1.7 Papaea

According to Kamakau, a tradition of the Papaea-Keanae region was that this area was the abode of the Hawaiian god of thunder – Kanehekili. Thunder and lightning were very strong in the days before European contact, and worship of the god Kanehekili was encouraged by special *kahuna* who could claim that they were descendants of this god (S. Kamakau 1976:70-72).

According to Kamakau, Kiha a Piilani's search for those who would help him in his war against Lono a Piilani included the seeking out of a wise person at Papaea named Kukui hooleilei, who, in turn, directed Kiha a Piilani to the wise man Kaluko in the uplands of Keanae (Samuel Manaiakalani Kamakau 1992:24).

3.1.2 The Koolau District

3.1.2.1 East Makaiwa, including Mooloa, Kolea, Loiloa, Keopuka, Honomanu and Keanae

The Oopuola Gulch marked the boundary between the Hamakualoa and Koolau Districts. The stream in this gulch watered small *loi kalo* (irrigated taro) areas (Handy et al. 1991).

According to the historian Kamakau (1970), in Maly (2001), god-associated accounts in the lands of Papaea, Oopuola and Keanae centered around the god Kane, (whose attributes also included *ka wai ola* – the waters of life – *kalo*, and sunlight) and a manifestation of thunder and lightning. Kanehekili, Kanewawawhilani, Kahoalii, Kauilanuimakehaikalani, and the many other gods who belonged to the upper and lower strata of the firmament, were called “gods of the heavens.” The first *kahu* who observed the *kapus* of these gods was named Hekili (Thunder). He lived at Papaea, where he was born in a place where thunder claps very loudly, with double claps, and where flashes of lightning smashed to pieces the forest of Oopuola (K. Maly and Maly 2001:13).

In Fornander's “Legend of Kihapiilani,” after Kiha a Piilani and Umi conquered the fortress of Kauiki at Hana, Kiha a Piilani began to construct a “roadway from Kawaipapa to the forests of Oopuola [sic],” which “was made and paved with smooth rocks” (Fornander 1918a:180).

The Makanali, Waikamoi, Puohokamoa and Haipuna streams are found in this region of Koolau. Here, Native Hawaiian families settled and cultivated gardens in the narrow valleys fed by small streams (McGregor 2007:91).

According to Maly (2001), the region of Waikamoi, situated in the upper portion of Kalialianui Ahupuaa, are lands that represent some of the most significant native forest resources remaining in the Hawaiian Islands, and are part of a unique cultural landscape – in that the native flora, fauna, mist, rains, water, natural phenomena and resources, were all believed to be *kino lau* (the myriad body-forms) of gods, goddesses, and lesser nature spirits of Hawaiian antiquity (K. Maly and Maly 2001:ii).

According to Beckwith (1970) in Maly (2001), Kane-hekili was the god worshipped by those who claimed an *aumakua* in the thunder. In the forest uplands, and in the region of the *heiau* “Pakanalao,” erected back of Keanae at a place where violent thunderstorms occur, thunder is the divine form of the god Kane-hekili. This god was said to have been seen in his human form as

having one side of his body black and the other side white. Kahekili, the last ruling chief of Maui, was tattooed on one side of his body to show he belonged to the family of the thunder god.(K. Maly and Maly 2001:13).

3.1.2.2 Kaaiea Stream

The Kaaiea Stream at Mooloa may have been named after a great chief brought to Hawaii by the Samoan king Paao. According to Fornander, the chief Pili-Kaaiea was brought to the Hawaiian Islands to bring an end to the anarchy that Paao found when he first arrived (Fornander 1880:33).

When Fornander recorded the traditions of the chief Pili Kaaiea, he found there were two sets of traditions regarding the origin of Paao; the king who visits Hawaii, returns to his home islands to seek a powerful chief to quell the anarchy he sees. In both legends, Pili Kaaiea was brought to Hawaii to take possession of the islands, and it is from Pili Kaaiea that the principal chief families of Hawaii have claimed descent.

Of the first of these legends, Fornander states: This story of Paao was collected by David Malo. Malo stated that Paao came from “Wawao,” a place that he left and proceeded then to Hawaii, where he established himself in the capacity of a high priest. Finding the island in a state of anarchy and without a sovereign chief, “on account of the crimes of Kapawa, the chief of Hawaii,” he sent back (or went back himself) to his native islands, to invite Pili Kaaiea to come and take possession of Hawaii. (Fornander 1880:35).

In the first legend, Paao came from one of the islands of the Tonga group. The second legend was collected by Samuel Kamakau, about which Fornander writes:

The other legend, states that Paao came from “Opolu,” in the Samoan group, and that he left those islands with Pili Kaaiea, Pili’s wife, Hinaauaku, his own sister Namauuo-malaia, and thirty-five other relatives. After a long and dangerous voyage, Paao and his group arrived at the island of Hawaii, where Pili became sovereign chief of the island.(Fornander 1880:35).

According to Maly, the region of the Waikamoi Preserve watershed, situated the upper portion of Kalialianui Ahupuaa, are lands that represent some of the most significant native forest resources remaining in the Hawaiian Islands, and are part of a unique cultural landscape – in that the native flora, fauna, mist, rains, water, natural phenomena and resources, are all believed to be *kino lau* (the myriad body-forms) of gods, goddesses, and lesser nature spirits of Hawaiian antiquity(K. Maly and Maly 2001:ii)

According to Beckwith (1970) in Maly (2001), Kane-hekili is the god worshipped by those who claim an *aumakua* in the thunder. In the forest uplands, and in the region of the heiau “Pakanaloe,” erected back of Keanae at a place where violent thunderstorms occur, thunder is the divine form of the god Kane-hekili. This god was said to have been seen in his human form as having one side of his body black and the other side white. Kahekili, the last ruling chief of Maui, was tattooed on one side of his body to show he belonged to the family of the thunder god.(K. Maly and Maly 2001:13).

3.1.2.3 Kolea

Kolea Ahupuaa is one of the boundaries of the Waiakamoi Preserve, which is further bounded by Puukalai-ipu Ahupuaa. It may be possible that Kolea Ahupuaa is named for the endemic plant (*Myrsine sandwicensis*), also known as the Kolea *lau lili*, once found in the mesic and wet forests and shrublands of east Maui. Early Hawaiian uses for the wood of the Kolea *lau lili* tree were for carving the gunwales (the uppermost portions of the hull) for canoes (B. H. Krauss 1993:50, 325). The tree is also known as a source for red dye for the making of designs on *kapa*, or bark-cloth. In the jungle-forests of the Hana region, these trees can grow to impressive size. Kolea *lau nui* (*Myrsine lessertiana*) is one of nineteen *Myrsine* species endemic to the Hawaiian Islands (Barboza 2009). According to Kaaiakamanu, the bark, leaves and flowers of the *kolea* tree were used medicinally to treat *paoao* (a childhood disease passed from the parents, such as syphilis and gonorrhea) and *ea* (an infection) (Ka'aiakamanu 2003:63-64).

It was noted by McGregor that Native Hawaiian families settled and cultivated gardens in the narrow valleys fed by small streams, including the Haipuaena Stream. Next, in the broad, deep valley of Honomanu, which has a large stream and a broad beach for fishing canoes and net fishing, a large Native Hawaiian population constructed terraces deep into the valley for taro cultivation (McGregor 2007:91).

3.1.2.4 Honomanu

Honomanu Valley was best characterized as a large stream with a broad deep valley and a good beach for fishing canoes. In ancient times, Honomanu was said to have supported a large population. Terrace walls were observed by Handy (1991:498):

...as far as the level land goes – a little less than a mile. Above the valley, on elevated flatlands, there used to be some terraces and houses. These upland slopes were doubtless planted with all the plants that flourish where there is much rain, but they were too wet for sweet potatoes (Handy et al. 1991:499).

The Koolau Ditch trail at Honomanu was described in the 1915s as possessing, “beauty that baffles description, and were its attractions made widely known, tourists in plenty would assuredly visit it to gaze down its two-thousand feet depth” (Ford 1915:168). The road to Hana crossed the Honomanu Gulch by way of a serpentine roadway that descended down the side of a steep mountain cliff, through the valley floor, and across several bridges before climbing up another steep cliff to exit the valley (Duensing 2007:134).

According to the Hawaii State Registry of Historic Bridges, the Punalau Stream empties into Honomanu Bay and is crossed by the Kolea Bridge; located in Honomanu Ahupuaa (State of Hawaii 1990).

Kikau is a hill at the southeast corner of the land of Honomanu and on the boundary of Koolau and Hamakualoa Districts.

3.1.2.4.1 The Koolau Ditch

Michael M. O'Shaughnessy arrived in Hawaii in 1899 as the world's foremost irrigation engineer. In 1905 he completed long tunnels for the Koolau Ditch, and from 1902-1904 worked alongside Jorgen Jorgensen, a hydraulic engineer, to extend the Hamakua Ditch another 10 miles toward Hana. The Koolau Ditch was later turned over to the East Maui Irrigation Company.

Originally it fed into the New Hamakua Ditch at Alo, but it was connected to the Wailoa Ditch upon its completion in 1923 (Wilcox 1996:116-117). During the period of road construction to Hana, the road crew led by John Wilson that constructed the portion of the Hana highway between Kailua and Keanae in 1904, constructed a workers camp at Honomanu Valley. (B. Krauss 1994:88-89).

3.1.2.5 Keanae

3.1.2.5.1 Pre-contact

During the Pleistocene era, the Koolau Gap upland of the Keanae Peninsula was a long, broad, sloping valley reaching right up into the caldera of Haleakala. But a series of late volcanic eruptions caused lava to flow down into the Keanae Valley, partially filling it, then flowing down to the coast and cooling to form a broad, flat peninsula as it spread over the delta of sediment where the stream valley had once met the sea. The stream carved a channel through the new lava, which soon became forested. There are several small streams between Keanae and Wailua Nui. They flow in deep small gorges and the terrain is very rough, but there were a few small *loi* developments (Handy et al. 1991:501).

Handy recounts the Native Hawaiian story of the founding of the Keanae *loi* area:

In ancient times, the Keanae peninsula was barren lava. But a chief, whose name is not remembered, was constantly at war with the people of neighboring Wailua and was determined that he must have more good land under cultivation, more food, and more people. So he set all his people to work (they were then living within the valley and going down to the peninsula only for fishing). Carrying soil in baskets from the valley down to the lava point. The soil and the banks enclosing the patches were thus, in the course of many years, all transported and packed into place. (Handy et al. 1991:500)

Keanae is described as a unique wet-taro growing *ahupuaa* developed by the early inhabitants for irrigated taro with a *loi* complex that covered the peninsula. In traditional times, Polaukulu [Palauhulu] Stream brought an abundant supply of water to the taro patches, which are still used for raising wet taro today (K. a. O. Maly 2006:8). The Native Hawaiian mythology states that the god Kane accompanied by Kanaloa, thrust his *kauila* staff into solid rock and water gushed forth. Additionally, Ashdown stated that the Lualailua fishponds were located at Keanae, and that they were considered sacred, or *wahi pana* (Ashdown 1971:45).

Stokes (1916) recorded a *heiau* in Keanae named Pakanaloa. Ashdown elaborated on the *heiau*, stating that, “Kahuna Kahekili was *kahu* of this *heiau*” (Ashdown 1971:44). She further stated that:

Kahuna Kahekili was born with the mark of Kane Hekili [the ancient god of thunder]. Two of those descendants were King Kahekili, Maui's final ruler, and Ulumaheihēi, who was called Governor Hoapili at Lahaina under the first, second and third Kamehamehas. Such priests and kings of the Kane Family were called Na lii Kapu akua, or men possessing the *kapu* of the God-Trinity called La Hui Akua. In other words, descendants of the earliest “gods” who had landed at Keei where Kane had said, “*Oi ana,*” or “Let this be seen.” As he spoke and

touched a stone with his spear, water gushed up in a beautiful *puna-wai* (water spring). (Ashdown 1971:44-45)

The mythology of the Keanae region gives an account of the thunder god, Kanehekili, as being a god worshipped by those who claim an *aumakua* in the thunder. It was said that a *kahuna* named Kahekili kept the *heiau* of Pakanaloa, which had been erected at the back of Keanae at a place where violent thunderstorms occur (Beckwith 1982:62).

Also according to an informant (Mrs. Hardy of Keanae) for Beckwith, the Keanae shoreline was the setting for the story of a husband and wife who lived near the sea in a wooded area known as Kaupalahalaha. Every day, the man went fishing and one day instructs his wife to give fish to his sister when she comes from her upland garden with vegetables for the family. The man's wife is stingy and gives her sister-in-law only the tail end of a fish. This, the woman in disgust drops into a calabash. One night both husband and wife have a dream and, rising, they find a live shark in the calabash. For many years they keep it in a pool which may be seen today at this place and make food offerings to it. Once, during high water, it washed down to the sea. It now lives in a hole called Lua hui (Hole of the tail) which may be seen near Mrs. Hardy's house and which extends underground half a mile and comes out near the Keanae wharf (Beckwith 1982:259).

Fornander records in "The Legend of Kihapiilani" that Kiha a Piilani was sent to Keanae at Koolau to receive the advice of Kahoko, who then sent him to Kauiki at Hana to receive the advice of Lanakila, an advisor who is then given the land of Hana by Kiha a Piilani. Kiha a Piilani then traveled to the island of Hawaii to seek an alliance with King Umi, in order to destroy Lono a Piilani of Maui, his brother, who had greatly offended him. Fornander recorded the invasion of Hana by the forces of Umi as beginning with the Hawaii fleet of canoes landing at Kapueokahi.

Of the region of Kalaloa Point at Nuaailua Bay, a *mooolelo* reference was found in Fornander as a prominent place name of East Maui (Fornander 1916b:248).

Nuaailua in pre-Contact times was a flat-bottomed valley like Honomanu, but smaller. Handy states that terraces once covered the flatlands and much taro was formerly raised. However, Handy's conclusion is that the valley had long been uninhabited, or cultivated. He stated that upland taro should have flourished there (Handy et al. 1991:499).

3.1.2.5.2 Historic Period

In Linnekin's study of Keanae Ahupuaa, the history of land titles at Keanae is given. Under the terms of the 1848 Mahele, common people who could establish proof of residency, could receive title to that land via a Land Commission Award. There were twenty-one Land Commission Awardees in Keanae, and thirty-nine in Wailua. The Land Commission Awards were parcels of land awarded to common people who could establish that the land they cultivated and lived on was theirs as Native tenants (Linnekin 1985:24). In addition, according to Linnekin, lands at Keanae were also owned as tenants-in-common under a system called the *hui*. In this way, the ownership of an undivided interest in a large tract of land was far more adaptable to the need [for agriculture] for the two neighboring taro-growing areas at Lower Keanae and in the Wailua Valley, where the concept of the land *hui* is a traditional form of land holding by groups of relatives or dependents (Linnekin 1983b:218) and (Linnekin 1983a:169).

In historic times, a Protestant church was built at Keanae. The church at Keanae was built about 1860. The wood roof beams were hewn from Lehua trees. The church was Protestant

congregational, and was named “Lanakila Ihiihi o Iehova ona Kaua”. The church was built of rock and coral from the seashore. The first minister was the Reverend S. K. Kamakahiki, a native of Keanae. (Akuna 2013).

By the late 1800s, immigrants from countries such as China and Japan had arrived along the Hana coast to work in sugar plantations, making changes to the Native Hawaiian landscape. Between the 1880s and the 1930s, more than half of the Keanae *kalo loi* [taro fields] were planted in rice (Duensing 2005). By 1927, rice was considered the most important grain grown in Hawaii (O. W. Freeman 1927:51).

In the early 1900s, a Chinese fraternal society was established at Keanae.

3.1.2.6 Wailua Nui

The Wailua Nui Stream is a large stream that flows into the ocean at Wai o Kila, on the Hana side of the Keanae peninsula, in the Wailua Valley. In ancient times, Handy stated that the two adjacent areas of Keanae and Wailua Nui comprised a major center of population on the island of Maui (Handy et al. 1991:272).

Stokes (1916) described four *heiau* at Wailua Nui in the following manner:

The informant Kama stated that: *heiau* Ohia, land of the same name; near house of informant Kama, who called it a Koa ia [fishing shrine]. Built by chief Kaimuki. Previous occupant of place used stones for pig pen and pigs died.

Various native informants stated: *heiau* Kaluanui, land of the same name, below Ohia and one third of a mile from sea; on side of taro patch. Small, 41 x 42. Two sections, enclosure and platform, the latter running into the hill and seeming to have continued up the slope. Said by Mrs. Napihaa to have been for sacrifice, and that the drums were heard.

Informant and guide Enos Kapoohiwi stated that: *heiau* Kukaipuni, land of Pauwalu; 300 feet south of road, 5-600 feet west of school, cresting top of slope and facing North West by west. Terrace springing from ground level and extending to height of 8 to 12 feet according to undulations of land. Disturbed, no characteristics remaining. Upper surface of platform 42 x 50.

The informant Kalo described *heiau* Makehau, on flat land of same name. Mauka of main lower road, and 150 feet south of Makehau road. Disturbed platform 43 x 72 remaining, and indications that it extended to greater width. Eight coconuts on platform, said to have been planted by Kaniho, who took care of the *heiau*. Kaniho was remembered as an old man by Kalo the guide and informant. (Stokes 1916:3-4)

A Catholic church, “Saint Gabriel’s Church,” was constructed out of white coral in 1860. From the archives of correspondence with the Vicariate, came a letter dated 1865, in which the full story of the erection of St. Gabriel’s Church, is told. In the words of Father Leonor Fouesnel:

When there was a question as to the building of a new chapel at Wailua Nui (Keanae), our Protestant neighbors had been working for two years on the

erection of a new temple. They had a hard time getting the necessary material. There was no beach in this region and consequently no sand. Rocks abound, but the lime-boiled coral – as well as the sand – has to come from the sea. One has to dive for it as deep as six to ten feet.

So we gather our neophytes and tell them to get the necessary materials, sand and coral, so as not to delay the work of the two Brothers who will soon arrive to build their church. A day was chosen and set for all to go down together and begin the diving and hauling. But on the appointed day a fierce storm was raging and it was only four days later that the ocean calmed. All of our people went down armed with iron bars to loosen the coral. What a surprise greeted them when, coming to the assigned place, they found the shore heaped with coral.

Of course, they went to work with a will and soon gathered coral enough to take care of the whole building. The Protestants looked on, spellbound, but did not dare take the coral that seemed to belong to the Catholics. However, the next day, they hurried down to gather what we had left behind. But (and I was an eyewitness to this) when they arrived at the shore, all at once the sea took to a sudden swelling and washed away the last vestiges of coral.

The Hawaiians of this district were simply wonderful in this enterprise. They not only gathered coral and sand with their bare hands, but as if in procession, the priest leading, the men with their wives and children went up into the mountains to saw and to carry piece by piece the necessary wood for the construction of their church.

When Brothers Arsene and Charles arrived, it took only a short time to build the church. The new chapel was blessed by Father Modest Favens. This is how Keanae got its stone church, topped by a small square tower.

In Hana, in Kaeleku, there used to be another mission chapel of the Keanae parish. It became relatively important when in 1905 the Hana Plantation was reorganized and its name changed to Kaeleku Sugar Company. The mill was always in Kaeleku, which village was part of the Hana ecclesiastical district until Keanae district was formed in 1940. (Schoofs 1978:288-289)

In Wailua and Keanae, the teachings of the Catholic faith were carried on by the catechist Helio Koaeloa Mahoe. In 1840, when Helio was teaching the faith in Wailua, a few Protestant emissaries went to see Princess Keakalole, who owned Wailua Bay and lived there. They asked her to chase Helio from the property. But, although Protestant herself, the Princess refused to do so. Helio continued to travel from village to village of East Maui. The spot where grateful natives buried the “lay-apostle of Maui” was discovered by Father Cyril Eraly, who for 16 years was in charge of the Hana district. In 1908 a memorial in the form of a wooden cross was planted on the mound which rises from the center of the *makai* Wailua Gulch, a few yards away from Helio's grave. In 1931, Father Cyril erected a 20-foot concrete cross at the site (Schoofs 1978:255-256).

Cecelia Kanakaole of Wailua continued the teachings of the Catholic faith by building a small native-style chapel near her house. She had been a pupil of Helio Koaeloa Mahoe, and also resisted threats from the neighboring Protestants (Schoofs 1978:257).

Sailing to the windward, after noting the positions of Niihau, Kauai, Oahu, and Molokai, British explorer Cook sailed his ships off to the northeast end of Maui. According to Fornander, a number of canoes approached his ships to trade, off the coast of Haalua, just below Wailua Nui (Samuel Manaiakalani Kamakau 1992:97). Kalaniopuu boarded Cook's ship with a group of his paddlers. This was November 30, 1778 (Fornander 1880:171). It was noted by Cook that the following items were traded by the natives of this region of East Maui:

Our visitors supplied us with a quantity of cuttle-fish, in exchange for nails and iron. [expecting the natives would return the next day]...many of them appeared, bringing with them potatoes, taro (sic), bread-fruit, plantains and small pigs. (Cook and King 1785:129)

3.1.2.7 Wailua Iki

Wailua Iki is known in Native Hawaiian legend as the place where Kapo (the elder sister of Hiiaka) saved Pele from Kamapuaa.

According to Beckwith, the Maui legend of the hog-man Kamapuaa and the goddess Kapo at Wailua-iki is told this way:

Kamapuaa came to the island of Maui in his fish form and saw a rainbow resting over Kapos house. Her husband was out fishing and she was beating *tapa* when the handsome stranger entered her house. Two men on the cliff signal to her husband and he comes running and hits Kamapuaa with his paddle. Kamapuaa sends the husband flying over the cliff, called today Kuou, and the spot where he fell is seen today in the shape of a huge stone by the roadside. The gap between Wailua and Wailua Iki through which today runs a steep trail, was torn out at the time of this struggle. Kapos house could also be seen. Similar stories of Kamapuaas attack upon Pele are among the popular stories told in this vicinity. In the pursuit Kamapuaa lost his hair at a point called Huluhulu-nui (Many bristles), runs against the cliff at Puaahookui, and finally overcomes Pele at the hill called Kaiwi o Pele (The bones of Pele). (Beckwith 1970:213)

Fornander recorded the mythology surrounding the landmark Kaiwi o Pele [The Bones of Pele] in a story told by the informant John Moo at Lahainaluna School. In the *ahupuaa* of Aleamai, the story begins at a popular surfing spot known as Puhele, at Hana. It was here that Namakaeha, a stranger who came from Kahiki met Mahinahina from the southern region of Hana. As they walked along a road, Namakaeha saw the goddess Pele, digging potatoes. Confronted by Namakaeha as a traveler seeking opponents to fight, Pele battled Namakaeha. They fought until Pele weakened.

The body of Pele was taken and the bones were stripped of flesh and taken and buried in the ground. They were exhumed by dogs, placed in a pile and that is why this hill is so named, because the bones of Pele were stripped off there. (Fornander 1919a:506-508)

Famous places were listed on the hill Kaiwi o Pele. At the top, the place where the famous warrior Peapeas bones were burnt (see Fornanders "Story of Peapea," Vol. V 1918-1919 pp 458-462). On the eastern side of the same hill are the holes made by the club of Kane and Kanaloa. On the western side were the boys digging potatoes; near that is the fishing *noio* (small black tern)

(Fornander 1919a:506-510). It was from this hill that the goddess Hina left the earth to live on the moon (Pukui et al. 1974:71).

3.1.2.8 Nahiku

According to Handy (et al. 1991), Nahiku was a fertile *ahupuaa*, which was cleared and terraced with irrigated taro cultivated in the tradition of Native Hawaiians. In ancient times, the settlement at Nahiku spread over gently rising ground above the shore, with a number of groups of *loi*, watered from Makapipi Stream (Handy et al. 1991:501). Along the shore there was a *hala* forest that extended from Ulaino to Hana (Wenkam 1970). The region above Nahiku was traditionally forested with native trees such as *koa*, *ohia lehua*, and sandalwood. According to Handy, many plants that were used for native medicine also grew there.

In the late 1890s, sugar was grown in the Nahiku region. The Nahiku Sugar Company completed the construction of a landing for the government of Hawaii in 1901, and constructed rail-lines for the construction of a derrick at the landing. Although the Hana Plantation began railroad operations in 1883 (Conde 1993:30), there appears to be no record of the use of locomotives at the Nahiku Sugar Company, although a rail line was laid to the landing. In 1902 there was talk of a planned merger with the Hana Sugar Plantation by which the Hana Plantation would pay an annual rental of \$4,500 over a 26-year lease which included a valuable set of water rights (Thompson 1902:272). The sugar plantation land at Nahiku was acquired by the Hawaiian Commercial & Sugar Company and the East Maui Irrigation Company in 1921 (Hatch 1922:1410).

In the early 1900s, Nahiku became the site for a number of competing rubber plantations. At that time, there was a growing demand for rubber for automobile tires (Lindsay 1907:289-290). The Nahiku Rubber Company was in operation in 1905. The Koolau Plantation operated in the region in 1907. The American-Hawaiian Rubber Company operated in the region in the mid-1910s, and became the largest employer in the region. A decline in the price of rubber doomed the industry. After testing for several years, the rubber growers came to the conclusion that it would not be profitable to continue. It was found that the temperature was hardly warm enough for rubber to grow best and that labor was much more expensive than at Malaysia (O. W. Freeman 1927:64). The oldest of the rubber plantations, The Nahiku Rubber Company, Ltd., which had been managed by David Colville Lindsay, was closed on January 20, 1915 (Siddall 1917:175).

The Hanawi Stream in Nahiku contained a fresh water source so large [Big Spring] that it was studied for 12 years between 1930 and 1942 by W.O. Clark, the geologist for the Hawaiian Sugar Planters Association. Geologic studies were carried out at Hanawi Canyon by G.A. MacDonald between 1939 and 1940, during which he succeeded in mapping a number of perched springs and high water tables. The structure of the artesian spring which supplied the large water source [Big Spring] was not discovered at that time, but subsequent work by the East Maui Irrigation Company located an artesian source at Hanawi for water 395 feet above sea level (Stearns and MacDonald 1942:225).

In 1903, the Hawaiian Commercial & Sugar Company and the Maui Agricultural Company combined to extend the Koolau Ditch water collection system of the Lowrie Ditch another 10 miles toward Hana. By extending the ditch through the Nahiku district, water could be collected from one of the best watersheds in the Hawaiian Islands. The ten-mile extension crossed thirty-eight valleys, requiring that number of tunnels through the dividing ridges. The completed ditch had a

daily capacity of 85 million gallons. At about the same time, the Hamakua Ditch was extended to meet the Koolau Ditch, and the old ditch enlarged to a capacity of sixty million gallons per day. Some of the surplus water from these projects was delivered to the Kihei Plantation, a distance of 50 miles from Nahiku (Thompson 1902:43).

In the early 1900s, travel writer Jack London and his wife, on a sailing expedition around the world, stopped at Maui to travel the ditch trail at Nahiku. His horseback travels around Haleakala and overland to Hana, appeared in his book, "The Cruise of the Snark," which was first published in 1911. London observed the lay of the land between Paliku and the Koolau Gap, in Haleakala Crater; with his travels on into Hana, where the pack horses, "galloped into Hana like a bunch of colts." London inspected the rubber plantation at Nahiku and traveled by way of the Nahiku Ditch Trail, of which he said:

There are no carriage roads through the ditch country, and before the ditch was built, or bored, rather, there was no horse-trail. Hundreds of inches of rain annually, on fertile soil, under a tropic sun, means a steaming jungle of vegetation. A man, on foot, cutting his way through, might advance a mile a day, but at the end of a week he would be a wreck, and he would have to crawl hastily back if he wanted to get out before the vegetation overran the passage way he had cut. OShaughnessy was the daring engineer who conquered the jungle and the gorges, ran the ditch and made the horse-trail. He built enduringly, in concrete and masonry, and made one of the most remarkable water-farms in the world. Every little runlet and dribble is harvested and conveyed by subterranean channels to the main ditch. But so heavily does it rain at times that countless spillways let the surplus escape to the sea. (London 2000 Reprint:130-134)

London went on to describe some of the precarious conditions along the Nahiku Ditch Trail:

One of our cow-boys was noted as the strongest and bravest on the big ranch. He had ridden mountain horses all his life on the rugged western slopes of Haleakala. He was first in the horse-breaking; and when the others hung back, as a matter of course, he would go in to meet a wild bull in the cattle-pen. He had a reputation. But he had never ridden over the Nahiku Ditch. It was there he lost his reputation. When he faced the first flume, spanning a hair-raising gorge, narrow, without railings, with a bellowing waterfall above, another below, and directly beneath a wild cascade, the air filled with driving spray and rocking to the clamour and rush of sound and motion--well, that cow-boy dismounted from his horse, explained briefly that he had a wife and two children, and crossed over on foot, leading the horse behind him.

The only relief from the flumes was the precipices; and the only relief from the precipices was the flumes, except where the ditch was far underground, in which case we crossed one horse and rider at a time, on primitive log-bridges that swayed and teetered and threatened to carry away. I confess that at first I rode such places with my feet loose in the stirrups, and that on the sheer walls I saw to it, by a definite, conscious act of will, that the foot in the outside stirrup, overhanging the thousand feet of fall, was exceedingly loose. I say "at first"; for,

as in the crater itself we quickly lost our conception of magnitude, so, on the Nahiku Ditch, we quickly lost our apprehension of depth. The ceaseless iteration of height and depth produced a state of consciousness in which height and depth were accepted as the ordinary conditions of existence; and from the horses back to look sheer down four hundred or five hundred feet became quite commonplace and non-productive of thrills. And as carelessly as the trail and the horses, we swung along the dizzy heights and ducked around or through the waterfalls. (London 2000 Reprint:130-134)

3.1.3 The Hana District

The Hana District included the northern *ahupuaa* of Wananalua, Waikaakihi, Oloewa, Aleamai, Haneoo, Hamoa, Mokae, Kakio, Makaalae, Waiohonu at Pohakuloa, Puuiki, Pohue, Popokanaloa, Pukuilua, Haou, and the following *ahupuaa* in the southern portion of the Hana District: Piapia, Kawaloa, Muolea (in close proximity to the Kipahulu region), Koali, Wailua, Puuhaoa, Paehala, and Pualu. Kaumakani and Papauluana are the final two *ahupuaa* before Kipahulu.

The pre-Contact settlement pattern for the Hana region was determined in ancient times under a special arrangement of the subdivision of lands (Alexander 1890:105). Five sub-districts of traditional districts, or *moku*, make up the Hana district. These sub-districts are called *okanas*. Kamakau described the Hawaiian social structure as it existed before European contact as a time where the islands had no subdivisions. “But when an island became crowded with people, the land was divided and portioned out equitably and a name given to each part in order to identify it” (S. Kamakau 1976:6).

3.1.3.1 Honomaele

According to Native Hawaiian traditions, around the year A.D. 1570, a high chief from the western side of Maui named Kiha-a-Piilani conquered the formerly independent chiefdoms of the Hana region, uniting the entire island into one *moku* or polity. At the time of his conquest, Kiha-a-Piilani may have dedicated the massive *heiau* of Piilanihale, which looms above the wind-swept cliffs of Honomaele (Kirch 1985:143-144).

3.1.3.2 Wakiu

According to Fornander, Kalaehina was a warrior from Hawaii bent on seizing the kingship of Maui from the *alii* Kamalalawalu. Kalaehina arrived at Hana at a time when the people were engaged in games of strength and skill. Kalaehina desecrated the games and defied the commands of Kamalalawalu, and for his actions, Kamalalawalu ordered the people to kill Kalaehina. Because of the great strength of Kalaehina, Kamalalawalu was so afraid he escaped to a pool of water at Waianapanapa, which lies in [the *ili* of] Honokalani (Fornander 1918b:206).

3.1.3.3 Hana Town Vicinity: Kawaipapa to Wananalua

According to Kamakau (1991), the succession of chiefs who ruled in the Hana district reads thus:

Aikanaka was the chief of Koali and Muolea in Hana. Hema was the chief of Kauiki. Kahai was the chief of Iao in Wailuku. Wahieloa was the chief of Papauluana in Kipahulu. Laka, the chief, was born at Alae in Kipahulu; he ruled at

Koolaupoko, Oahu. After another five chiefs, Palena [a Haho] was born on the hill of Kauiki at Hana. He ruled and died at Oahu. Hanalaa nui and Hanalaa iki were the twin sons of Palena and Hikawainui – they were born at Kahinihiniula at Mokae and Hamoa and a certain *moku aina* land was named after these boys. (Samuel Mānaiakalani Kamakau 1991:101)

3.1.3.3.1 *Moolelo of the Region*

3.1.3.3.1.1 *The Demi-god Maui*

Kauiki was the home of the demi-god Maui and of Hanaiakamalama, the mother of Maui, who kept her refuge at the summit of Kauiki, to be closer to the moon. Maui used his great hook to raise the Hawaiian Islands out of the sea. In this legend, Maui baited his hook named Manaiakalani with the *alae*, the red-billed mud-hen from whom Maui learned the art of making fire by rubbing sticks. The *alae* was sacred to Hina, the daughter or wife of Kanaloa. Hina lived in the sea and spoiled the bait (the *alae*) so that the islands were not drawn together by the fishhook as Maui desired and thus defeated the purpose of Maui, so that the bottom of the sea was broken up into pieces and only came to the surface as fragments or islands (Fornander 1916a:370) rather than as a mainland, as Maui would have preferred.

Maui caught the sun in a noose, beat him, and compelled him ever after to travel slower and with a lesser heat. Fornander recorded the feat of the demi-god Maui snaring the sun in this way:

When Maui saw the sun rising over Hana, he climbed Haleakala. He then used a snare woven from the husk of coconuts that he had gathered at Waihee. When the sun travelled directly overhead, Maui snared it with ropes woven from the coconut husk and broke off some of its rays. He repeated this and broke all of the strong rays of the sun. The sun promised that he would travel slower across the sky. In this way, Mauis mother could dry her *kapa* (bark-cloth) properly (Fornander 1919b)

Ellis (1833) recorded the mythology of Maui differently. It was reported to him that Maui, an ancient priest or chief, was building a *marae*, or temple, which it was necessary to finish before the close of the day; but perceiving the sun was declining and that it was likely to sink before the work was finished, he seized the sun by his rays, bound them with a cord to the *marae* or an adjacent tree, and then prosecuted his work till the *marae* was completed, the sun remaining stationary during the whole period (Ellis 1833:129).

3.1.3.3.1.2 *Mythical Lands of the Gods*

In myth, Kane and Kanaloa are represented as gods living in the bodies of men in an earthly paradise situated in a floating cloudland or other sacred and remote spot where they drink *awa* and are fed from a garden patch of never-failing growth. The land of *Kane huna moku* (Hidden land of Kane) is one of these islands. Here live Kane and Kanaloa with other spirits who are Kanes direct descendants: such as Kane hekili, or “Kane of the thunder,” it is a middle land between heaven and earth where spirits enjoy all the delights of earth without labor and without death. Years ago, a family who worshipped *Kane huna moku*, living in Hana, fixed upon a certain day when the island would pass by and take them away in the flesh.

When the day came there were strange shapes in the clouds and excitement ran high. There are also stories of those who have caught sight of the hidden island.

Mrs. Pukui relates, from the account given to her by her grandmother when she was a child in Kau on Hawaii, that when *Kane huna moku* passes by one can hear cocks crowing, pigs grunting, see flickering of lights and waving of sugar cane and persons moving about the island. An old woman is its guardian. She holds an implement of destruction for anyone who lands without invitation (Beckwith 1970:67-72).

Kane hua moku is still worshipped as an *aumakua* or guardian spirit.

3.1.3.3.1.3 *Hua*

According to Kalakaua, about A.D. 1170 when Hua became *alii nui* (the ruling chief) of Hana, he claimed to be directly descended from the god Kane. It was said that Kane did not approve of Hua's warlike ways. Hua had access to the largest and finest timber in the islands, making his war canoes formidable. He spent much time harassing neighboring *ahupuaa*, and he plundered the coastal villages of Hilo at Hawaii. Hua resided principally in Hana, where he had constructed a large royal mansion. During an annual festival, Hua ordered that some *uwau* or *uau* birds be brought to him for a feast. He ordered that the birds be caught only in the mountains, but his priest disagreed and stated that the birds, at this time of year, should be caught at the seashore. Hua had been searching for a way to rid himself of his priest, Luahoomoe, and he demanded the birds be brought only from the mountains. If this was not done as he demanded, the priest would be sacrificed (Kalakaua 1888:160-161).

Luahoomoe warned his two sons to seek refuge at a mountainous spot named Hanaula, far away from Hana, because, if he were put to death, he warned that in retaliation, death would come to those who sacrificed him, and death would follow those who witnessed his sacrifice. The bird hunters returned with their birds, that they assured Hua had come from the mountains. But when his priest opened the birds, he found their throats full of tiny fish and bits of seaweed, as he had predicted. At this revelation, Hua instantly killed Luahoomoe. A continuous hot wind from the south blew across Hana, and the ground shook. Drops of blood fell from the clouds and streams wells and springs were no longer yielding water.

The gods had obviously been angered by the murder of Lahoomoe; but what was to be done? A great number of human sacrifices were called for, which did nothing to bring back water to the region and end the drought. After vainly trying to stop the dreadful scourge, Hua secretly embarked with a few of his attendants for Hawaii. He landed in the district of Kona, where the drought followed him. Wherever he went, the fresh water sank into the earth and the clouds dropped no rain. Finally Hua died of thirst and starvation, as the gods had decreed, and his bones left to dry in the sun. "Rattling are the bones of Hua in the sun," became a saying of those who would warn of the fate of one high in power who dared to defy the gods. In time, little by little, water came back to the streams of Hana, first to those who had faith in the gods, and soon after, the rains returned (Kalakaua 1888:165).

3.1.3.3.1.4 *Aikanaka*

According to Hawaiian mythology recorded by Thrum (1923), Aikanaka was a Maui chief, son of Heleipawa, who was born at Kowali Muolea, at a place called Hoolono kiu in Hana and was reared at Makaliihanau, and his home was on Kauiki hill. He was a good industrious man and a kind ruler. Hinahanaiai kamalama (Hina who worked in the moon), or Hinamaikalani (Hina from

the heavens) came from Ulupaupau in Kahiki to be his wife and to them are born, first, children of no import, then Punaimua (Puna the first-born) and last Hema. Hina's servants are Kaniamoko and Kahapouli. After the birth of Puna, Hina begins to enlarge her landholdings. In this traditional story, the children's excrement had to be carried to the north side of the water hole at Ulaino. Hina soon wearied of the task and the *tapu* involved in the disposition of the excrement. To escape this duty, Hina leapt to the moon from a place called Wanaikulani on the night of Hoku (Full moon). As her husband leapt to catch her, Hina's leg broke off in his hand. Thereafter she is called Lonomuku, and she hangs in the moon to this day (Thrum 1923:70-72).

3.1.3.3.1.5 *Kamehamehanui*

Fornander (Fornander 1880) described the Hana region as once being under the jurisdiction of the Maui king, Kamehamehanui, [who had succeeded Kekaulike] in the mid-1700s. About the year A.D. 1759, Kalaniopuu gathered an army at Kohala, on the island of Hawaii, and invaded Hana, taking the fort at Kauiki Hill overlooking the harbor of Hana, as well as the district of Kipahulu. But Kamehamehanui, although taken by surprise, soon made careful plans to retake his lost territory. Several battles were fought at Hana, in which the Maui forces prevailed, primarily at Makaolehua [Mokulehua] and Akiala. However, the fortress at Kauiki withstood all attempts to retake it, and after a prolonged siege, Kamehamehanui withdrew his forces and left Hana in possession of Kalaniopuu (Fornander 1880:146-148).

3.1.3.3.1.6 *The Battles of Kapalipilo*

In Native Hawaiian legends, the battles of "Kapalipilo" describe the assault by the combined forces of Maui, Molokai and Lanai on the fort at Kauiki that were meant to dislodge the Hawaii forces (Fornander 1880:146-148). According to Kamakau, the field of battle started with the massing of the Maui armies from Heleleikeoha to Nahiku. Wananalua soon became the battlefield. At a signal from the islet of Mokuhanu, the fortified walls of Kauiki were attacked. Soon, the battlefield shifted to the districts of Akiala and Keawaikau. The fighting soon came down to a challenge between Kaohele, a chief from Molokai, and Kamakaukii, a famous fighter from Hawaii. After a time, Kaohele gained the advantage, and Kamakaukii attempted to escape the battlefield, but the Molokai chief chased the Hawaii fighter through the *ahupuaa* of Honomale, Kawela, two Kuukuukamanu, two Kahalili, two Kaeleku, Honokalani, Wakiu and through a part of Kawaipapa. Kaohele overtook Kamakaukii at Waialanahu near Pihehe and thrust him through the scrotum with a spear. Despite the victory by Kaohele, the fort did not surrender, Kamehamehanui retired, leaving Hana in the hands of the warriors of Hawaii (Samuel Manaiakalani Kamakau 1992:80-81).

According to Fornander, several years passed by with no mention of warfare at Hana. After the death of Kamehamehanui (about A.D.1765), and about A.D.1775 the war between Maui and Hawaii broke out again. The Hawaii occupation forces at Hana, under the command of Kalaniopuu, sent a raiding party to Kaupo. The people of Kaupo suffered great destruction of property, cruelty, and loss of life at the hands of the Hawaii forces. This event angered Kahekili, governor of Maui at that time. Kahekili sent soldiers under the command of Kaneolaelae to support and protect the people of Kaupo. The result was the battle at a point of land known as "Kaleokailio," during which Kalaniopuu was defeated. He then abandoned Hana and returned to Hawaii to prepare for his next war against the forces of Maui (Fornander 1880:150-151).

3.1.3.3.1.7 *Kiha a Piilani*

Kiha a Piilani, seeking revenge against his brother, the then-ruler of the island of Maui, Lono a Piilani, made his way to Kinahole at Kawaipapa. Here, Kiha a Piilani heard the counsel of Kahuakole. Here, life was good, as the land of Kawaipapa was described as a place:

...where taro, sweet potatoes, bananas, sugar cane and wild fruits grew in abundance, and there was always much food to be had. Kawaipapa was rich in fish from the ponds and from the sea (Samuel Manaiakalani Kamakau 1992:25).

Kawaipapa is also the region of Hana where Kiha a Piilani met his wife Koleamoku. The two of them surfed together at Waipunaalae and fell in love. They were married and soon had a son, named Kauhiokalani. It was then that Kiha a Piilani asked Koleamoku to ask of her father for some additional farm lands at Honomaele, Kaeleku, Kawaipapa and the two Wananalua. It was then that Koleamokus father, Hoolae makua, told her that the taking of those lands would pit Kiha a Piilani against the king of Maui, Lono a Piilani, and that he would not agree to the award of these lands for farming, for his allegiance was with Lono a Piilani (Samuel Manaiakalani Kamakau 1992:26-27). Kamakau (1992) relates the story of Kiha a Piilani and his wife, Koleamoku:

Kiha a Piilani asked his wife to appeal to her father for additional farmland. In response, Kiha a Piilani and Koleamoku were *refused* ownership in the following *ahupuaa*- the lands of Honomaele and Kaeleku that supplied the *ohia* wood and *ieie* vines for Kealakona to build ladders for the fortress of Kauiki, the *ahupuaa* of Kawaipapa, which supplied the stones of kanawao that were used in battle, and the Wananalua lands, where the fortress Kauiki was located. Koali contained the fortress of Kue. The father of Koleamoku recognized that Kiha a Piilani was planning a rebellion against his brother, Lono a Piilani, by attempting to gain control of these lands. He did not consent to the request for additional farmland, because he supported the rule of Lono a Piilani. (Samuel Manaiakalani Kamakau 1992:26-27).

Kiha a Piilani appealed to the Hawaii chief Umi a Liloa for help in defeating his brother in battle. One year was spent building canoes for this war on the island of Hawaii. When the fleet of war canoes arrived at Hana, the forces of Kiha a Piilani and Umi a Liloa landed at Kaihalulu and Waikaahiki. There they were repelled at first, but Kiha a Piilani conceived a new plan. He called for the fleet of canoes to land instead at Wailua Iki and for the warriors to travel overland to engage the forces of Lono a Piilani on land instead of at the seashore, where they would be more evenly matched. In time, the fortress of Kauiki was taken by the Hawaii invaders. When this news was received at Wailuku by Lono a Piilani, he died. The victor, Kiha a Piilani, divided the lands of Maui among his chiefs, and Umi a Liloa returned to Kailua, on the island of Hawaii (Samuel Manaiakalani Kamakau 1992:429).

It was also at Kawaipapa that the combined forces of Umi a Liloa and Kiha a Piilani battled Lono a Piilani for the right to rule Maui. The armies of Umi a Liloa sailed from the island of Hawaii in great numbers, but, owing to the courageous fighting of the Maui hero Hoolae makua at Punahoa, the invading canoes were forced to land at Waikaahiki. The battle shifted between Kihahale and Waikoloa, in front of Kawaipapa, where they fought with slings:

Stones were slung at the canoes. Hoolae kept close to a rock that is now called Hoolae Rock. It was so named because he kept close to it in battle and was victorious over the warriors of Hawaii.

The next morning the Hawaii war canoes pressed shoreward from Nalualele to Kaihalulu to Lehuaua. Hoolaemakua fought with those who slung the solid *alastones* of Kawaipapa, the skilled throwers of smooth pebbles of Waiaahiki, the expert stone tossers of Waikiu and Honokalani and the quick-slinging lads of Kaeleku. These men used their skill with stones and the Hawaii warriors were sent helter-skelter. Some of the canoes were broken and some were seized by Hoolae makua (Samuel Manaiakalani Kamakau 1992:29).

In order to avoid further conflict with the Maui hero Hoolae makua, Kiha a Piilani directed invading canoes to land instead at Wailua Iki. The canoes sailed for Wailua Iki at Koolau, where the fighting commenced at “Ulaino, at Makaolehua, and in Akiala at Laahana, at Kawaikau, at Nenewepue, at Kamehaikanas *kukui* tree and all the way along to Honokalani and Wakiu, into the pandanus grove of Kahalaoweke, down to Pihehe, to the flats of Kalani and the spring of Punahoa.” Finally, the Hawaii warriors were able to gain the advantage when they invaded Kauiki at night. The army of Umi a Liloa pursued the escaping Hoolae makua across Koolau, where he was caught directly back of Nahiku at a place called Kapiipiwai. He was killed. Kiha a Piilani then turned toward Wailuku, where Lono a Piilani ruled Maui. When Lono a Piilani learned of the death of Hoolae makua, he died of fear: that he would be the next one tortured by the forces of Umi a Liloa and Kiha a Piilani (Samuel Manaiakalani Kamakau 1992:30).

Kawaipapa is also the *ahupuaa* where Kiha a Piilani began to build his famous road paved with stones from the sea, a road that would, one day, encircle the entire island. According to Kamakau, Kiha a Piilani paved the roads of Maui with rocks and attempted to straighten the existing roads out, when that was possible (Samuel Manaiakalani Kamakau 1992:429).

3.1.3.3.1.8 *Kahekili*

About 1774, a small skirmish broke out in Wailuku between the forces of Maui’s chief Kahekili and the Molokai chief Keeaumoku, which resulted in Keeaumoku fleeing to Hana, where Mahihelelima was the commander of the Maui forces protecting the fortified hill of Kauiki. It was about at this time [1777] that Kaahumanu was born at Kauiki (Samuel Manaiakalani Kamakau 1992:83-84).

About the time [1781] of Kalaniopuus death, the chief Kahekili was determined to retake the territory of Hana that had been taken by the army of Hawaii Island. In order to defeat the forces which held the fortress at Kauiki, Kahekili determined that part of his strategy would be to deny the opposing forces water from the springs of Punahoa, Waikaakihi, Waikoloa and the ponds from Kawaipapa to Honokalani on the Koolau side of the hill. Kahekili determined that the fortress would soon surrender from lack of water. Kahekili did slaughter his opposition in just that way. Kamakau stated that those who were eye-witnesses to this slaughter said that at the *heiaus* of Kuawalu and Honuaua adjoining Kuakaha and Kauiki were numerous ovens where the corpses of the slain were burned and left to dry in the sun; hence this battle was called “Kaumupikao,” and with the capture of Kauiki, in 1782, Kahekili and his chiefs retired to Makaliihanau, the wide plain

mauka of Muolea and adjoining Koali, and took up land cultivation (Samuel Manaiakalani Kamakau 1992:115-116).

Fornander recorded the events of the mid-1700s thus:

Kalaniopuu landed at Hamakualoa, where he plundered the country and committed fearful barbarities on the people, until Kahekili came to their support with his forces, and after several encounters, drove Kalaniopuu on board his fleet [of war canoes]. Foiled at Hamakua Loa, Kalaniopuu made his next descent in the Koolau district, committing similar depredations and barbarities there. While there, he was joined by Mahihelelima, the Hawaii governor of the adjoining Hana district with a select force of warriors, and being thus enabled to rally and hold his ground against Kahekili, he again attempted the invasion of Hamakualoa, where the war was protracted, with varying success, for several months. (Fornander 1880:157)

3.1.3.3.1.9 *Kapueokahi Harbor*

It was at Kapueokahi at Hana that Kapakailiula confronted the ruling chief of Maui, Kakaalaneo, because he did not want the chiefess Makolea, a woman from his district of Kohala on Hawaii Island, to be married to Kakaalaneo. The two men engaged in combat just inland from the beach at Kapueokahi, at Hana. Spear fighting (*kaka laau*) commenced, but the spears that were thrown by Kakaalaneo missed their mark, possibly because of the “*awa* leaf wind of Hana,” but when Kakaalaneo attempted to run from the field of battle, Kapakailiula killed Kakaalaneo with his war club. Kapakailiula gave the island of Maui to Kukuipahu, (king of Kohala) and made him king in place of Kakaalaneo. Fearing a similar fate, the king of Oahu, Kakuhihewa, sent his canoes to Hana for Kapakailiula, in order that he would accept the offer to take possession of Oahu by arranging safe passage to Oahu. Although storms plagued the expedition, Kapakailiula landed at Waikiki and was granted possession of the island. While on Oahu, Makolea was kidnapped by Kaikipaaneana, king of Kauai. Kapakailiula followed his wife to Kauai and stayed with a chief who lived near the court. After Kapakailiula put the cruel chief Kaikipaaneana to death, Kapakailiula found Makolea and returned to Oahu (Fornander 1880:400-404).

Kauiki Point is the southern point that encloses Kapueokahi Bay. It is the birthplace of the demigod Maui and birthplace of the future wife of Kamehameha; Kaahumanu. When Kalaehina, younger brother of Kalaepuni came of age in Kona, he was charged by his older brother with the task of killing all of the offspring of the chiefs of Maui, so that Kalaehina could reign over the island of Maui. Kalaehina sailed for Hana at a time when the people of Hana were engaged in games of strength. The *kapu* sticks separating the king's palace from the general population had been put up. But when Kalaehina arrived, he defiantly took them down, then boldly entered the place reserved for the king. Kamalalawalu, the chief of Maui, then ordered his people to jump on Kalaehina and kill him. The great strength of Kalaehina became quickly evident as he swept them off their feet, killing great numbers of them, and frightening the remainder away. At the sight of his great strength, Kamalalawalu escaped to a pool of water at Waianapanapa, which lies in Honokalani, Hana (Fornander 1918b:204-206).

Kapakohana was the strongest man on Kauai, who one day decided to go on a tour of Maui. As he arrived at Kipahulu, the people of the region asked him what his plans were. Kapakohana

replied that he was going to make a complete circuit of the island of Maui, and he would next visit Hana. The people then said, “What a great pity that such a good looking man like you should be killed by our ill-tempered king Kalaehina. You had better return home.” Kapakohana asked if the king would be angered by one who goes quietly along the highway? They replied that Kalaehina was a most violent-tempered man, who had already destroyed most of the chiefs and warriors on the island of Maui. Kapakohana then assured the people of Kipahulu, that if combat were to take place, he would be the victor (Fornander 1918b:208-210).

The next day when Kapakohana arrived at Kaiwi o Pele in Hana, he was challenged to combat by Kalaehina, as the people of Kipahulu had predicted. The two commenced to wrestle. Kapakohana's plan was to push Kalaehina to the edge of the cliff at Kaihalulu, near Kapueookahi (the harbor at Hana). They both rolled over the cliff and fell into the sea. After a while, Kapakohana came up with the dead body of Kalaehina. Kapakohana then proceeded to cut out the jaw bone of Kalaehina, so that all would know that the king was, indeed, dead. By this act, Kamalalawalu was restored to his place as king of Hana. Kapakohana returned to Kauai, as he had said he would (Fornander 1918b:208-210).

3.1.3.3.1.10 *Kauiki*

Fornander records that the hill of Kauiki originated from the placenta of Hamoa. Of the headland of Kauiki itself, in Fornander's “A Story of Kauiki;”

Kahinalii, mother of both Pele and Hiiaka, gave birth to the goddess Puuhele, who was destined to wander across Maui Island after she was cast away by her sisters. She met Alenuihaha, (the channel between Maui and Hawaii Island), but the goddess Puuhele continued to walk until she stopped to talk to Manawainui at Kaupo. She then continued, stopping at Hana, where she met Kanahaha, who sees her and falls dead. A spring gushes from the spot to this day at Kanahaha Hill. At Wananalua Puuhele vows to remain. Kaihuokala saw her and asked her why she had trespassed on the lands of Wananalua. There she dies, where her spirit body caused the hill of Kauiki to rise up to a great height. The spirit of Kaihuokala, the one who challenged the arrival of Puuhele at Hana, forms a hill just inland of Hana. (Fornander 1919c:544-551)

Of the fortress at Kauiki, Fornander recorded:

This hill is famous, for it is a natural fort and people on it are generally safe from assault, being protected on all sides by steep and inaccessible cliffs. To the top of this hill a ladder was built on one side, a sort of small bridge made so as to entrap those trying to take the hill, that if those from below were to climb up in attack stones would be rolled down on them, thereby injuring them. Furthermore, a large wooden image was hewed out and made to stand at night, and served the purpose of a guard. This image was called Kawalakii and this great statue kept the warriors below from climbing the hill at night. (Fornander 1917:248)

Being victorious in a battle to defeat Lono a Piilani at Kauiki, Umi was given the lands of Hana by Kiha a Piilani, who became King of Maui, and who began the construction of the paved road

that circled the perimeter of Maui. At that time, the road was reported under construction between Kawaipapa to the forests of Oopuola (Fornander 1919a:176-180).

About 1760, the chief of Hawaii Island, Kalaniopuu, attacked the southern coast of Maui and captured the fort of Kauiki. This attack then made Hana and Kipuhulu a part of his domain. Kalaniopuu appointed Puna, a famous warrior and chief, to be in charge of protecting the fortress of Kauiki. It was soon decided by the chiefs of Maui, Molokai and Lanai, that the fortress should be in the hands of Kamehameha-nui, the ruler of Maui. This war was long, and involved widespread warfare primarily in the *ahupuaa* of Honomale, Kawela, both Kuukuukamanu, both Kahalili, two Kaeleku, Honokalani, Wakiu and part of Kawaipapa (Samuel Manaiakalani Kamakau 1992:79-81).

3.1.3.3.1.1 *Kamehaikana*

According to Beckwith, an enchanted breadfruit tree named Kamehaikana grew on the island of Oahu. Kamehaikana was a goddess with the power to overthrow governments. She was one of the deities of Oahu and was taken by the chiefs of Maui at Hana and became a deity of Kamehameha when he ruled the land (Beckwith 1970:281-283).

3.1.3.3.1.2 *Pueokahi*

Pueokahi was the name given to the Harbor of Hana, according to Fornander's informants. The harbor was named for an owl belonging to the chief, Peapea. When the owl saw that there were plenty of people, it flew to the door of the chief, indicating a multitude. Afterward, the bird was killed, and that is why it was called Pueokahi (Fornander 1919c:548).

3.1.3.3.1.3 *The Legend of Kuula-kai*

Kuula-kai and his wife Hinapukaia lived at Lehoula, Aleamai, Hana. Here, according to Moses K. Nakuina, the two raised their son, Aiai. Kuula was a fisherman who was known all over Hana as the one who could call fish to appear before him. Kuula made proper offerings to the fish-god, and because he made these offerings, he was given special powers over fish. Kuula-kai constructed a fishpond next to his house at the seashore, where he made his offerings.

At this time, Kamohoalii was king, who lived at Wananalua at Hana, Kamohoalii appointed Kuula-kai to be his head fisherman. About this time, Kuula-kai's wife gave birth to a son, who they named Aiai-a-Kuula. When Aiai was old enough to take care of himself, an unusual event occurred.

A large *puhi* [eel] called "Koono" lived at Wailau on the windward side of Molokai. The eel was worshipped by the people of Wailau, and they never tired of telling of the mighty things their god did, one of which was that a big shark came to Wailau and gave it a battle, and during the fight the *puhi* caused a part of the rocky cliff to fall upon the shark, which killed it. A cave was thus formed, with a depth of about five fathoms and that large opening is there to this day. This eel then left Wailau and came to live in a cave in the sea near Aleamai at Hana, called Kapuka-ulua ("The ulua hole") some distance out from the Ālau rock. The eel came to break and rob the pond that Kuula-kai built and stocked with fish of various kinds and colors, as are known today.

Kuula-kai was much surprised when he discovered his pond stock disappearing, so he watched day and night and at last, about daybreak, he saw a large eel come in through the *makai* [seaward] wall of the pond. When he saw this he knew then that it was the cause of the loss of his fish and was devising a way to catch and kill it, but on consulting with his wife they decided to leave the

matter to their son Aiai, for him to use his own judgment as to the means by which the thief might be captured and killed. When Aiai was told about the eel, he sent word to all the people of Aleamai and of Haneoo to make *ili hau* [tree bark] ropes several *lau* [400] fathoms in length. When all was ready a number of people went out with the rope in two canoes. Aiai-a-Kuula was in one canoe, and he had with him two large stones and held in his hand a fishermans gourd [*hokeo*] in which there was a large fishhook called Manaiakalani. One canoe from Aleamai and one from Haneoo set out to capture the eel.

When the canoes had proceeded far out he located his position by land marks and looking down into the sea, and finding the right place he told the paddlers to cease paddling. Standing up in the canoe and taking one of the stones in his hands he dove into the sea. Its weight took him down rapidly to the bottom, where he saw a big cave opening right before him, with a number of fish scurrying about the entrance such as uluas and other deep sea varieties. Feeling assured that the eel was in this cave, Aiai rose to the surface, got in his canoe, and removed his fishhook “Manaiakaalania from the gourd and baited it with a preparation of cocoanut and other substances attractive to fish, and instructed those in the canoe that if he succeeded in hooking the eel he would give the rope several quick jerks as the sign to them of his success. Saying this, he picked up the second stone and dove down again into the sea and proceeding to the cave he placed the hook into it, at the same time while murmuring a few incantations in the name of his parents. Then he knew that the eel was hooked so he signaled as planned. In a short while he came to the surface and entering the canoe they all returned to shore, trailing the ropew behind. He told those in the canoe from Haneoo to paddle toward Haneoo, and those from Aleamai to paddle to Lehoula at Hamoa. Once ashore, the ropes were pulled by the people assembled for the task. Aiai climbed KaiwioPele Hill and directed the people of both places to pull in the eel. The *puhi* was landed on the *pahoehoe* stones at Lehoula, where Aiai threw three basalt stones to kill it. The head was cut off and cooked in an underground oven, called an *imu*. A rocky formation at the shoreline resembling the backbone of an eel remains at the spot today as a reminder of the event (Nakuina 1901:114-124).

The killing of this *puhi* by Aiai made him famous. After this event a man came over from Wailau, Molokai to investigate, because he had a dream that told him that the *puhi*, who was his *aumakua* [family god] had been killed at Hana. When he learned that Aiai-a-Kuula was responsible, this man launched an evil scheme against Kuula-kai. He went one day, to Kuula, without orders, and told him that the king had sent him for fish for the king. Kuula gave him only one; an *ulua* [an important species of pompano used for food], with a warning direction, saying, “Go back to the king and tell him to cut off the head of the fish and cook it in the *imu*, and the flesh of its body cut up and salt and dry in the sun, for this is Hana the aupehu land: Hana of the scarce fish; the fish of Kama; the fish of Lanakila.

The man gave the *ulua* to the king and delivered a message very different from the one he had told the man. The king asked where the fish came from. The man answered, “Kuula.” The man, wanting to cause trouble for Kuula, said to the king, “Your head fisherman told me to come back and tell you that your head should be cut from your body and cooked in the *imu*, and the flesh of your body should be cut up and salted and dried in the sun.”

Hearing this, the *alii* was so angry with Kuula that he ordered all his chiefs and all the people to go up in the mountains and gather immediately firewood and place it around Kuulas house for he and his wife and child should be burned up. When Kuula and his wife saw the people of Hana

bringing firewood and placing it around the house they knew it foreboded trouble, so Kuula went to a place where taro, potatoes, bananas, cane and some gourds were growing. Seeing three dry gourds on the vine, he asked the owner of the garden for them and was told to take them. These he took to his house and discussed with his wife the evil day to come, and told Aiai that their house would be burned and their bodies too, but not to fear death nor trouble himself about it when the people came to shut them in.

After some thinking, Kuula remembered about his giving the *ulua* to the king's retainer and felt that he was the party to blame for this action of the king's people. Therefore he turned to his son and said, "Our child, Aiai a Kuula, if our house is burned and our bodies too, you must look sharp for the smoke when it goes straight up to the hill of KaiwioPele. That will be your way out of this trouble, and you must follow it until you find a cave where you will live. You must take this hook called "manaiaakalani" with you: also this fish-pearl (*pa hi aku*) called "kahuoi"; this shell called "lehoula" and this small sand-stone from which I got the name they call me, "Kuula au a Kuulakai." It is the progenitor of all the fish in the sea. You will be the one to make all the *kuulas* from this time forth, and also have charge of making all the fishing stations (*koa lawaia*) in the sea throughout the islands. Whenever you desire anything all you will have to do is to call, or ask, in our names and we will grant it. We will stand up and go forth from here into the sea and abide there forever, and you, our child, shall live on land here without worrying about anything that may happen to you. You will have power to punish with death all those that help to burn us and our house, whether he be king or people, they must die; therefore let us calmly await the calamity that is to befall us" (Nakuina 1901:114-121).

The king's people came one day and caught them and tied their hands behind their backs, the evildoer from Molokai being there to aid in executing the cruel orders of Kamohoalii resulting from his deceitful story. Kuula and his family were tied to the poles that supported their house, whereupon, the people barricaded the doorway with firewood, which they then set on fire. When the fire was raging all around the house and the flames were consuming everything, Kuula and his wife gave their last message to Aiai and left him. They went right out of the house as quietly as the last breath leaves the body, and none of the people standing there gazing saw where or how Kuula and his wife came forth from the house: their bodies were changed by some miraculous power (*mana kukua*) and entered the sea, taking with them all the fish swimming in and around Hana. They also took all sea-mosses, crabs, crawfish and the various kinds of shellfish along the sea-shore, even to the *opihi-koele* at the rocky beach; every edible thing in the sea was taken away. This was the first stroke of Kuula's revenge on the king and people of Hana that obeyed his mandate; they suffered greatly from the scarcity of fish.

When Kuula and his wife got out of the house, the three gourds exploded from the heat, one by one, and all those who were gazing at the burning house believed the detonations indicated the bursting of the bodies of Kuula, his wife and child. The flames shot up through the top of the house and the black smoke hovered above it, then turned toward the front of KaiwioPele Hill. The people saw Aiai ascend through the flames and walk upon the smoke towards the hill until he came to a small cave that was opening to receive and rescue him.

As Aiai left the house it burned fiercely and, carrying out the instructions of his father he called upon him to destroy by fire all those that had caught and tied them in their burning house. As he finished his appeal, he saw the rippling of wind on the sea and a misty rain coming with it,

increasing as it came until it reached Lehoula, which so increased the blazing of the fire that the flames reached out into the crowd of people for those that obeyed the king. The man from Molokai who was the cause of the trouble was reached also and consumed by the fire, and the charred bodies were left to show to the people the second stroke of Kuulas vengeance. But, strange to say, all those that had nothing to do with this cruel act, though closer to the burning house, were uninjured: the tongues of fire reached out only for the guilty ones. Soon, all that was left were a few smoldering logs and ashes.

The next morning Aiai left his cave and walked until he came to a road at Puilio, where he met several children at play, one of whom made friends with Aiai and asked him to his house. Aiai accepted the invitation, and the boy and his parents treating him well in every way he remained with them for some days. While there they heard of the kings order for all the people of Hana to go fishing for *hinalea*. The people obeyed the royal order but when they went down to the shore with their fishing baskets they looked around for their usual bait (*ueue*) which was to be pounded up and put into the baskets, but they could not find any, nor any around in the sea. Why? was the question. Because Kuula and his wife had taken with them all the fish and everything pertaining to fishing. Finding no bait, they pounded up limestone and placed it in the baskets and swam out and set them in the sea. They watched and waited all day, but in vain, for not a single *hinalea* was seen, nor did any enter the baskets. When night came they went back empty handed and came down again the next day only to meet the same luck.

The parents of the boy that had befriended Aiai was in this fishing party, in obedience to the kings orders, but they got nothing for their trouble. Aiai seeing them go down daily to Haneoo, he asked concerning it and was told everything, so he bade his friend come with him to the cave where he stayed after the house was burned. Arriving there he showed the stone fish-god Pohakumuone and said, "We can get fish up here from this stone without much work or trouble."

Then Aiai picked up the stone and they went down to Lehoula and setting it down at a point facing the fishpond which his father made he repeated these words: "O Kuula, my father; o Hina, my mother, I place this stone here in your name, Kuula, which action will make your name famous and mine, too, your son; the keeping of this *kuula* stone I give to my friend and he and his offspring hereafter will do and act in all things pertaining to it in our names."

This was the first establishment of the *koa kuula* on land; a place where the fisherman was obliged to make his offering of the first of his catch by taking two fish and placing them on the kuula stone as an offering to Kuula. Thus Aiai first put in practice the fishing obligations established by his father at the place of his birth, in his youth, but it was only accomplished through the *mana kupua* of his parents.

When Aiai finished calling on his parents and instructing his friend they saw several persons walk along the Haneoo beach with heir fishing baskets and set them in the sea. But they caught nothing. At Aiais suggestion they went over to witness the fishing effort. When they reached the fishers Aiai asked them, "What are those things placed there for?" And they answered "those are baskets for catching *hinaleas*, a fish that our king, Kamohoalii longs for, but we cannot get bait to catch the fish with."

"Why is it so?" asked Aiai.

And they answered, “Because Kuula and his family are dead, and all the fish along the beach of Hana are taken away.”

Aiai, called to his parents to deliver *hinalea* to two baskets that he had set in the fishpond. He demonstrated to the people that the first two fish be placed as an offering on the *koa* that had been established at Lehoula for Kuula. Aiai also told the people at the seashore that before the setting of the sun that day, that the king, Kamohoalii of Hana, would choke on these fish and die. After Aiai made his offering, the remaining fish were given to the families who were fishing in the area. Many of the *hinalea* were given to the king, who was strangled by eating the fish too quickly. In this way did Aiai win a victory over all of his fathers enemies (Nakuina 1901:124).

3.1.3.3.2 Western Contact

In December of 1788, William Douglas, commanding the British ship, the *Iphigenia*, arrived at Hana, and continued on to the island of Hawaii where he presented Kamehameha with a swivel cannon, which was mounted on a large double canoe, together with a number of muskets and a quantity of ammunition.

In 1790, Kamehameha then began to muster his armies for a planned invasion of Maui. That summer, Kamehameha landed at Hana. In a battle known as “Kaua o Kawaanui,” (Battle of Great Canoes) Kamehameha defeated the Maui advance guard there, after which he sailed for Hamakua Loa, sweeping the remaining Maui defenders back into the Iao Valley of Wailuku, and annihilating them at the battle called “Kaua i Kepaniwai o Iao,” (Battle of the Dammed Water of Iao), during which the slain warriors were said to have dammed the water of the Iao Stream. Kamehameha then returned to Hawaii to settle disputes there. In his absence, both Kahekili and the High Chief of Kauai, Kaeokulani formed an alliance to retake Hana. After that success, both chiefs launched an attack on Kamehameha at Waipio on Hawaii, where they were both defeated. After the death of Kahekili in 1793, Kamehameha assumed the rule over all of Maui, through his victory over the High Chief Kahekilis successor, the High Chief Kalanikupule, in the battle of Nuuanu on Oahu in 1795 (McGregor 2007:99).

In succession, during the mid-1800s, the Protestant missionary station at Hana was administered first, by its founder, the Reverend Mark Ives and his wife between 1837 and 1839. The Reverend Daniel Toll Conde and his wife were stationed at Hana between 1838 and 1848. In 1841, the teacher William Harrison Rice and his wife arrived to reinforce the mission. They remained at the Hana station until 1844. In 1844, the Reverend Eliphalet Whittlesey and his wife settled at the Hana station, where they remained until 1846, moving to Kaupo for one year until 1847, then returning to Hana until 1854. The Reverend William O. Baldwin was then assigned to the Hana station with his wife between 1855 and 1859 (Judd et al. 1969:16). Between 1862 and 1865, the Protestant missionary station at Hana came under the direction of Reverend Sereno Edwards Bishop and his wife (Anderson 1865:190).

In 1837, Protestant missionary Richard Armstrong recorded a visit to East Maui to investigate the birth place of Kaahumanu:

Hana is a fine and populous district. Hana is the birth place of Kaahumanu of blessed memory. The people of Hana seem to be much gratified with the prospect of having teachers among them. They have, by order of the governor, built two native houses with yards around them, for their accommodation. On introducing

the brethren, I asked them if they felt happy in seeing these new teachers. They all signified at once, by lifting the hand that they were. I asked them if they would be friendly to their teachers, protect them, assist them, build a meeting house, etc. Without hesitation the whole assembly, of perhaps seven hundred persons, gave the same signal of assent. (Armstrong 1838:247)

After spending two days with the brethren of Hana, and preaching several times to the people, my family needing me, I left them and set out for home in a canoe. But before we had fairly passed the mouth of the harbor, a high wave struck us, and in the twinkling of an eye we were all thrown into the sea, puffing and struggling in a high surf, like so many porpoises. But the wreck was seen by our friends on shore, and our friend Kaawais canoe came to our relief with all speed. No lives were lost, and nothing of consequence was lost, although the wailing and screaming of the women ashore was excessive. By the kindness of Kaawai, I procured another canoe and a new crew, and having borrowed some dry clothes, I set out a second time and in six hours after landed at Wailuku. We came before the trade-wind at a fearful rate, the canoe sometimes scarcely more than touching the tops of the waves. Fifty six hours going and only six returning. (Armstrong 1838:248)

In the 1860s, Kelk and Needham, two early sugar planters, first planted cane around Hana. The first sugarcane crops in Hana were ground in a bullock-powered mill.

The Hana Sugar Plantation was organized in response to a program initiated by the Kingdom of Hawaii, which made land and money available to aspiring sugar planters. In January 1852, a Mr. A. B. Howe asked the Hawaiian government for a \$3,000 loan to begin sugar operations in Hana. G. P. Judd, a Minister of the interior for the Kingdom, acquired land in Hana, following the conclusion of government surveys by William Patterson Alexander to settle Native Hawaiian land claims. In 1852, Judd was able to purchase 223 acres of government lands in Hana. By 1860 Judd had amassed some 641 acres, which he then sold to the partners of the Hana Sugar Plantation: Needham, Thomas, Cook and August Unna (MacLennan 2014).

Reverend Daniel Conde founded the American Protestant missionary church at Wananalua in 1838. The stone church at Wananalua still stands, which was built in 1842.

The original Wananalua Congregational Church had a steep roof of hand-hewn rafters of native wood and was thatched with grass in the native style. In 1898 much-needed repairs were undertaken by four prominent citizens. Reverend Hanuna, Judge Josepha, plantation manager Mr. Gjerdrum and Henry Perrine Baldwin. The church was stripped to its bare stone walls, the rafters replaced by Pacific Northwest redwood, and new roofing material applied (Belknap 1942:4).

3.1.4 Construction of the Hana Belt Road

One of the greatest achievements of Kiha a Piilani, an *alii nui*, who unified all of the island of Maui in the 16th century, was the paving of a road [*ala loa*] around the whole perimeter of Maui.

It was from Hana that Kiha a Piilani moved to secure the great high chief Umi a Liloa of Waipio [Hawaii] as his ally, and it was from Hana that Kiha a Piilani moved on to conquer all of Maui. (Handy et al. 1991)

The road built by Kiha a Piilani was paved with stones in the mid-1500s (Handy et al. 1991:489). The *Ala loa* (“Long Road”) that ran all the way around both the east and west ends of Maui, was studied and described by anthropologist Martha Foss Fleming; that the method of building this paved roadway consisted of a line of men standing from the sea and handing stones one to the other until they reached the required place. Here the stones were placed into position. The trail was paved with flat, hard beach stones. Remains of sections of the trail remained at Kaeleku and between Wailua and Keanae in the 1930s (Fleming 1933:5). At the turn of the century, in the early 1900s, portions of the trail remained usable between Nahiku, Kailua and Halehaku (Dodge 1916:347).

In 1904, John Wilson and John Duggan became partners and were awarded the contract to begin to build the section of the road between Kailua and Keanae. The cost of this project at that time was \$33,242. The original specifications for the road to Hana are not known, but the improvements could not have been much more than a rough horse trail surfaced with stones. The primary mechanical difficulty was to blast out cuts where cliffs were too sheer to scratch out even a flat path wide enough for a carriage. Of all the cuts, the most spectacular was at Honomanu, where the road clung to an enormous cliff face high above the ocean, then sloped down the broad cliff-side to the waters of the bay (B. Krauss 1994:88).

Before 1905, nearly all funds for road construction came from the Territorial government. When the County of Maui elected its first Board of Supervisors in 1905, the most critical infrastructural issue facing the newly-created Board of Supervisors was the development of a belt road from central Maui to Hana along the north coast of the island. To that end, the Board of Supervisors in 1907 hired John H. Wilson as Maui County superintendent of roads.

Between 1905 and 1908 concrete bridges were built in the ditch country near Nahiku to support a proposed 60-mile paved road between Hana and Kailua (Hawaii Heritage Center 1990:5). In 1912, John Wilson, was awarded a contract for \$83,750 to build the Nahiku-Keanae portion of the road (B. Krauss 1994:119). Bridge building on Maui surged in 1911 when the Territorial legislature established a Loan Fund Commission to oversee a special fund for belt roads. Maui received a substantial amount from this fund, which made possible the building of four bridges on the Hana belt road, in addition to 17 other bridges in Maui County. A narrow road and bridge to Nuaailua Bay near Keanae was built by 1912. In 1915, the office of County Engineer was created and Hugh Howell became the first named to the post (Hawaii Heritage Center 1990:5). In 1913, John Wilson and Link McCandless became partners to move the construction forward. Construction equipment was landed at Nahiku at a small wharf that Wilson had constructed (B. Krauss 1994:66). From Hana, contractors Wilson and McCandless had completed the road to the Nahiku-Keanae section by 1915. The onset of war between the United States and Germany in 1917 created havoc with the fortunes and finances of Wilson and McCandless. In 1920, John Wilson was elected Mayor of Honolulu.

Work on the northern Hana belt road proceeded from different areas at different times. At this point, the job of completing the Hana belt road came under the administration of the Federal Government of the United States, when \$300,000 was made available for building roads (Maui News 1926:Section Two, Page Four). In 1923, the survey by the county engineer of the belt road from Keanae to Kopiliula was authorized, and bids for construction called for. Paul Low, the County Engineer, and a committee from the Maui Chamber of Commerce asked that more of

Maui's prisoners be secured to work on the belt road project. A. H. Wong, assistant engineer to Paul Low, and his eventual successor, also oversaw the completion of the belt road. The amounts allocated to the completion of the belt road were: \$50,000 for upgrades to the Hana water system, and \$117,500 for the road construction from Kailua to Kopiliula. Earlier, \$25,000 had been required to construct the portion of the belt road between Kuiaha and Kakipi Gulch. The Territory made no effort to sell bonds to push the project ahead until 1920. Financing for the belt road construction had become more difficult to justify, and in 1922, the management of the sugar plantation at Kaeleku offered to buy bonds to finish the road (Hawaii Heritage Center 1990:5).

Despite the projected cost of \$692,000 for the remainder of the belt road to cross ditch country, the County of Maui decided to push ahead. The extension between Kailua and Keanae required additional work. The County administration regularly used convict labor shipped in from other islands to save money. Work camps for convicts and free road gangs were located at either end of the extension. Completion of the belt road to Hana was finally made possible by the Federal Government, which in 1925 appropriated funds for primary roads (Hawaii Heritage Center 1990:6). The entire East Maui section of the belt road was opened December 18, 1926 (Maui News 1926:Section Two, Page Five).

3.2 Previous Archaeological Research

This section provides an overview of the research and findings of previous archaeological investigations along the historic section of Hana Highway, Route 360.

3.2.1 Early Studies

Formal archaeological research began on Maui early in the twentieth century when Thomas Thrum began recording the *heiau* of Maui in the Hawaiian Annual from 1909 through 1918. By the conclusion of his study, Thrum had located 121 *heiau* on Maui (Thrum 1908-1918). At the same time, J.F.G. Stokes was also documenting many structures and *heiau* on Maui (Stokes 1917). The first attempt at a systematic island wide survey, however, was undertaken by Winslow Metcalf Walker from 1928 to 1929. The survey was commissioned by the Bishop Museum and focused primarily on major surface historic properties such as *heiau*, fishponds, and intact village sites (Walker 1931). A minimum of at least 66 sites identified by Walker were located along the historic portion of Hana Highway. These sites are summarized in Table 1 below, with approximate locations shown in the following figures depicting previously identified historic properties located near the project corridor and in relation to historic bridges (Figure 7, Figure 9, Figure 11, Figure 13, Figure 15, Figure 16, and Figure 18).

Table 1. *Heiau* sites identified by Walker (1931) along the historic portion of Hana Highway.

Walker Site #	Heiau Name	Locational Information	Description	Source
72	Puuokalepa	Hamakualoa District in Puolua: 800 feet east of the Protestant Church on top of a small knoll overlooking a steep gulch.	Outlines only remain indicating size of 65 x 100 feet. Front is faced to height of 20 feet on hillside. Stokes reports it as sacrificial.	(Walker 1931:91)
73	Kupaikaa	Hanehoi Region: At Hinaliekahi on the hillside, just below the Kailua ditch and west of the Kailua Protestant Church.	Partly demolished when the ditch broke - 48 feet of wall remain on the east and 94 feet on the north. The northwest corner, which is intact, has been built up in three terraces to a height of 20 feet. Drums heard from this <i>heiau</i> .	(Walker 1931:91)
74	Pohakuokaia	Kailua in Hoalua Region: At Hoalua below the church on a bluff near the end of a pineapple field.	Small <i>heiau</i> with walls of basalt 3 feet high and 6 feet thick. Measures 60 x 30 x 20 x 12 x 28 x 50 feet. Beach stones used but no coral or pebbles seen.	(Walker 1931:92)
75	Honomauloa	At Hanawana	Destroyed	(Walker 1931:86)
76	Halepaahau	At Hanawana	Destroyed	(Walker 1931:86)
77	Kauhiahale	Kailua in Puuomaile Region: At Moii in Puuomaile on the <i>mauka</i> side of the road opposite the store. A big mango tree is growing in the center.	A walled enclosure showing two and three terraces on the sides. L-shaped measuring 200 x 137 feet. Northeast corner is triple terraced 10 feet high. There is an enclosure 38 x 22 (feet) the northwest corner. Construction is of rough basalt. No coral or pebbles.	(Walker 1931:92)

Walker Site #	Heiau Name	Locational Information	Description	Source
78	Pohakuokane	Kailua in Puuomaile Region: In a dense thicket of <i>hau</i> on the ridge just east of Kailua gulch below the road.	Small L-shaped <i>heiau</i> enclosure built of stream worn basaltic rocks.	(Walker 1931:93)
79	Halekanaloa	At Papaea	Destroyed	(Walker 1931:86)
80	Kalaeohia	At Papaeaiki	Destroyed	(Walker 1931:86)
81	Nakeikiikalalomakaiwa	At Makaiwa	Destroyed	(Walker 1931:86)
82	Kukuilono	Keanae Region: On point of Keanae peninsula	Destroyed or not found.	(Walker 1931:94)
83	Lalaola	Keanae Region: On point of Keanae peninsula	Destroyed or not found.	(Walker 1931:94)
84	Pakanaloa	Keanae Region: Upper slopes on point of Keanae peninsula.	Destroyed or not found. Said to have been a war heiau to Kanehekili.	(Walker 1931:94)
85	Lelewi	Keanae Region: At Koolau	Destroyed or not found.	(Walker 1931:94)
86	Paliuli	Keanae Region	Destroyed or not found.	(Walker 1931:94)
87	Kanekauolono	Keanae Region	Destroyed or not found.	(Walker 1931:94)
88	Kamokukupeu	Keanae Region	Destroyed	(Walker 1931:94)
89	Puuokohola	Keanae Region: At Honomanu	Destroyed or not found.	(Walker 1931:94)
90	Kawalimukala	Keanae Region: At Pauwahu	Destroyed or not found.	(Walker 1931:94)
91	Kupau	Koolau District: Kupau above the road in Keanae valley	Mostly destroyed, 84 feet of terrace wall remains.	(Walker 1931:94)

Literature Review for the Hana Highway, Route 360, Bridge Preservation within the Hana Highway Historic District

Walker Site #	Heiau Name	Locational Information	Description	Source
92	Kualani	Keanae Region: On top of ridge on west side of Waiokane Falls.	Destroyed or not found.	(Walker 1931:94)
93	Kamilo	Wailuanui Region: at Kawaloa on the north side of the stream in a dense grove of hau and puhala.	A small enclosure 22 x 25 feet built of rough basalt and some pebbles. Walls 3 feet high and 3 feet thick.	(Walker 1931:94)
94	Heiau of Ohia	Wailuanui Region: At Ohia in the valley three quarters of a mile from the sea.	Stones removed to build pig pen, and outlines thus lost. Probably an agricultural heiau built by a chief named Kaimuki.	(Walker 1931:94)
95	Kaluanui	Wailuanui Region: at Kaluanui on the east side of taro patches a third of a mile from the seas.	Enclosure with higher terraces on one side. Measures 15 x 29 feet and the terrace at the south end is 11 feet wide. The west side is 6 feet wide and 4 feet high.	(Walker 1931:95)
96	Kukuiaupuni	Wailuanui Region: At Pauvalu on the top of the slope 300 feet south of the road and 500 feet southwest of Keanae Elementary School.	Two platforms. This first is a terraced platform facing northwest by north with a height of 12 feet at this point. Platform measures 50 feet long by 42 feet wide. The second platform is about 200 feet away and measures 47 x 51 x 5 feet.	(Walker 1931:95)
97	Makehau	Wailuanui Region: At Makehau on a level piece of land ¼ of a mile from the Wailua Road and 150 feet in from the Makehau Road.	Said to have been a heiau of two platforms of which only the upper preserves much of its original outline 72 x 43 feet and five feet high	(Walker 1931:96)

Literature Review for the Hāna Highway, Route 360, Bridge Preservation within the Hāna Highway Historic District

Walker Site #	Heiau Name	Locational Information	Description	Source
98	Kaluakelea	Nahiku Region: at Honoluluui on the ridge just west of Makapipi gulch.	A heiau partly destroyed by the rubber plantation. It measures about 50 x 45 feet. At the northwest corner are three low terraces reaching a total height of 6 feet. No coral or pebbles seen.	(Walker 1931:99)
99	Pohoula	Nahiku Region: near the village of Nahiku on the east side of Makapipi Gulch.	A heiau of the open platform type facing the sea. It measures 72 x 72 x 65 x 64 feet and extends into the hill on the west and south sides. The height at the northeast corner is 8 feet and a wall runs along the east side 3 feet high and 4 feet thick. The platform is built of stream-worn stones and pebbles, but no coral. Two terraces form the top, the higher one being 36 x 25 feet and only a foot above the general level.	(Walker 1931:100)
100	Haleaka	Nahiku Section: on the east bank of Makapipi stream about 300 yards from the school.	A platform on a high hill. It is built up 4 feet on the front and 5 feet at the back, where it forms a wall. It is of rough construction with stream-worn stones inside, but cattle and pigs have destroyed any interior structures. At the northwest corner the slope is double terraced.	(Walker 1931:100)
101	Lanikele	Ulaino Region: On top of the bluff west of Lanikele gulch at the shore.	Walled structure with a commanding location of a stretch of shore from Huelo Point on the west to honokalani on the east. Measures 116 x 90 feet; walls are 6-	(Walker 1931:101)

Literature Review for the Hana Highway, Route 360, Bridge Preservation within the Hana Highway Historic District

Walker Site #	Heiau Name	Locational Information	Description	Source
			8 feet high and 12 feet thick. No interior structures of any kind.	
102 (*SIHP -100)	Piilanihale	West Honomalele Region: at the shore on a high hill near Kalahu Point.	The largest heiau found on Maui. A stone platform 340 x 425 feet, terraced in several steps on the north and east sides. Very probably it was the royal abode of the great Piilani family of Maui chiefs, who flourished in the 16th century.	(Walker 1931:103)
103	Kuakealii	Honokalani Region: about $\frac{3}{4}$ mile north of Waianapanapa Cave near the shore.	A large open platform not more than 4 feet high. Measures 90 feet on two sides, the other two being 85 and 110. The top is entirely paved with small pieces of lava and pebbles. Two pits possibly serving as refuse pits for the sacrificial altar. Small pits in several places around the edge appear to be image holes.	(Walker 1931:104)
104	Ohala	Honokalani Region: a quarter mile east of the road on the south side of the trail.	Low platform of rough construction standing 4 feet high. 110 feet long by 75 feet wide. No corals or pebbles in the pavement, which has been disturbed to form pits in many places. Drums are said to be heard from this heiau on certain nights.	(Walker 1931:105)
105	Kaniomoku	Kawaipapa Region: The cane lands above the road.	Mentioned by Thrum as the place where Kaahumanu spent her childhood. Her birthplace was in a large cave on the side	(Walker 1931:106)

Literature Review for the Hana Highway, Route 360, Bridge Preservation within the Hana Highway Historic District

Walker Site #	Heiau Name	Locational Information	Description	Source
			of Kauiki Hill on the bay. The heiau has been totally destroyed.	
106	Kawaipapa	Kawaipapa Region: The cane lands above the road.	A heigu located near the point where the road crosses the gulch of the same name. It was destroyed by building the road.	(Walker 1931:106)
107	Wikaloa	Kawaipapa Region: in the rough lava flow beyond the Mormon cemetery.	A single platform of rock 5 feet high, 75 feet long, 15 feet wide. No evidence of it being a heiau except it looks too large for a burial platform.	(Walker 1931:107)
108	Unknown	Kawaipapa Region: on Keanini Point beyond the factory, 100 feet from the shore.	Small heiau probably of the Kuula class. Little more than a level spot in the lava, 30 x 35 feet. The front is toward the bay. Likely a burial platform.	(Walker 1931:107)
109	Kauleiula	Kawaipapa Region: about 50 yards east of the site on the point of Nanualele.	A stone platform on a rise of ground 6-8 feet high. Mesasures 60 x 95 feet with additional 30 feet of level hill-top which may have been included in the heiau. Constructed of large lava chunks and water-worn boulders. Several terraced platforms, likely graves, are present on top of the heiau. An off angle house enclosure is present on the heiau as well. A large natural pond is located on the hill below, one of several in that vicinity.	(Walker 1931:109)

Walker Site #	Heiau Name	Locational Information	Description	Source
110	Kauleilepo	Kawaipapap Region: at Kainalimu on the point of rocks just north of Hana Bay	A twin or double heiau consisting of two elevated open platforms connected by a causeway. The larger measures 42 x 54 feet. The causeway is 25 feet long, 8 feet high, and 4 feet wide. The smaller platform is 22 x 26 feet. Constructed of water-worn boulders with pieces of aa lava and coral sprinkled over the top. Modern houses and sheds have been built on the front of the heiau thus destroying much of the surface of the platform.	(Walker 1931:109)
111	Honuaula	Wanunalua Region: Base of Kauiki Hill	War heiau built by King Hua-a-Pohukai na of Lahaina sometime during the early part of the 12 th century. Thrum speaks of Honuaula being built prior to the raid on Hawaii. All traces are now destroyed.	(Walker 1931:110)
112	Kuawalu	Wanunalua Region: Base of Kauiki Hill	War heiau built by King Hua-a-Pohukai na of Lahaina sometime during the early part of the 12 th century. On the successful return of the king he built Kuawalu, said to have measured 70 x 120 feet. All traces are now destroyed.	(Walker 1931:110)
113	Kaikaiea	Hana Region: The cane lands in the vicinity of Hana	Destroyed. Thrum says it was a medium-sized heiau.	(Walker 1931:111)

Walker Site #	Heiau Name	Locational Information	Description	Source
114	Kilinui	Hana Region: The cane lands in the vicinity of Hana	Destroyed. Thrum says it was a medium-sized heiau. Kilinui was said to be sacrificial.	(Walker 1931:111)
115	Lanakila	Hana Region: The cane lands in the vicinity of Hana	Destroyed. Thrum says it was a medium-sized heiau. Lanakila was said to be a place of refuge.	(Walker 1931:111)
116	Puuhoeuale	Hana Region: The cane lands in the vicinity of Hana	Destroyed. Thrum says it was a medium-sized heiau.	(Walker 1931:111)
117	Koahaepali	Alaemai Region: north of Ka Iwi of Pele on a hill in the midst of the canelands.	Open platform 60 x 66 x 30 feet with the back extending into the cane lands. Small enclosure at the southeast and from it a rough wall runs diagonally downhill.	(Walker 1931:111)
118	Luumaikaua	Haneoo Region: Located 200 yards east and 500 yards south of Ka Iwi O Pele hill.	Small heiau 18 x 25 feet, perched on a hilltop 25 feet above the cane land. The front is open to the sea and a rough terrace is at the top.	(Walker 1931:111)
119	Kahuwakahoku	Haneoo Region: on the shore near the large fishpond	An open platform of rough construction on which a house and modern sheds and graves have been placed. There is some coral and pebbles. The highest point of the platform from the ground is 4 feet.	(Walker 1931:111)
120	Kuluanui	Hamoia Region: at the east end of the rough papaia area 300 yards from the road.	High open platform 62 x 40 feet. Has the appearance of a truncated pyramid when viewed from the side. Resembles tapa-	(Walker 1931:112)

Literature Review for the Hana Highway, Route 360, Bridge Preservation within the Hana Highway Historic District

Walker Site #	Heiau Name	Locational Information	Description	Source
			drying platform on the rail to Nuu, Kaupo.	
121	Pakiokio	Hamoia Region at Mokae, located 100 yards east of the County Road near the house of a Japanese occupant named Weda.	An open terraced platform of a more irregular outline than many of the other heiau structures. It measures 40 x 120 ft. and has a paved walk approaching from the southwest corner.	(Walker 1931:113)
122	Unknown	Hamoia Region: just back of the house of Kalekaeo at the shore.	Small heiau platform 30 x 45 feet constructed of rough lava with a few beach pebbles or pieces of coral. May have been a kuula or fish heiau.	(Walker 1931:114)
123	Haleolono	Hamoia Region: in the center of the cane lands about a quarter of a mile up from the shore, 100 yards north of the Hamoia road.	Large heiau nearly 100 feet square and 10-15 feet high. A stone lined pit is in the northwest corner of the platform. A walled enclosure stands in the corner of the heiau wall, likely for the priest.	(Walker 1931:114)
124	Kaiwionole	Pukuilua Region	Destroyed when the road was built.	(Walker 1931:115)
125	Kahokuwelowelo	Pukuilua Region	Destroyed in cane lands above the road.	(Walker 1931:115)
126	Kakahau	Pukuilua Region: at Kihimaniania above the road about 200 yards	A roughly constructed high open platform measuring 65 x 20 x 33 feet. Height ranges from 10-20 feet. Some coral and pebbles found on the platform. Drums are also heard from this heiau.	(Walker 1931:115)

Walker Site #	Heiau Name	Locational Information	Description	Source
127	Ahoa	Pukuilua Region: On a rise of ground 500 yards above the road	Open terrace type of heiau measuring 110 feet across the front. Damaged during cultivation and the sides can only be traced back 26 feet. No coral or pebbles were seen. Drums are heard on the night of Kane.	(Walker 1931:116)
128	No Record	-	-	-
129	Haleokane	Koali Region: On a high bluff above Alaaula Gulch at the mouth on the west.	A platform heiau walled at the back only. It measures 40 x 55 feet. The back is unpaved and surrounded by a low wall on three sides. There are a few pebbles and pieces of coral in this enclosure. Drums are heard on the night of Kane.	(Walker 1931:117)
130	Haleolono	Koali Region: At Wainai east of Koali Heiau above the road.	A small rough stone platform 15 x 20 feet without coral or pebbles... it has been disturbed by plantation workers. It is said that music of flutes is heard first from this heiau and then from a similar one across Alaaula Gulch, of which nothing remains.	(Walker 1931:118)
131	Heiau at Koali	Koali Region: On the hill above the road on the east side of Wailua Gulch.	A large heiau 55 x 100 feet of the terraced platform type. It has a low wall on the northeast and northwest side. Large blocks of basalt are used to form the main platform which is paved with flat beach stones and pebbles in certain areas. A house enclosure is located in the	(Walker 1931:118)

Literature Review for the Hana Highway, Route 360, Bridge Preservation within the Hana Highway Historic District

Walker Site #	Heiau Name	Locational Information	Description	Source
			west corner indicating occupancy in recent times.	
132	Poomanini	Puaaluu Region: Near Hana road	Destroyed. The top of a small hill at Papaaluana just above the gate leading to Kaumakani was pointed out as a hill of refuge. There was no stone structure associated with it.	(Walker 1931:119)
133	Napua	Kaumakani Region: At Manekineki on the north side of Oheo Gulch near the waterfall.	Only a small section of rock-faced terrace can be seen... and cultivation has destroyed the rest. Informant J. Kamai said it was of the "Pookanaka class" and more powerful than any other heiau in Kipahulu.	(Walker 1931:119)
134	Wailoa	Alaenui Region: At Kukui about fifty yards above the road between the Catholic church and Oheo Gulch.	A series of terraces built against the side of a hill, disturbed by plantation activity. There is an enclosure on top built of stream worn stones which measures 25 x 60 feet in an irregular shape.	(Walker 1931:119)
135	Kanekauila	Kakalahale Region: Site of the present Catholic church just south of the road.	A large heiau of the open platform type measuring 220 feet long and 210 feet wide at the back. At the south corner the terracing facing has been built up 25 feet, but this facing has been greatly disturbed in the building of modern walls. The heiau is of rough lava construction and only at the southeast side can the pebble pavement be seen. The name	(Walker 1931:120)

Literature Review for the Hana Highway, Route 360, Bridge Preservation within the Hana Highway Historic District

Walker Site #	Heiau Name	Locational Information	Description	Source
			“Kanekaula” is said to mean “Lightning wielder.”	
136	Waihee	Halemano Region: Below the County Road on a hill near the shore.	A platform destroyed by the plantation.	(Walker 1931:121)
137	Mahinaula	Halemano Region: Just below the Kipahulu mill Makai of the road 150 yards.	A low platform built on a natural hill 5 feet high and 20 feet across and about 25 feet long. The stones have been removed for modern pigpens and stone walls, but some coral and pebbles were found on top. The heiau is said to have been of Hoouluu ai class.	(Walker 1931:121)
138	Maulili	Maulii Region: Half a mile west of the mill on the Makai side of the road.	An irregular shaped platform just below the road. The edge of the stone terrace is 4 feet high. In the southeast corner is a large enclosure and a smaller enclosure for a house stands at the west side. Blocks of basalt with pebbles and coral make up the construction of the terrace.	(Walker 1931:122)

3.2.2 Modern Archaeological Studies

A summary of modern archaeological investigations conducted in the vicinity of Hana Highway, Route 360, is available in Table 2 below, followed by a more thorough discussion of each study (Sections 3.2.2.1 through 3.2.2.5).

Table 2. Previous archaeological studies conducted along Hana Highway, Route 360.

Reference	Location	Description	SIHP Site # Identified
(Soehren 1963)	Portions of East Maui	Includes findings from the Keanae and Wailua area and Haleakala National Park. Attempts to relocate previously described sites were generally unsuccessful, however a large number of previously unrecorded sites were identified.	Numerous sites, including -539, the Wailuanui Complex, near current project corridor in Hana town.
(Kirch 1985)	Maui Island	Synthesis of Maui archaeology and prehistory.	-
(Nakkim 1970)	Hana Region	General or reconnaissance level surface survey, never formally published. 66 sites were described in various detail, from Ulaino Ahupuaa in the north to Puuiki Ahupuaa in the south.	-
(Duensing 2001)	Hana Belt Road	Consists of the Hana Highway Historic District extending from Hoalua Bridge near Huelo in the Makawao District to Koukouai Bridge in the Kipahulu District. 73 contributing feature components dating to over 50 years old: 59 bridges and 14 culverts.	-1638
(S. D. M. Freeman et al. 2004)	A portion of Hana Highway between mile posts 4.2 and 23.7	Archaeological monitoring for highway improvements. No historic or pre-contact sites identified.	-

Reference	Location	Description	SIHP Site # Identified
(McCurdy et al. 2014)	A portion of Hana Highway between mile posts 8.1 and 21.5	Field inspection for second phase of proposed improvements. Five previously unrecorded features of the Hana Belt Road, SIHP -1638, recorded, including a cut rock face portion of the road bed, cast concrete posts, and stacked lava retaining and headwalls.	-
(Sinoto and Pantaleo 1992)	26 mile corridor for a new waterline along Hana Highway from Waipioiki to Wailuku Ahupuaa	Archaeological inventory survey. No significant historic properties were identified.	-
(Dega 2003)	Hamakualoa District: TMK: 2-9-05: 10 (por.)	Archaeological assessment. No structures or cultural material observed.	-
(Pestana and Dega 2005)	Hamakualoa District: TMK: 2-9-05:023	Pedestrian inventory survey and subsurface testing program. No structures or cultural material observed.	-
(Conte 2005)	Huelo Point: TMK 2-9-07:052	Archaeological inventory survey. Six sites identified, consisting of multiple terraces and two remnant walls.	-5746 through -5751
(E. M. Fredericksen 2000)	West Hanawana: TMK: 2-9-11:18	Archaeological inventory survey. A previously identified historic agricultural site with irrigated taro terraces and possible house features was re-identified.	-4153
(D. L. Fredericksen and Fredericksen)	West Hanawana: TMK: 2-9-11:18	Second phase of archaeological inventory survey. A total of 52 newly identified features of SIHP -4153 were recorded.	-4153
(Perzinski et al. 2002)	West Hanawana: TMK 2-9-11:04 & 05	Archaeological inventory survey. An <i>auwai</i> (SIHP -5205) and <i>loi</i> (SIHP -5206) were identified along the foot of a <i>pali</i> . A carbon date of AD 990-1220 was obtained from sediments underlying a terrace retaining wall.	-5205 and -5206

Reference	Location	Description	SIHP Site # Identified
(Kennedy et al. 1992)	Hamakualoa District: TMK 2-9-10:3	Archaeological inventory survey with subsurface testing. Three sites recorded, including a set of five mounds (SIHP -3132), six agricultural terraces with two <i>auwai</i> and three walls (SIHP -3133), and (a complex of two irrigated terraces with one <i>auwai</i> and five wall segments (SIHP -3134).	-3132 through -3134
(Todd D. McCurdy and Hallatt H. Hammatt 2010)	Kolea Reservoir	Archaeological inventory survey. The Kolea Reservoir, a previously unrecorded historic property, was recorded at that time.	SIHP -6682
(Arnold et al. 2007)	Kolea Ahupuaa and Honomanu along Hana Highway	Archaeological monitoring for the installation of two emergency telephones. No cultural material was observed during any phase of the backhoe trench excavations.	-
(Group International et al. 1995)	Keanae and Wailuanui	Cultural landscape study. Recorded the intensive use of the Keanae and Wailuanui region for taro, identified three separate field systems, and noted the processes by which community cooperation led to the field system operation.	-3932 through -3938, -3940, and -3941
(E. M. Fredericksen and Fredericksen 2004b)	Keanae Park	Archaeological monitoring of the restroom improvement project. Encountered subsurface agricultural deposit containing fine clay, charcoal, and weathered marine shell fragments.	SIHP -5534
(Hill et al. 2008)	Keanae School	Archaeological monitoring of the schoolyard. No new historic properties documented.	-
(A. Haun and Henry 2003)	Pauwahu in Wailuanui Ahupuaa: TMK: 1-1-008:015, 023	Archaeological inventory survey. One historic property identified, consisting of an overhang (AD 1420-1650) and trail.	-5237

Reference	Location	Description	SIHP Site # Identified
(Palama 1981)	Wailua Homesteads	Archaeological field inspection. No new historic properties identified.	-
(Donham 2005)	Keanae: TMK 1-2-01:04	Archaeological assessment. No significant findings.	-
(Hammatt and Shideler 2003)	Wailuaiki stream gage along Wailuaiki Road	Field inspection. No sites or concerns noted.	-
(Kennedy 1986)	Wailuaiki hydroelectric along a Civilian Conservation Corp trail	Archaeological investigations. No sites identified but informants alluded to a number of different types of sites in the area, including: 1) “an important cave with a feather cloak inside”, 2) “a number of old and important <i>heiau</i> ”, 3) contemporary lean-to shelters associated with pig hunting or plant gathering, 4) a shrine established in the 1930s by a Hawaiian worker who “brought his god with him”, 5) shrines associated with <i>wauke</i> (<i>Broussonetia papyrifera</i>) and <i>olona</i> (<i>Touchardia latifolia</i>), and 6) canoe builders shrine associated with <i>koa</i> (<i>Acacia koa</i>) tree removal.	-
(E. M. Fredericksen 2007a)	Puaa Kaa State Park	Archaeological monitoring for wastewater system improvements. No cultural material remains identified.	-
(Madeus and Fredericksen 2006)	Nahiku: TMK 1-2-01:26	Archaeological inventory survey. One historic property identified consisting of two features, a low platform and retaining wall.	-5961
(E. M. Fredericksen and Fredericksen 1998)	Nahiku: TMK 1-2-02: 26	Archaeological inventory survey. Eleven sites identified, including agricultural enclosures, terraces, walls, habitation areas, shelters, five probable burials, and a shrine. Pohoula Heiau (SIHP -99) was re-located within the project parcel.	-99, -4514 through -4520, -4522, -4523 and -4548

Reference	Location	Description	SIHP Site # Identified
(Sinoto et al. 2001)	Nahiku between Kuhiwa Gulch and Kahakapuaa Gulch: TMK 1-2-03:21	Archaeological inventory survey. A large enclosure and rectangular depression (SIHP -5056), as well as a lithic surface scatter (SIHP -5057) identified during survey.	-5056 and -5057
(Kouneski and Kennedy 2006)	Nahiku Homesteads: TMK 1-2-02: 50	Archaeological assessment. No cultural material or historic features were observed.	-
(W. M. Fredericksen and Fredericksen 1978:1)	Upper Nahiku: TMK 1-2-04:007	Archaeological survey. Examined six power pole installation locations, none of which contained any observed archaeological surface remains.	-
(R. H. Cordy 1970)	West Ahupuaa: Piilanihale Heiau	Phase I of the Piilanihale Heiau Project, consisting of clearing and mapping the <i>heiau</i> and locating and mapping surrounding sites. Twelve additional features were identified that were not directly related to the <i>heiau</i> , including house platforms, graves, pits, enclosures, and walls.	-100
(Kolb 1990)	West Ahupuaa: Piilanihale Heiau	Series of excavations at the site. Data obtained during testing led to the conclusion that the structure had been built in four major building stages.	-100
(Kam 1984)	Hana Airport: TMK 1-3-03:22	Site inspection for a clearance and fencing project. No archaeological features identified within the project area, although a Hawaiian foot-trail observed adjacent, along the coast.	-
(Hill 2006)	Hana Airport: TMK 1-3-003:022-040	Field inspection. No remnant archaeological features observed	-
(Hill 2007)	Hana District: TMK: 1-3-009:097	Surface inspection. No cultural remains or features observed.	-

Reference	Location	Description	SIHP Site # Identified
(Gregg et al. 2005)	Kauamanu Ahupuaa: TMK 1-3-09:80	Archaeological inventory survey. Identified one historic property consisting of two segments of a historic sugarcane railroad constructed at some point after 1883 by the Kealeku Sugar Company.	-5674
(Chun and Dillon 2009a)	Hana District: TMK 1-3-009: 099	Field inspection. No surface features identified.	-
(Chun and Dillon 2009b)	Hana District: TMK 1-3-009: 089	Field inspection. No surface features identified.	-
(Bushnell and Hammatt 2000)	Kawela Ahupuaa: TMK 1-3-03:15	Archaeological inventory survey. No archaeological remains identified.	-
(Estioko-Griffin 1988a)	Ka'ealeku Lava Tube	Field inspection. The entrance proved unsafe, however, and no inspection was made of the interior. Human burials were reported by local informants.	-1813
(Donham 1996)	Ka'ealeku Lava Tube	Field inspection. Large quantities of cattle remains found disposed at the southernmost opening of the cave. Other cultural modifications included three stone cairns and a possible excavation area into a ceiling collapse pile. No human burials observed.	-1813
(Dixon 1998)	Kaeleku Ahupuaa: cinder pit located at the base of Puu Olopawa	Field inspection. A human cranium without mandible was recovered during excavations for cinder. It was suggested that the remains might be associated with the construction of a plantation-era irrigation tunnel in the vicinity. Because there was no evidence for more burials and the cranium seemed to be an isolated find, recommendations were given for no further archaeological work.	-

Reference	Location	Description	SIHP Site # Identified
(Pearson 1970)	Honokalani and Waianapanapa State Park	Preliminary survey of the park identified approximately 34 archaeological features, including a <i>heiau</i> , five cave shelters, a pre-contact trail, one pictograph, six <i>ahu</i> , two U-shaped shelters, five miniature enclosures, three shelter walls, two house platforms, and three cemeteries that had been apparently divided by either familial or religious affiliation, as well as several other wall segments or enclosures. Also noted the presence of an additional graveyard on State-owned lands to the west of the park.	-1230
(Morton and Lum Ho 1975)	Honokalani	Observations on the burial complex on the coast between Hana airport and Waianapanapa State Park noted by Pearson. Site describes as including terraces, a trail, platforms, and associated caves.	-1230
(Kennedy 1984)	Honokalani	Archaeological inventory survey. Identified and mapped a total of 368 features at the burial complex noted by Pearson and observed by Morton and Lum Ho. Features included filled areas between lava flows, above-ground burial platforms, <i>ahu</i> , incomplete or unfinished graves, and a possible religious structure.	-1230
(A. E. Haun et al. 2004)	Waianapanapa State Park	Archaeological inventory survey. Relocation of most of the historic properties originally identified by Pearson, as well as a few newly identified properties and features. In total, 59 properties identified including 29 enclosures, 14 walls, 10 cairns, 10 terraces, eight pavements, six platforms, five trails, five caves, five uprights, four U-shapes, four L-shapes, four mounds, three overhangs, three alignments, three cemeteries, two C-shapes, one cupboard, a modified outcrop, a	-5340 through -5398

Literature Review for the Hana Highway, Route 360, Bridge Preservation within the Hana Highway Historic District

Reference	Location	Description	SIHP Site # Identified
		pictograph and petroglyphs. The earliest radiocarbon date retrieved indicated that settlement within the area occurred as early as the late 1200s, while other dates indicate occupation between the 1400s and mid-1600s.	
(E. M. Fredericksen 2007b)	Waianapanapa State Park	Archaeological monitoring. No significant findings.	-
(O'Claray-Nu et al. 2011)	Waianapanapa State Park	Archaeological monitoring. Seven possible subsurface features were documented, consisting of marine midden and <i>ili ili</i> deposits, remnant rock wall features, and a remnant-fire pit. No new SIHP numbers were assigned to these features due to stratigraphic disturbance and loss of context, in some cases, and association with previously documented sites (SIHP -5380, -5389, -5392, and -5395).	-5380, -5389, -5392, and -5395
(Dagher and Dega 2014)	Hana District: TMK 1-3-005:013	Archaeological assessment. Negative findings.	-
(Dagher and Dega 2012)	Hana District: TMK 1-3-005:034	Archaeological assessment. Negative findings.	-
(Bevacqua 1972)	Hana High and Elementary School	Initial walk through survey. Noted one archaeological habitation site in a corner of the school campus that had been previously disturbed by bulldozing.	-
(E. M. Fredericksen and Fredericksen 2004a)	Hana High and Elementary School	Archaeological assessment. No significant remains were observed but a possible rock enclosure was noted in the vicinity of a planned leach field installation.	-
(Todd D. McCurdy and Hallett H. Hammatt 2010)	Hana High and Elementary School	Archaeological monitoring. No cultural materials or features observed.	-

Literature Review for the Hana Highway, Route 360, Bridge Preservation within the Hana Highway Historic District

Reference	Location	Description	SIHP Site # Identified
(Pantaleo 2006)	Hana Town: TMK 1-3-004:008	Archaeological inventory survey. No significant findings.	-
(Landrum 1984)	Kawaipapa Ahupuaa	Archaeological reconnaissance and historical survey. No historic properties identified, but an abandoned segment of the old government road and historic roadside refuse along a dump access road were observed.	-
(E. M. Fredericksen 2003)	Hana Landfill	Archaeological assessment. No significant finds	-
(A. E. Haun and Henry 2014)	Kawaipapa Ahupuaa: TMK 1-3-004:001	Archaeological inventory survey. A total of 26 sites documented, consisting of agricultural pits, walls, terraces, modified outcrops, mounds, enclosures, surface scatters, platforms, pavements, and historic ranching features including troughs, a basin, a foundation, a railroad grade, and a road.	-4964, and -6527 through -6551
(Cleghorn and Rogers 1987)	Hana Ranch Lands	Preliminary archaeological and historic investigations consisted of compiling a list of known sites, analysis of aerial photographs, and a brief field inspection. Documented four sites, including -4007, a stone-lined depression; -4008, a terraced platform and a small rock shelter; -4009, a possible <i>heiau</i> consisting of a large earthen terrace with a possible stone paving and sloping walls on three sides; and -4010, an area of deteriorated terrace remnants in the pasture.	-4007 through -4010
(Kennedy 1990)	Kainalimu Bay	Archaeological reconnaissance. Identified Walker Site 109, Kauleiula Heiau.	-
(Chun and Dillon 2006)	Hana Bay: TMK 1-3-007:001 (por.) and 003	Archaeological assessment. Negative results, despite the proximity of the project location to the beach.	-

Literature Review for the Hana Highway, Route 360, Bridge Preservation within the Hana Highway Historic District

Reference	Location	Description	SIHP Site # Identified
(Henry and Graves 1993)	Hana Medical Center	Archaeological inventory survey. Identified four historic properties consisting of two complexes and two boundary walls.	-3150 through -3153
(Wulzen et al. 1996)	Hana Medical Center	Data recovery of SIHP -3150 yielded 177 portable artifacts, primarily historic in nature. Final analysis and interpretation indicated that the site was likely used for a limited range of domestic activities.	-3150
(Perzinski and Dega 2009)	Hana Highway by the Hana Fire Department: TMK 1-4-006: 999	Archaeological inventory survey. Two features documented associated with historic Hana Belt Road, SIHP -1638, consisting of a historic bridge and a basalt lined culvert.	-1638
(W. M. Fredericksen et al. 1993)	Hana Fire Station: TMK 1-4-06:002	Archaeological inventory survey. No cultural material remains or historic properties identified.	-
(Estioko-Griffin 1988b)	Kawaipapa Complex	Field inspection for fishpond rehabilitation project resulted in the relocation of the pond and one of two previously recorded habitation caves, in addition to a wall segment, an additional cave, and one artifact consisting of a drilled trumpet shell.	-1485
(McQuagge 1990)	Hana Cultural Center	Archaeological survey adjacent to Hana Courthouse property. Historic material was encountered in trash pits located during hand testing, indicating previous use as a house site first occupied circa W.W.I. and continuing into the 1950s.	-1626
(E. M. Fredericksen and Fredericksen 2002)	Hana Ballpark: TMK 1-4-02: 021	Archaeological monitoring. Unidentified burial site encountered. One pecking stone, two hammerstones, a 1940 U.S. penny, an Indian head nickel, ceramic sherds from a single small bowl, and a rectangular screw top pint liquor	-5190

Literature Review for the Hana Highway, Route 360, Bridge Preservation within the Hana Highway Historic District

Reference	Location	Description	SIHP Site # Identified
		bottle were all collected from imported fill back dirt piles across the site.	
(Bordner 1981)	Hana Ballpark: TMK 1-4-02: 021	Archaeological reconnaissance and subsurface testing. no indications of archaeological or historic cultural activity observed.	-
(Chaffee and Dega 2004)	Hana Town Center: TMK 1-4-03: 056	Archaeological inventory survey resulted in documentation of refuse area containing bottle glass from the late 1800s to early 1900s.	-5546
(Perzinski and Dega 2011)	Hana Town: TMK 1-4-03:09 (por.)	Archaeological inventory survey. One historic property identified consisting of a historic terrace constructed of stacked cobbles and boulders.	-6807
(Sinoto 1985)	Hana Ranch Garden Cottages	Archaeological reconnaissance survey, conducted due to proximity of SIHP -1482, Kauiki Hill. No surface remains identified.	-
(Pietrusewsky 1989)	Kauiki Hill Beach	Inadvertent find: a human skull was collected by the Hana Police.	-

3.2.2.1 East Maui and Hana Regional Studies

The Bishop Museum conducted a survey of several portions of East Maui under contract with the National Park Service in 1963 in order to supplement the earlier studies and more accurately document known and newly identified sites in the region (Soehren 1963). While no map is available depicting the overall survey areas, the report includes findings from the Keanae and Wailua area and Haleakala National Park. Attempts to relocate previously described sites were generally unsuccessful, however a large number of previously unrecorded sites were identified during the survey (Soehren 1963:v). Estimated locational information and uniform site records, including site maps, were compiled for all of the sites recorded during the survey.

In 1985, Patrick Kirch provided a synthesis of Maui archaeology and prehistory and lamented that there had, as yet, been no intensive archaeological studies conducted in the Hana area: Hana being considered as one of the major Maui centers of late prehistoric population concentration and political development (Kirch 1985:134-144).

Lynn Nakkims survey of the Hana area constituted a general or reconnaissance level surface survey, but was never formally published (Nakkim 1970). In all 66 sites were described in various detail, from Ulaino Ahupuaa in the north to Puuiki Ahupuaa in the south. Nakkim also included environmental, historical, and oral history information concerning the Hana area.

3.2.2.2 The Hana Belt Road

The Hana Belt Road, SIHP 50-50-(7, 12, 13, 16 and 17)-1638, consists of the Hana Highway Historic District extending from Hoalua Bridge near Huelo in the Makawao District to Koukouai Bridge in the Kipahulu District. In 2001, the Hana Belt Road was nominated and added to the National Register of Historic Places (Duensing 2001). Within the Hana Highway Historic District are 73 contributing feature components dating to over 50 years old. Of these 73 contributing features, 59 are bridges and 14 are culverts (Duensing 2001:3, 17, 25-32).

Forty three of the 59 bridges along the Hana Belt Road are under the jurisdictions of the State of Hawaii, located within the Hana Highway Historic District between Hoalua Bridge and the southern border of Hana town, as well as 12 of the 14 culverts. This portion of the Hana Belt Road is considered part of Hana Highway (Route 360). The remaining 16 bridges and two culverts are under the jurisdictions of the County of Maui and are located south of Hana town to Koukouai Bridge in Kipahulu, along what is now known as Piilani Highway (Route 31).

In 2004 (S. D. M. Freeman et al.), Cultural Surveys Hawaii, Inc. conducted archaeological monitoring of a portion of Hana Highway between mile posts 4.2 and 23.7 for highway improvements (Figure 6 through Figure 17). No historic or pre-contact sites were identified during monitoring. In 2014 a field inspection was completed for the proposed improvements in the second phase of the project between mile posts 8.1 and 21.5 (Figure 6 and Figure 8). Five previously unrecorded features of SIHP -1638, the Hana Belt Road, were recorded during the inspection, including a cut rock face portion of the road bed, cast concrete posts, and stacked lava retaining and headwalls (McCurdy et al. 2014).

3.2.2.3 Hamakualoa District

Sinoto and Pantaleo (1992) conducted an archaeological inventory survey covering an approximate 26 mile corridor for a new waterline along Hana Highway from Waipioiki to Wailuku Ahupuaa (Figure 6). No significant historic properties were identified.

An archaeological assessment of a portion of TMK: 2-9-05: 10 was conducted in 2003 (Dega 2003), and a parcel located approximately 300 m to the east (TMK: 2-9-05:023), was subject to a pedestrian inventory survey and subsurface testing program in 2005 (Pestana and Dega) (Figure 6). No structures or cultural material of any kind were identified during either survey.

In 2005, an archaeological inventory survey (Conte) was conducted for a large 20 acre parcel at Huelo Point (TMK 2-9-07:052) (Figure 6). Six sites were identified during survey (SIHP -5746 through -5751), consisting of multiple terraces and two remnant walls (Figure 7). While only these six sites were documented during the course of this survey, it is believed that other archaeological sites may have been present preceding grubbing and grading activity permitted by the County of Maui prior to SHPD review (Conte 2005:51).

Frederickson (2000) conducted the first phase of an archaeological inventory survey on a parcel (TMK: 2-9-11:18) in West Hanawana near the mouth of Hanawana Stream (Figure 6). A previously identified historic agricultural site with irrigated taro terraces and possible house features (SIHP -4153) was re-identified on Fredericksons study parcel (Figure 7). These features were partially mapped by Frederickson for informational purposes. Two test units were excavated within a terrace, and two charcoal samples were radiocarbon dated, both returning a date range of A.D. 1425-1665 (E. M. Fredericksen 2000:10). Frederickson also notes that many features are present in the immediate area though they extend beyond the property boundaries of his study area.

In 2003 the second phase of the inventory survey was completed (D. L. Fredericksen and Fredericksen). A total of 52 newly identified features of SIHP -4153 were recorded, the majority of which consist of agricultural terraces. Cultural material remains recovered during subsurface testing yielded basalt lithic material in the northern portion of the property, nearest to the ocean, suggesting use of the area as a lithic reduction area that possibly also served as a fishing station. A possible burial was identified during testing as indicated by the exposure of a large flat water worn boulder and possible pit outline. Radiocarbon dates from charcoal samples collected during hand testing indicate occupational dates ranging from the 15th to 17th century, with some areas in use through modern times (D. L. Fredericksen and Fredericksen 2003).

Perzinski and others (2002) conducted an archaeological inventory survey in West Hanawana Ahupuaa in the Hanawana Stream Valley (Figure 6). Two historic properties were identified: Site -5205 and -5206 (Figure 7). SIHP-5205 is an *auwai* and SIHP -5206 is a *loi*. Both sites run along the foot of a *pali*, as does the tributary stream that supplies them. The two sites are situated on an alluvial terrace of Hanawana stream. A carbon date of AD 990-1220 was obtained from sediments underlying a terrace retaining wall.

Kennedy and others (1992) conducted an archaeological inventory survey with subsurface testing at TMK 2-9-10:3, located on the *mauka* side of Hana Highway (Figure 6). Three sites were identified (Figure 7) during the survey including SIHP -3132 (a set of five mounds), SIHP -3133 (six agricultural terraces with two *auwai* and three walls), and SIHP -3134 (a complex of two irrigated terraces with one *auwai* and five wall segments) (Kennedy et al. 1992:1).

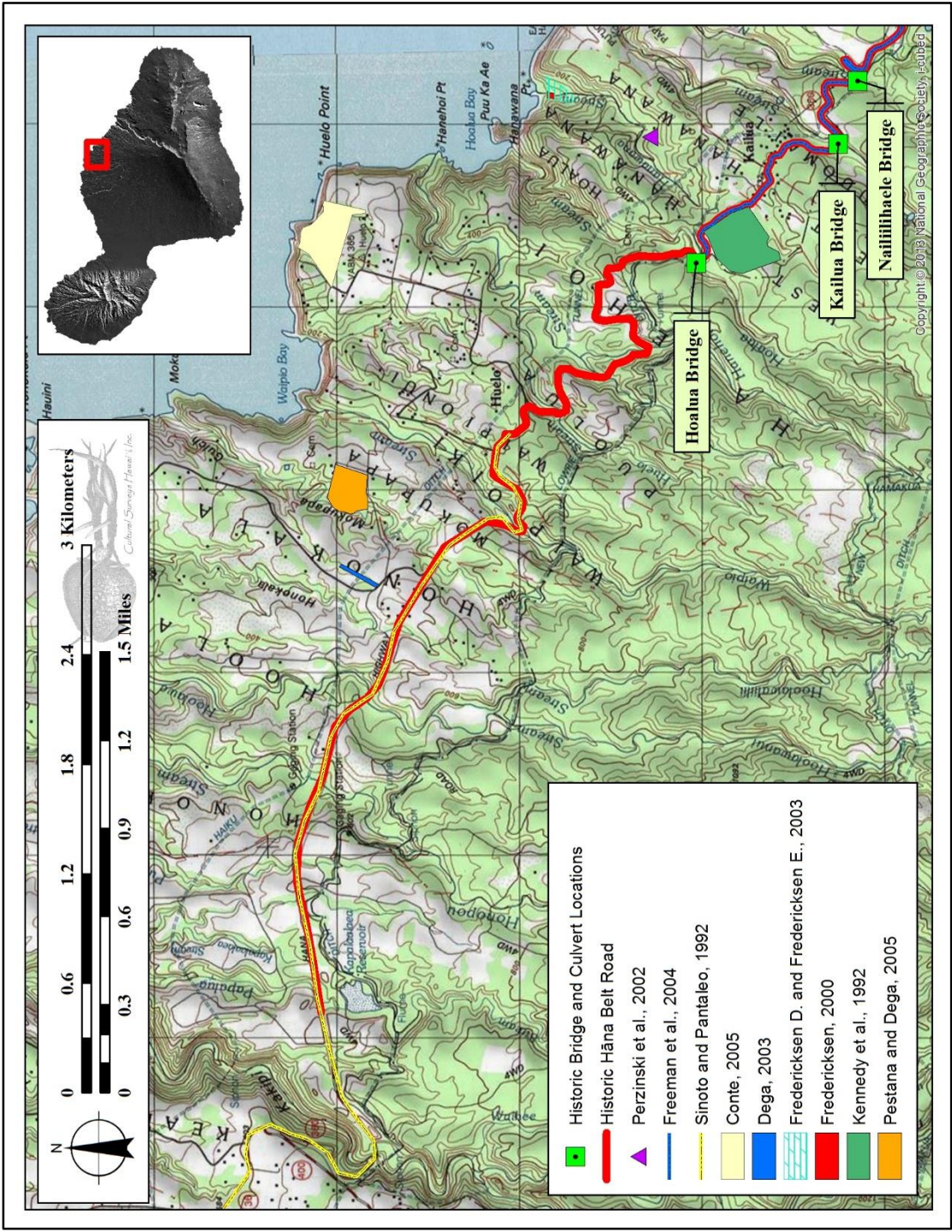


Figure 6. A portion of the U.S.G.S 7.5-minute topographic map, Haiku quadrangle, showing previous archaeological studies conducted in the Hamakualoa Region near the project corridor (shown in red).

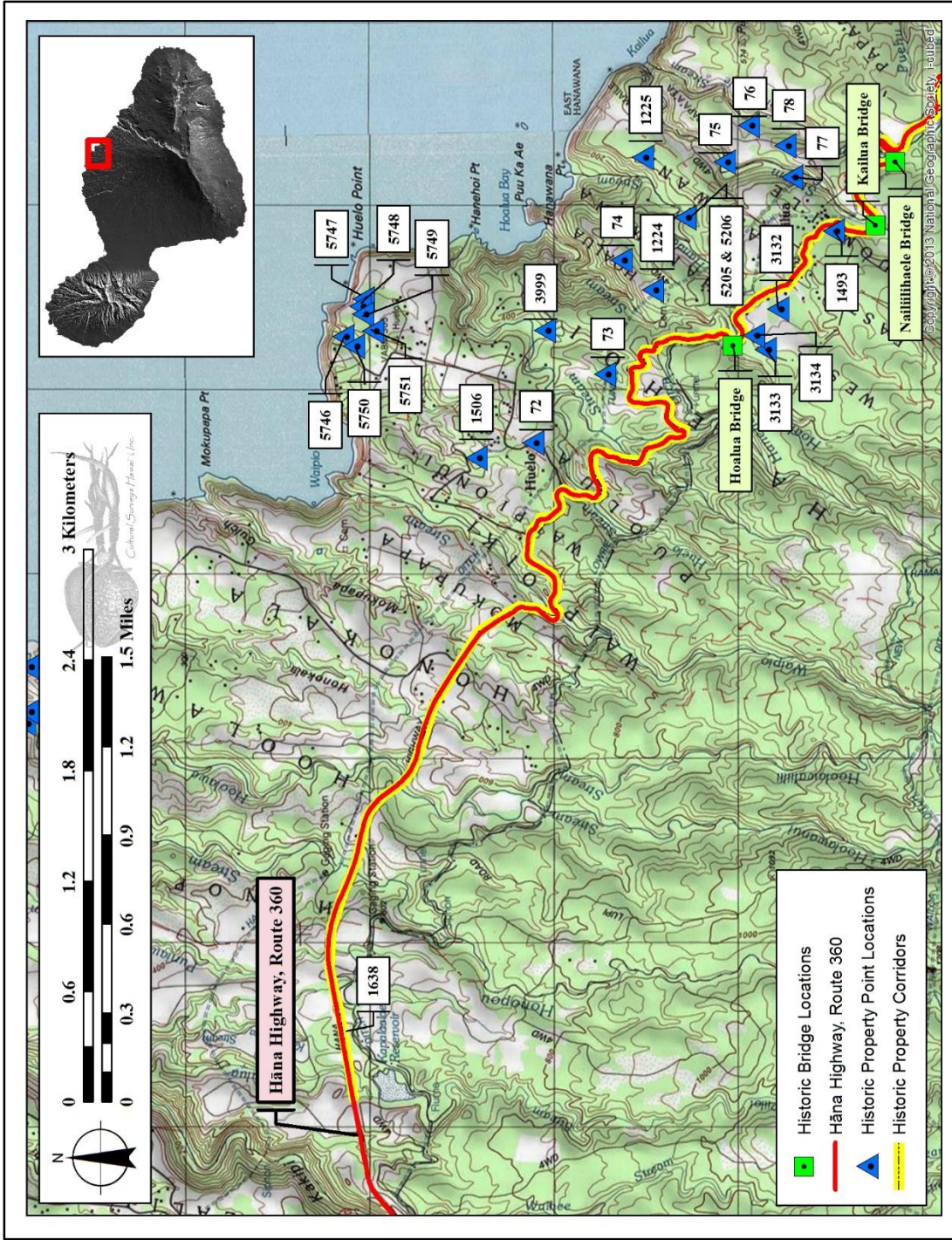


Figure 7. A portion of the U.S.G.S 7.5-minute topographic map, Haiku quadrangle, showing previously identified historic properties located in the Hamakualoa Region near the project corridor, and in relation to historic bridges (labeled).

Literature Review for the Hana Highway, Route 360, Bridge Preservation within the Hana Highway Historic District

3.2.2.4 Koolau District

Cultural Surveys Hawaii, Inc. performed an archaeological inventory survey in Kolea Ahupuaa at the Kolea Reservoir on the west side of Kolea Stream (Figure 8). The Kolea Reservoir (SIHP - 6682), a previously unrecorded historic property, was recorded at that time (Todd D. McCurdy and Hallatt H. Hammatt 2010) (Figure 9).

In 2007 Cultural Surveys Hawaii conducted archaeological monitoring for the installation of two emergency telephones along Hana Highway, one in Kolea Ahupuaa and the other in Honomanu (Figure 8). No cultural material was observed during any phase of the backhoe trench excavations (Arnold et al. 2007:29).

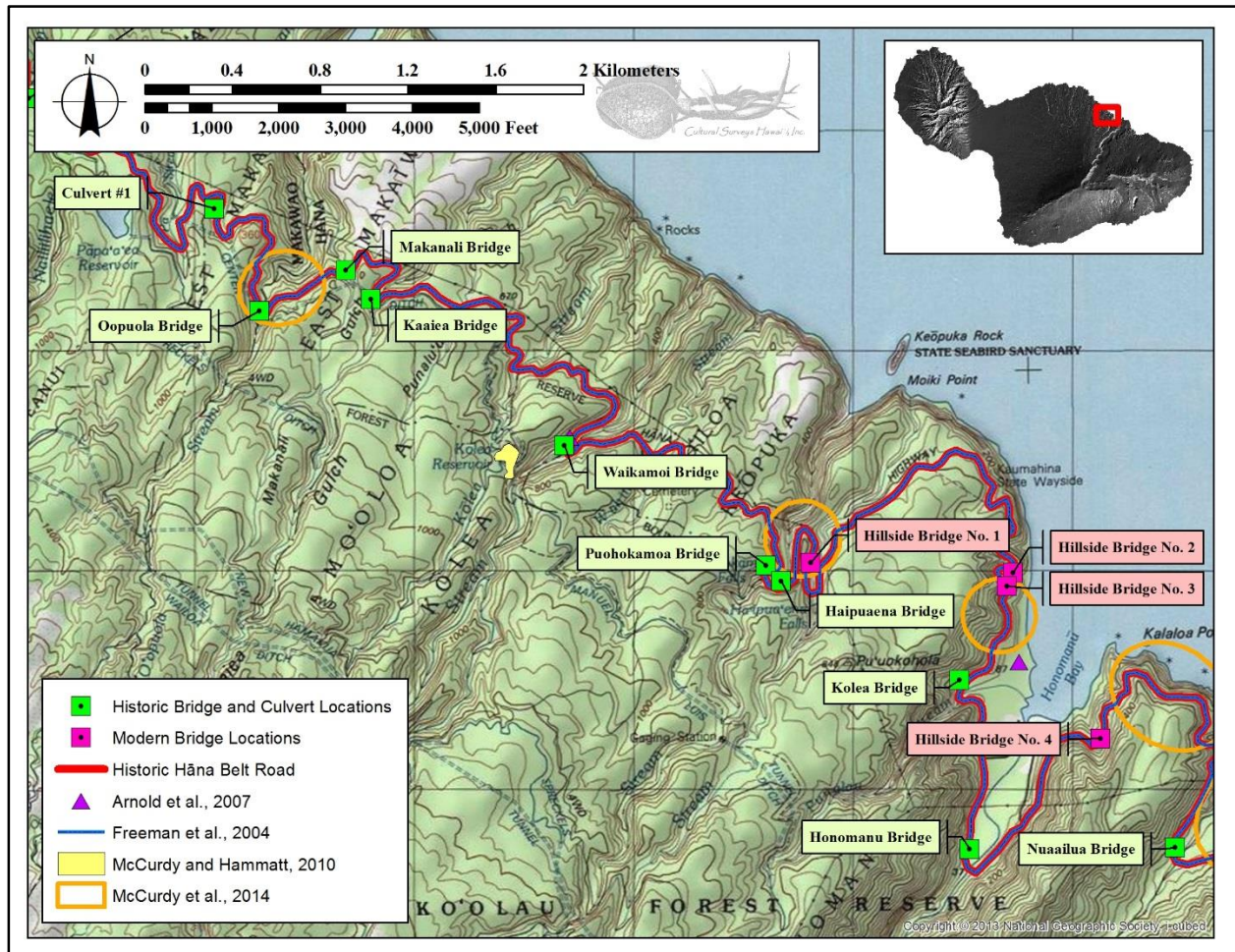


Figure 8. A portion of the U.S.G.S 7.5-minute topographic map, Keanae quadrangle, showing previous archaeological studies conducted in the northwestern portion of the Koolau District near the project corridor (shown in red).

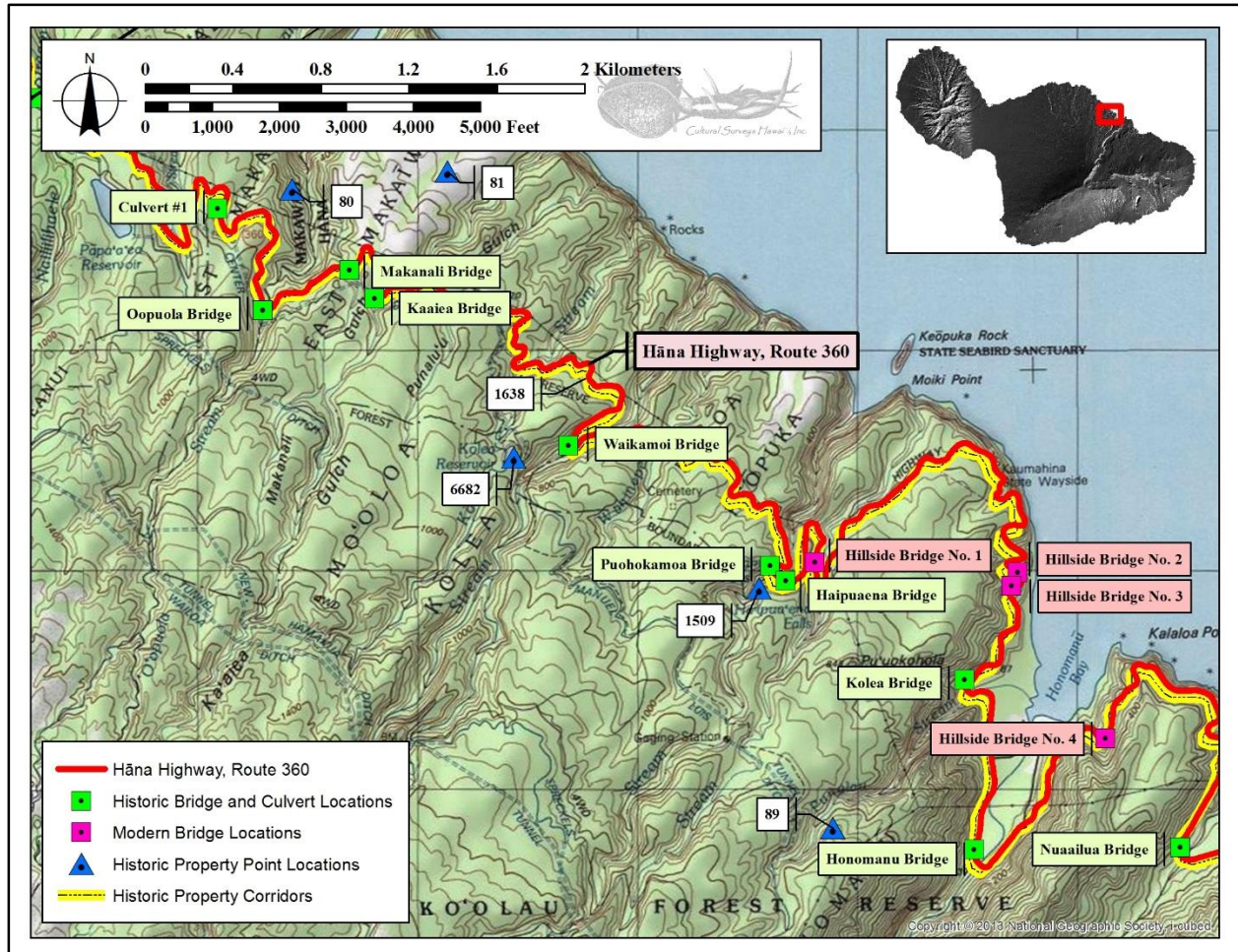


Figure 9. A portion of the U.S.G.S 7.5-minute topographic map, Keanae quadrangle, showing documented previously identified historic properties located in the northwestern portion of the Koolau District near the project corridor (shown in red), and in relation to historic and modern bridges (labeled).

3.2.2.4.1 *Ke anae Vacinity*

A 1995 cultural landscape study by Group 70 International, Inc., Davianna McGregor, and Cultural Surveys Hawaii, Inc. recorded the intensive use of the Keanae and Wailuanui region for taro (Figure 10 and Figure 11), identified three separate field systems, and noted the processes by which community cooperation led to the field system operation (Group 70 International et al. 1995). According to the cultural landscape study, over 490 LCAs claimed taro patches of various sizes at Keanae and Wailuanui during the mid-19th century Great Mahele. Several LCAs included claims for pools and fishponds.

Monitoring of the Keanae Park restroom improvement project revealed a subsurface agricultural deposit, SIHP -5534 (Figure 11), containing fine clay, charcoal, and weathered marine shell fragments (E. M. Fredericksen and Fredericksen 2004b) (Figure 10). The layer was encountered at 50-65 cm below the park surface. The proximity of a possible stream or *auwai* observed nearby suggests that the deposit was associated with irrigated rather than dry-land agriculture. Radiocarbon dates derived from collected charcoal samples yielded date ranges from A.D. 1410-1630 (E. M. Fredericksen and Fredericksen 2004b:4-5).

More recently, Cultural Surveys Hawaii performed archaeological monitoring services within the boundaries of the 3.53-acre schoolyard of Keanae School (Hill et al. 2008) (Figure 10). The government-mandated improvements required subsurface excavation to install a new septic tank and other appurtenant facilities, and to render inert the existing cesspool. The location of the septic tank improvements was planned to replace the existing cesspool, and to tie in to existing service pipelines. No new historic properties were documented during the monitoring operations.

Haun and Henry (2003) conducted an archaeological inventory survey of approximately 4 acres at TMK: 1-1-008:015, 023 in Pauwalu in Wailuanui Ahupuaa (Figure 10). The inventory survey resulted in the identification of one historic property, SIHP -5237 (Figure 11), consisting of an overhang (Feature A) and trail (Feature B). The overhang was interpreted as a pre-contact temporary habitation shelter that was occupied between AD 1420-1650 and the trail as a transportation route.

Soehren (1963) conducted an archaeological inventory survey of portions of east Maui, including Keanae and Wailua Ahupuaa. The survey identified SIHP-539, Wailuanui Complex (Figure 11), which covers about 520 x 180 meters and includes 15 graves along with 2 possible house sites. More features in the area were observed, however, time did not allow the inventory team to map or record them. Most of the features are located within 25 meters of the edge of the cliff.

Stephen Palama (1981) conducted an archaeological field inspection of approximately 3.16 acres within Wailua Homesteads (Figure 10). This cursory field inspection did not locate any new historic properties.

Personal communication with the Maui SHPD Assistant Archaeologist, Jenny Pickett, indicates the presence of a culturally sensitive area within Wailuanui Ahupuaa that has not yet been documented (Jenny Lyn Pickett 2014). Attempts to organize a visit to the site with SHPD were made by CSH in order to gather location data, but as of the writing of this report it has not been possible to coordinate a field visit. It should be noted here, however, that this culturally sensitive area is present and known to the SHPD Maui office.

An archaeological assessment was conducted of two proposed locations within TMK 1-2-01:04 in 2005 for construction of a plant nursery and dwelling (Donham 2005) (Figure 10). No historic properties were identified during the walk through or subsequent subsurface testing.

In 2003, Cultural Surveys Hawaii conducted a field inspection of the proposed Wailuaiki stream gage relocation along Wailuaiki Road (Hammatt and Shideler 2003) (Figure 10). No archaeological sites or historic preservation concerns were noted during the inspection.

Joseph Kennedy (1986) conducted archaeological investigations for a proposed east and west Wailuaiki hydroelectric project (Figure 10). This investigation studied a strip along a Civilian Conservation Corp trail. Joe Kennedy identified no sites in the field but reports his inquiry of a number of parties, including former CCC worker and EMI employee Jimmy Hueu (then age 71), well-known *kupuna* Uncle Harry Mitchell, pig hunters, EMI employees, and other members of the Keanae/Wailuanui community regarding archaeological sites in the vicinity. Informants alluded to a number of different types of sites including: 1) “an important cave with a feather cloak inside”, 2) “a number of old and important *heiau*”, 3) contemporary lean-to shelters associated with pig hunting or plant gathering, 4) a shrine established in the 1930s by a Hawaiian worker who “brought his god with him”, 5) shrines associated with *wauke* (*Broussonetia papyrifera*) and *olona* (*Touchardia latifolia*), and 6) canoe builders shrine associated with *koa* (*Acacia koa*) tree removal. The informant testimony lead Kennedy to recommend that archaeological monitoring be associated with any build-out of the proposed hydroelectric project.

Xamanek Researches reported on archaeological monitoring for wastewater system improvements at Puua Kaa State Park in Nakapehu Ahupuaa in 2007 (E. M. Fredericksen) (Figure 10). No evidence of cultural material remains was identified during the monitoring program.

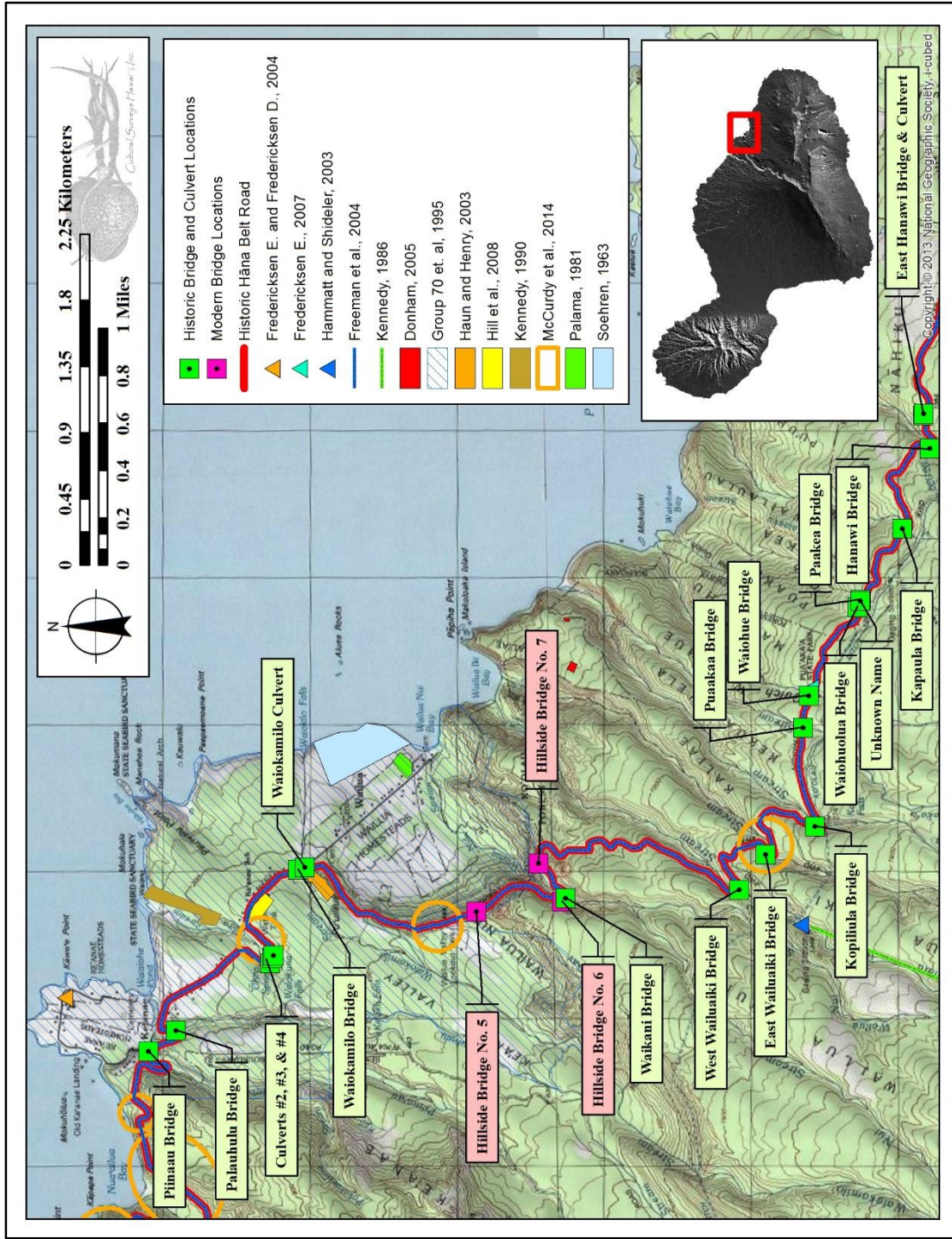
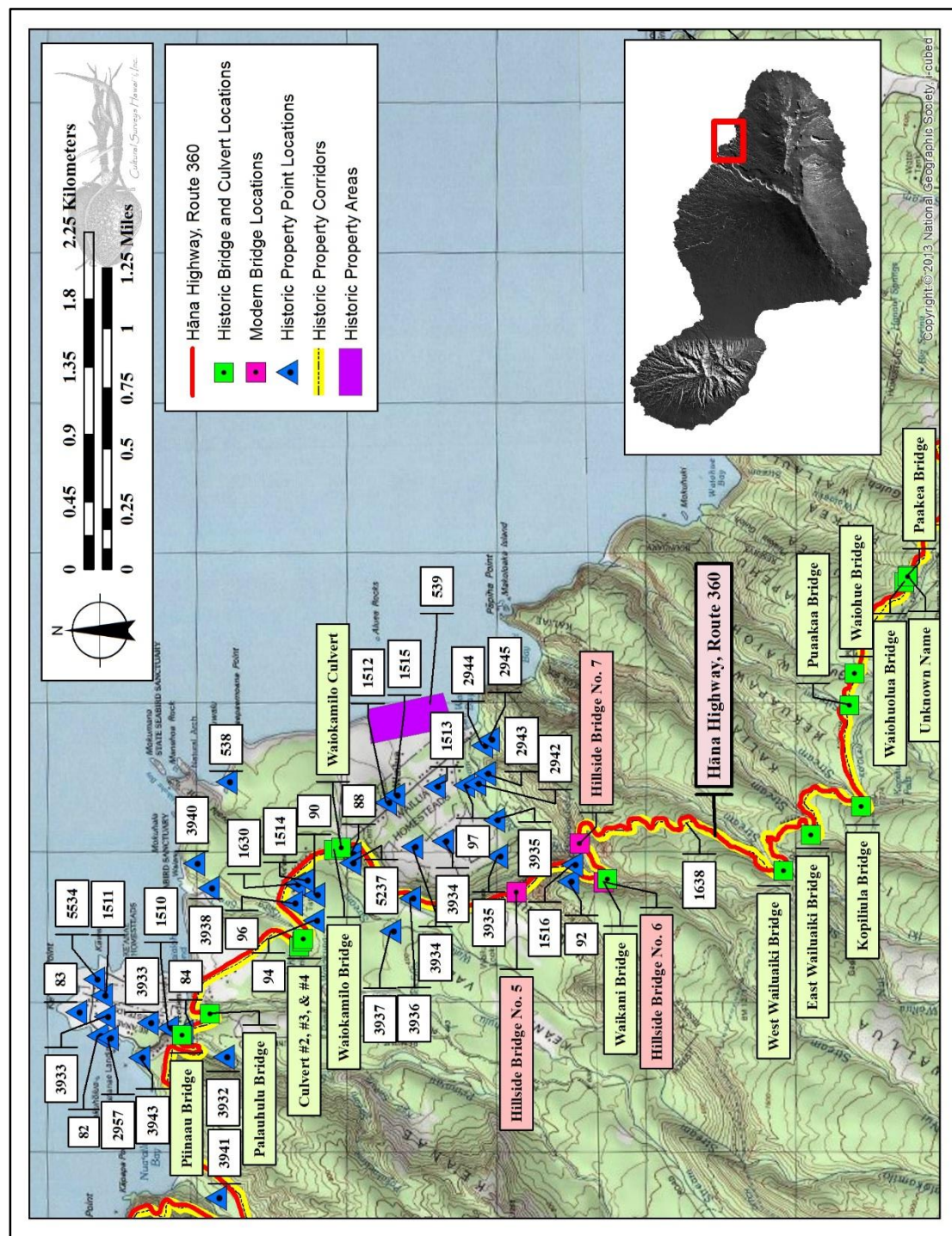


Figure 10. A portion of the U.S.G.S 7.5-minute topographic map, Keanae quadrangle, showing previous archaeological studies conducted in the Keanae vicinity near the project corridor (shown in red).



3.2.2.4.2 *Nahiku Vacinity*

A 2006 inventory survey of TMK 1-2-01:26 was completed for the proposed construction of a residence on the property (Madeus and Fredericksen 2006) (Figure 12). One historic property (SIHP -5961) was identified consisting of two features, a low platform and retaining wall (Figure 13). Subsurface testing of the site yielded small pieces of porcelain, glass shards, a glass button fragment, volcanic glass flakes, a possible hammerstone, water worn cobbles and pebbles, and marine shell midden remains (Madeus and Fredericksen 2006:25-26).

An archaeological inventory survey was conducted of TMK 1-2-02: 26 (E. M. Fredericksen and Fredericksen 1998) (Figure 12) during which a total of 11 sites were identified, SIHP -4514 through -4520, -4522, -4523 and -4548 (Figure 13). Site types included agricultural enclosures, terraces, walls, habitation areas, shelters, five probable burials, and a shrine. In addition, Pohoula Heiau (SIHP -99) was re-located within the project parcel (E. M. Fredericksen and Fredericksen 1998:17).

Archaeological Services Hawaii, in association with Aki Sinoto Consulting of Honolulu (Sinoto et al. 2001), conducted an archaeological inventory survey of a parcel of land on the coast between Kuhiwa Gulch and Kahakapuaa Gulch (TMK 1-2-03:21) (Figure 12). A large enclosure and rectangular depression (SIHP -5056), as well as a lithic surface scatter (SIHP -5057) were identified during the course of the survey (Sinoto et al. 2001:16) (Figure 13). Backhoe testing resulted in culturally sterile subsurface deposits.

A parcel in Nahiku Homesteads (TMK 1-2-02: 50) was subject to an archaeological assessment in 2006 (Kouneski and Kennedy) (Figure 12). Modern debris was observed on the surface indicating use of the property in the past, however, no cultural material or historic features were observed.

In 1978 an archaeological survey was conducted in a conservation district in upper Nahiku (within TMK 1-2-04:007), “mauka of Hana Highway in the Nahiku area... follow[ing] an existing EMI access road into the area” (W. M. Fredericksen and Fredericksen 1978:1) (Figure 12). The pedestrian survey examined six power pole installation locations, none of which contained any observed archaeological surface remains. The area appeared to have been considerably disturbed, likely due to road construction. The rainforest environment may also have contributed to deterioration of any preexisting remains.

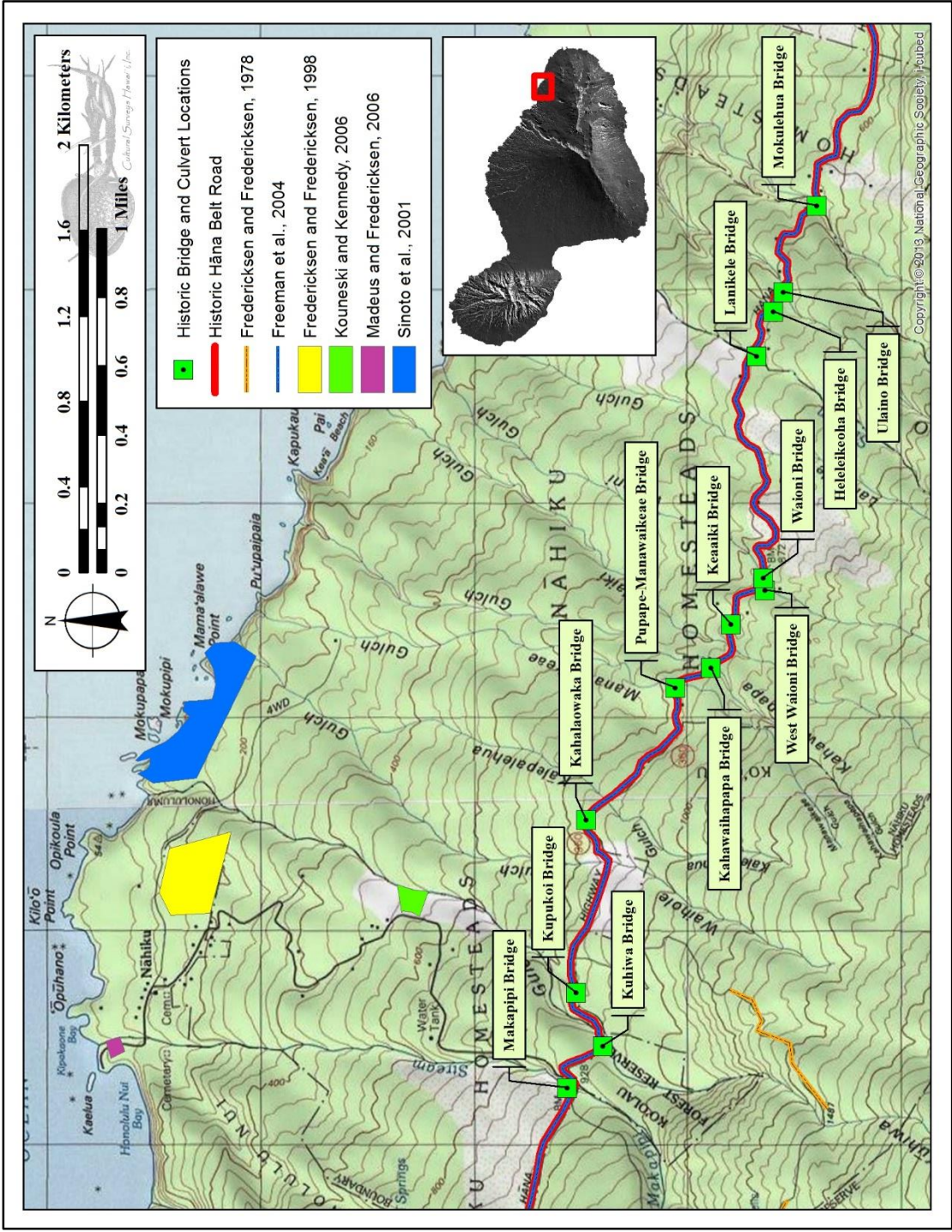


Figure 12. A portion of the U.S.G.S 7.5-minute topographic map, Nahiku quadrangle, showing previous archaeological studies conducted in the Nahiku vicinity near the project corridor (shown in red).

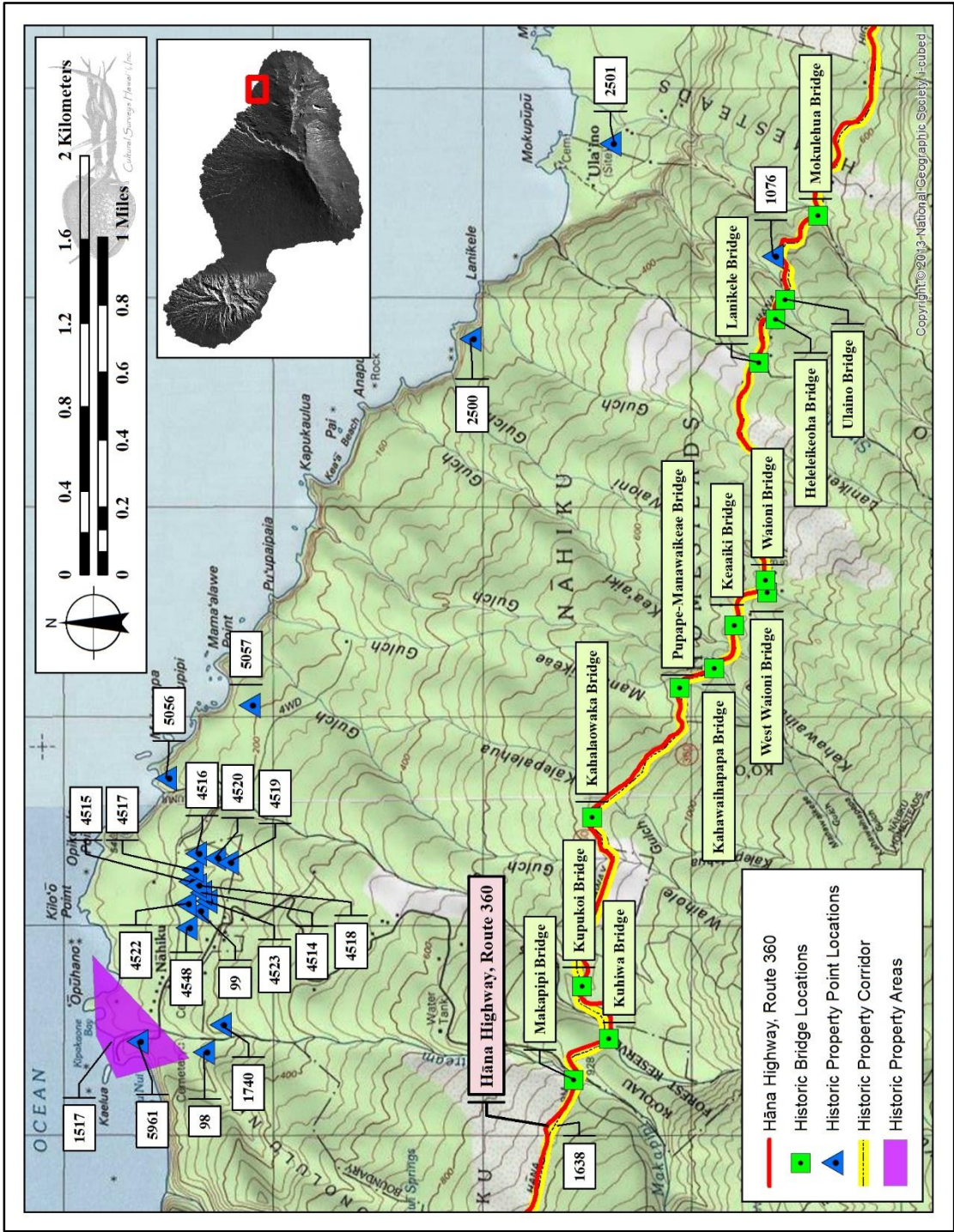


Figure 13. A portion of the U.S.G.S 7.5-minute topographic map, Nahiku quadrangle, showing documented previously identified historic properties in the Nahiku vicinity near the project corridor (shown in red), and in relation to historic bridges (labeled).

3.2.2.5 Hana District

3.2.2.5.1 Piilanihale Heiau

Archaeological work has been conducted in West Honomaele Ahupuaa in association with Piilanihale Heiau (Walker Site 102/SIHP -100) and Kahanu Gardens. Phase I of the Piilanihale Heiau Project was completed in 1970 with the objective of clearing and mapping the *heiau* and locating and mapping surrounding sites (R. H. Cordy 1970) (Figure 14 and Figure 15). Twelve additional features were identified that were not directly related to the *heiau*, including house platforms, graves, pits, enclosures, and walls (R. H. Cordy 1970:16). The material evidence observed during this study suggested a chiefly residence function more so than a *luakini* class *heiau* function, which had been the traditional trend of thought (R. H. Cordy 1970:16).

Following the site survey report for the Piilanihale Heiau by Ross Cordy (1970), and two short reports establishing a research design for the *heiau* (Kolb 1989; Tuggle 1976), Michael J. Kolb (1990) began a series of excavations at the site (Figure 14). Data obtained during testing led to the conclusion that the structure had been built in four major building stages (Kolb 1990).

3.2.2.5.2 Hana Airport and Vicinity

In 1984, Wendell Kam conducted a site inspection for a clearance and fencing project of the Hana Airport (Figure 14). The inspection determined that, “the mauka portion of the runway had been previously bulldozed during the 1950s and [in] 1972 by Fong Construction and Hirahara Construction, respectively” (Kam 1984:1). In regard to the *makai* (seaward) portion of the runway, the report stated, “that no archaeological features existed in the proposed area although a Hawaiian foot-trail lies adjacent, along the coast” (Kam 1984:1).

A field inspection of the Hana Airport boundary was performed in 2006 (Hill) for installation of a fence line to enclose the property (TMK 1-3-003:022-040) (Figure 14). The topography of the boundary line was found to be very level. Only within 25 m of the shoreline did the topography change from level fill to unmodified undulating *aa* clinker lavas. No remnant archaeological features were observed. The property appears to have been heavily disturbed for construction of the airport, consisting of fill material that has been graded and leveled (Hill 2006:7).

In 2007 a surface inspection was conducted of 2.93 acre parcel just south of the airport (TMK: 1-3-009:097) for the proposed construction of a private residence (Hill 2007) (Figure 14). The inspection determined that some of the surface soils within the lot consisted of graded fill material associated with construction of the road to Hana Airport. No cultural remains or features were observed during the course of the inspection (Hill 2007:12).

An archaeological inventory survey was conducted at TMK 1-3-09:80 in Kauamanu Ahupuaa (Gregg et al. 2005) (Figure 14). The survey identified one historic property, SIHP -5674 (Figure 15), consisting of two segments of a historic sugarcane railroad constructed at some point after 1883 by the Kealeku Sugar Company (Gregg et al. 2005:i).

Affordable Cultural & Ecological Services conducted a field inspection of TMK 1-3-009: 099 (Figure 14) with negative results (Chun and Dillon 2009a). No surface features were identified during the inspection, and subsurface testing suggested the removal of the upper soil layers through erosion or disturbance (Chun and Dillon 2009a:1).

Chun and Dillon (2009b) conducted a second field inspection one parcel to the east (TMK 1-3-009: 089) (Figure 14). The entire parcel was inspected but no surface features were observed. Limited subsurface testing resulted in shallow soils over bedrock, suggesting the removal of much of the upper soil layers throughout the parcel (Chun and Dillon 2009b:1).

A 34-acre parcel in Kawela Ahupuaa (TMK 1-3-03:15) was the subject of an archaeological inventory survey in 2000 (Bushnell and Hammatt) (Figure 14). No archaeological remains were identified during the survey within the subject parcel.

In 1988, a field inspection was conducted in the *ahupuaa* of Ka‘eleku at SIHP -1813 (Figure 15), a lava tube, in response to the owners desire to open up the lava tube to the public (Estioko-Griffin 1988a) (Figure 14). The entrance proved unsafe, however, and no inspection was made of the interior. The recommendation was made to perform a thorough survey of the interior of the lava tube before opening it to the public. Apparently, the lava tube was used in the fifties and sixties as a bomb shelter (personal communication with Cathy Dagher, Oahu SHPD, April 2000). The tube is thought to have once extended to the ocean but has since been dynamited (date unavailable). Human burials were also reported by local informants who had been through the cave with *kupuna* (Maui/Lanai Islands Burial Council Minutes, January 1998). Theresa Donham, the Maui SHPD archaeologist at the time, also made an inspection of the lava tube. Large quantities of cattle remains were found disposed at the southernmost opening of the cave. Other cultural modifications included three stone cairns and a possible excavation area into a ceiling collapse pile. No human burials were found during the inspection (Donham 1996).

Two years later, a field inspection was made in Kaeleku Ahupuaa at a cinder pit located at the base of Puu Olopawa (south of the area depicted in Figure 14), *mauka* of SIHP -1813 and the Estioko-Griffin study area (Dixon 1998). A human cranium without mandible was recovered during excavations for cinder. It was suggested that the remains might be associated with the construction of a plantation-era irrigation tunnel in the vicinity. Because there was no evidence for more burials and the cranium seemed to be an isolated find, recommendations were given for no further archaeological work.

3.2.2.5.3 Waianapanapa State Park

Richard J. Pearson (1970) identified approximately 34 archaeological features during the initial survey of Waianapanapa State Park, located along the coastline along Honokalani and Wakiu Ahupuaa (Figure 14). These features included one *heiau*, five cave shelters, a pre-contact trail, one pictograph, six *ahu*, two U-shaped shelters, five miniature enclosures, three shelter walls, two house platforms, and three cemeteries that had been apparently divided by either familial or religious affiliation, as well as several other wall segments or enclosures. Pearson further noted the presence of an additional graveyard on State-owned lands to the west of the park, between the park and the current location of the Hana Airport. These graves consisted of a series of rectangular platforms, some with *iliili* paving and one with an upright rectangular basalt crystal. The graves were said to belong to a Hana family, but had not been used in three generations at the time of the survey. Based on the overall findings within the park boundaries, Pearson observed that the exploitation of wetter environs surrounded by dense rainforests, as opposed to the leeward counterpart, may have resulted in the development of scattered homesteads rather than nucleated villages.

Morton and Lum Ho (1975) made observations on the ruins at Wakiu Ahupuaa, on the coast between Hana airport and Waianapanapa State Park. They described the burial complex site including terraces, a trail, platforms, and associated caves.

Kennedy (1984), in an effort to relocate the burial complex initially noted by Pearson (1970) and first described by Morton and Lum Ho (1975), carried out an archaeological inventory survey of the complex (Figure 14). Kennedy identified and mapped a total of 368 features at the burial complex. These features were grouped into five broad categories: 1. filled areas between lava flows; 2. above-ground burial platforms; 3. *ahu*; 4. incomplete or unfinished graves; and 5. a possible religious structure (Kennedy 1984).

An archaeological inventory survey conducted in 2004 (A. E. Haun et al.) resulted in the relocation of most of the historic properties that were originally identified during Pearsons initial study of Waianapanapa State Park in 1970, as well as a few newly identified properties and features (Figure 14 and Figure 15). In all, the survey conducted resulted in the identification of a total of 59 properties that were comprised of 119 features in a 111-acre project area. Identified features included 29 enclosures, 14 walls, 10 cairns, 10 terraces, eight pavements, six platforms, five trails, five caves, five uprights, four U-shapes, four L-shapes, four mounds, three overhangs, three alignments, three cemeteries, two C-shapes, one cupboard, a modified outcrop, a pictograph and petroglyphs. The earliest radiocarbon date was retrieved from one of the large cave sites (SIHP -5372) and indicated that settlement within the area occurred as early as the late 1200s, while dates from a platform site at SIHP -5366 indicates that occupation occurred between the 1400s and mid-1600s. Examples of enclosed house yards indicate that occupation within the area continued into the historic period, while use of the area has continued into modern times. Unlike the settlement pattern put forth by Pearson (1970), whereby habitation was represented by scattered homesteads, Haun and others suggest that the rather concentrated nature of site clusters as well as the location of permanent habitation sites relative to ceremonial features were more characteristic of nucleated village settlement.

Monitoring conducted by Xamanek Researches in 2007 (E. M. Fredericksen) for wastewater system improvements at Waianapanapa State Park (Figure 14) indicated that the upper portion of the park at that location was previously disturbed, likely associated with construction of the original restroom facility and subsequent improvements. No significant cultural material was identified during the monitoring program.

Further monitoring was performed by Archaeological Services Hawaii during continuing waterline improvements at Waianapanapa State Park (O'Claray-Nu et al. 2011) (Figure 14). Seven possible subsurface features were documented, consisting of marine midden and *ili ili* deposits, remnant rock wall features, and a remnant-fire pit (O'Claray-Nu et al. 2011:18). No new SIHP numbers were assigned to these features due to stratigraphic disturbance and loss of context, in some cases, and association with previously documented sites (SIHP -5380, -5389, -5392, and -5395).

Archaeological assessments were conducted for two parcels adjacent to the *makai* side of Hana Highway, just southwest of Waianapanapa State Park (TMK 1-3-005:013 and 034) (Figure 14). The assessment consisted of pedestrian survey and mechanical excavation, both of which resulted in negative findings (Dagher and Dega 2012, 2014).

Just south of Waianapanapa State Park, Robert Bevacqua of the Bernice Pauahi Bishop Museum conducted the initial walk through survey of the Hana High and Elementary School Campus (Bevacqua 1972) (Figure 14). Bevacqua noted one archaeological habitation site in one corner of the school campus that had been previously disturbed by bulldozing.

An archaeological assessment of the Hana High and Elementary School was conducted by Xamanek Researches (E. M. Fredericksen and Fredericksen 2004a) (Figure 14). While no significant cultural materials or structural remains were noted during the pedestrian inspection of the developed campus, a possible rock enclosure was noted in the general vicinity of a planned leach field installation. This possible rock enclosure remnant was noted in a drainage area on an adjacent parcel. Other observations included possible rock alignments on a heavily vegetated parcel adjacent to and northwest of the campus proper.

Cultural Surveys Hawaii, Inc. reported on archaeological monitoring of the cesspool conversion at Hana High and Elementary School (Todd D. McCurdy and Hallett H. Hammatt 2010) (Figure 14). No cultural materials or features were observed during the monitoring operations.

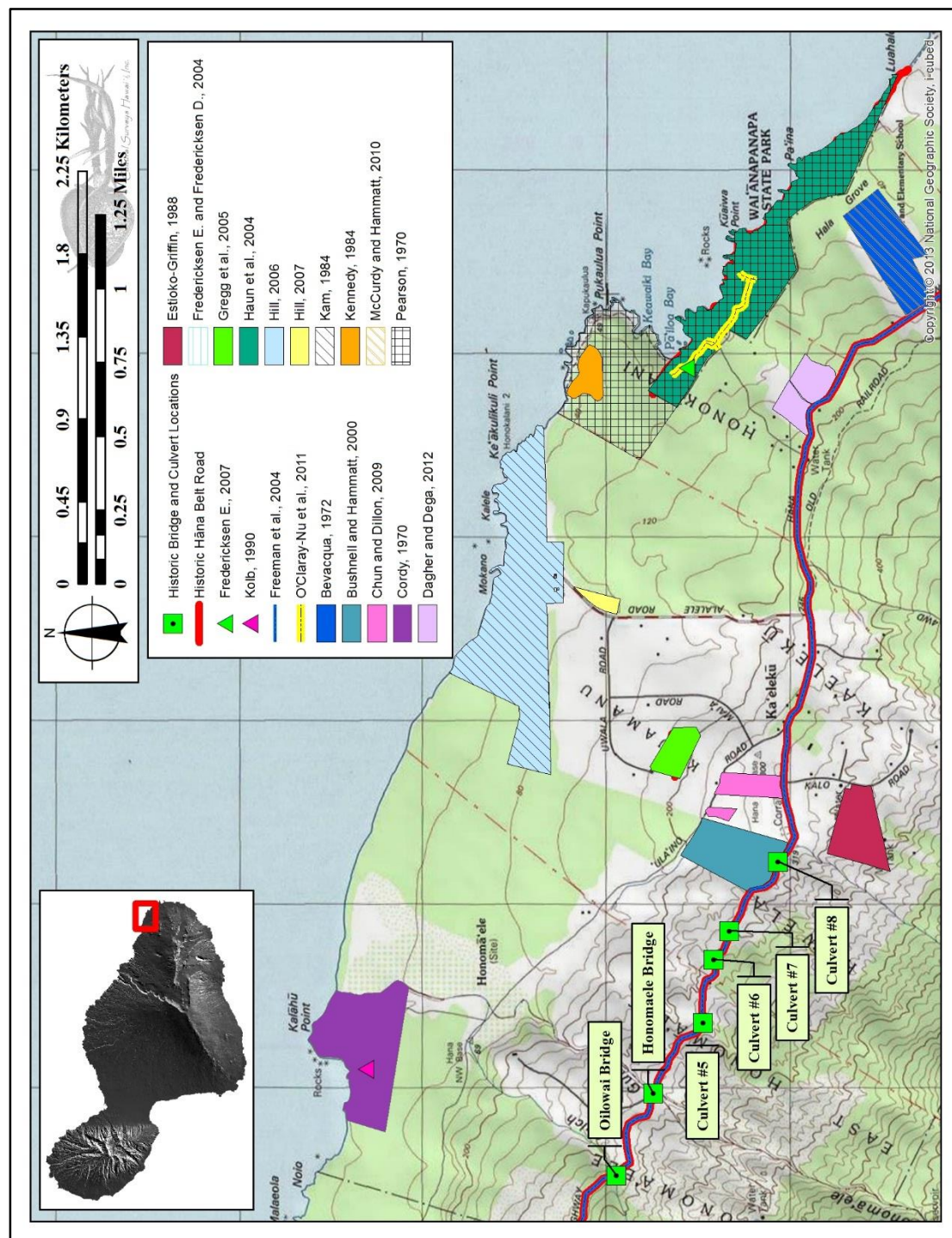


Figure 14. A portion of the U.S.G.S 7.5-minute topographic map, Hana quadrangle, showing previous archaeological studies between West Honomalele Ahupuaa and Waiānapanapa State Park.

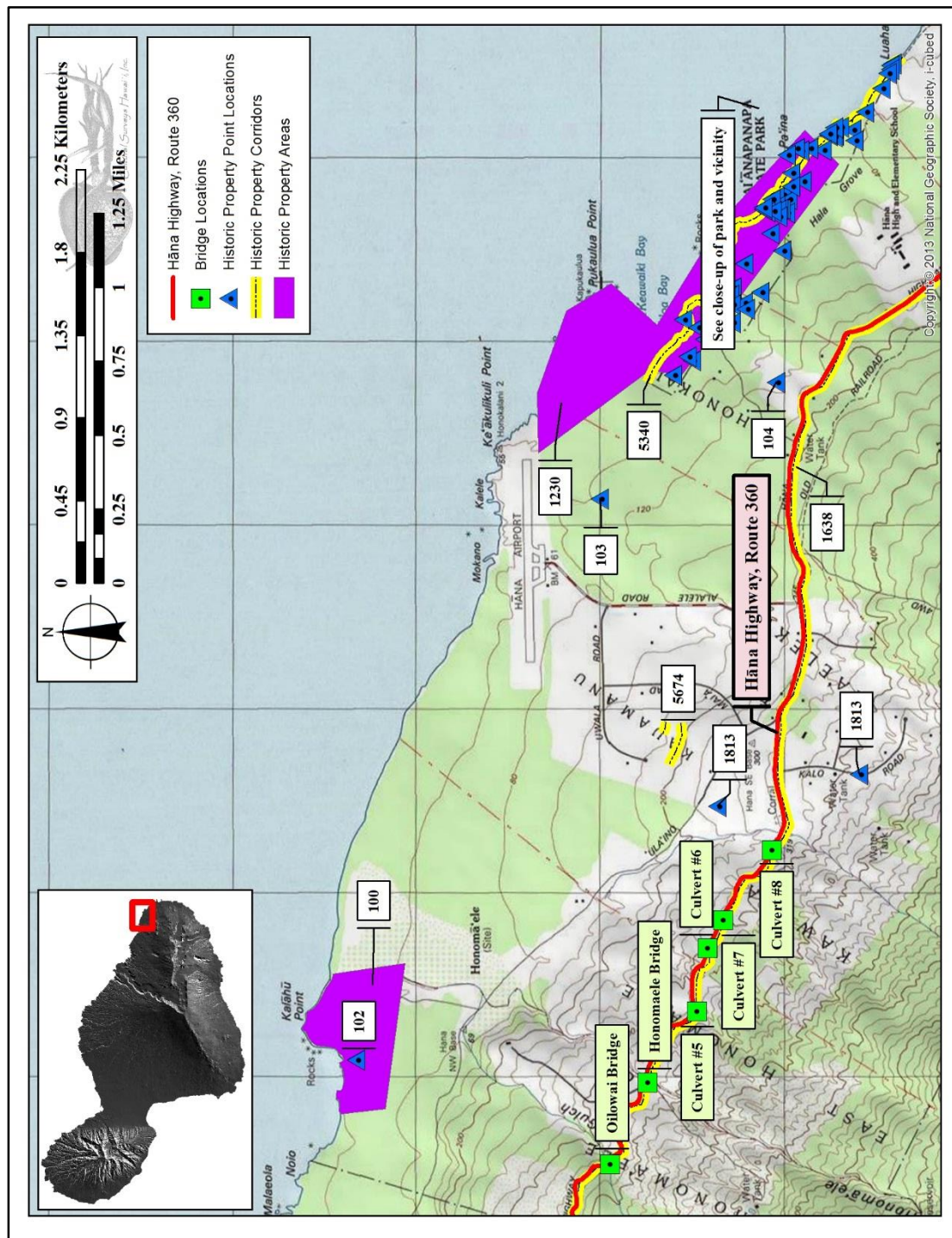
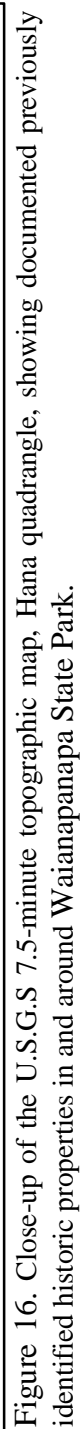


Figure 15. A portion of the U.S.G.S 7.5-minute topographic map, Hana quadrangle, showing documented previously identified historic properties located between West Honomāʻele Ahupuaʻa and Waiʻanapanapa State Park near the project corridor (shown in red), and in relation to historic bridges (labeled).

Literature Review for the Hana Highway, Route 360, Bridge Preservation within the Hana Highway Historic District



3.2.2.5.4 Hana Town Area

In 2006 a 12 acre parcel (TMK 1-3-004:008) was the subject of an archaeological inventory survey which revealed an absence of cultural remains due to previous disturbance from agricultural and residential development in the area (Pantaleo 2006) (Figure 17). The survey was reclassified as an archaeological assessment due to the negative findings.

An archaeological reconnaissance and historical survey was conducted by the Department of Anthropology, Bernice Pauahi Bishop Museum over a 14-acre area north of Hana Bay (Landrum 1984) (Figure 17). With the exception of an abandoned segment of the old government road and historic roadside refuse along a dump access road, no historic properties were identified within the project area.

An archaeological assessment was completed for the Hana Landfill in 2003 (Figure 17), resulting in no significant finds. The absence of cultural material was expected due to the surrounding rough *aa* terrain as well as the level of previous disturbance associated with landfill operations (E. M. Fredericksen 2003:3).

A 72.81 acre parcel (TMK 1-3-004:001) was recently inventory surveyed just *mauka* of the highway in Kawaipapa Ahupuaa (Figure 17) for the proposed development of an affordable housing subdivision (A. E. Haun and Henry 2014). A total of 26 sites were documented during the archaeological inventory survey (SIHP -4964, and -6527 through -6551, Figure 18), consisting of agricultural pits, walls, terraces, modified outcrops, mounds, enclosures, surface scatters, platforms, pavements, and historic ranching features including troughs, a basin, a foundation, a railroad grade, and a road (A. E. Haun and Henry 2014:21). Prehistoric habitation and agricultural sites accounted for the majority of the sites documented during the survey, however, the remains of sugar cane plantation infrastructure were also evident (A. E. Haun and Henry 2014:67).

The Bishop Museum conducted preliminary archaeological and historic investigations of Hana Ranch Lands in the early part of 1987 (Cleghorn and Rogers 1987) (Figure 17). The archaeological research consisted of compiling a list of known sites, analysis of aerial photographs, and a brief field inspection. Combined with aerial photographic analysis, field inspection located and briefly described five site areas thought to be within the subject parcel (south of Hana Town and Figure 16). These site areas include Site -4007, a stone-lined depression; -4008, a terraced platform and a small rock shelter; -4009, a possible *heiau* consisting of a large earthen terrace with a possible stone paving and sloping walls on three sides; and -4010, an area of deteriorated terrace remnants in the pasture. Walker site -121 was erroneously placed within the inspection area and was rediscovered and recorded by a later survey conducted by Kolb and others in the *ahupuaa* of Hamoa (Kolb 1993). In general, this aerial photographic survey was very helpful in predicting site locations and site types. This survey, like Nakkims survey (1970), indicated the existence of remnant-type agricultural features scattered throughout the lands of the Hana Ranch. Prior to these surveys most of the archaeology of Hana was associated with *heiau* structures.

Joseph Kennedy (1990) conducted an archaeological reconnaissance of approximately 2.6 acres at Kainalimu Bay (Figure 17). The reconnaissance identified one site during the course of the field examination, SIHP -109 (Figure 18), which was previously identified by Walker (1931) as Site 109 Kauleiula Heiau (refer to Table 1).

An archaeological assessment was conducted in 2006 (Chun and Dillon) near Hana Bay for construction of a residential dwelling (TMK 1-3-007: 003) and an associated easement through state lands (TMK 1-3-007: por. 001) (Figure 17). Pedestrian survey and test excavation yielded negative results, despite the proximity of the project location to the beach. The property parcel and easement cover a very small area of land, however, which has been heavily impacted by residents and beachgoers (Chun and Dillon 2006:42; 2008:38).

Henry and Graves (1993) identified four historic properties during an inventory survey for the Hana Medical Center (Figure 17 and Figure 18). Two of the historic properties were complexes (SIHP -3150 and -3153), while two were interpreted as boundary walls (SIHP -3151 and -3152). Formal site types associated with the identified historic properties included enclosures, platforms, walls, and terraces associated with habitation, animal husbandry, boundary markers, agriculture, and indeterminate functions.

Archaeological data recovery was conducted for SIHP -3150 at the Hana Medical Center Site in 1996 (Wulzen et al.) (Figure 17). A total of eight excavation units were dug and the data recovery efforts yielded 177 portable artifacts, primarily historic in nature. Final analysis and interpretation indicated that the site was likely used for a limited range of domestic activities. Ceramic and glass attributes indicated that occupation of the site likely occurred after AD 1880, a time period that is contemporary with the maximum extension of the Hana sugar plantation fields.

In 2009 a pedestrian survey was conducted by Scientific Consultant Services, Inc. (Perzinski and Dega) for a road widening project on Hana Highway by the Hana Fire Department (TMK: 1-4-006: 999) (Figure 17). During the survey two features were documented associated with historic Hana Highway, SIHP -1638, consisting of a historic bridge and a basalt lined culvert (corresponding with Culvert #9, no bridge name) (Perzinski and Dega 2009:13, 18).

An earlier archaeological inventory survey was performed for the construction of the Hana Fire Station at TMK 1-4-06:002 (W. M. Fredericksen et al. 1993) (Figure 17). The one acre lot was surveyed and tested, however, no cultural material remains or historic properties were identified.

A field inspection of SIHP -1485, Kawaipapa Complex, was conducted in 1988 by the State Parks Archaeologist at that time Agnes Estioko-Griffin, with regards to a fishpond rehabilitation project that was being considered by the land owner (Estioko-Griffin 1988b) (Figure 17 and Figure 18). The complex in its entirety consisted of an unnamed pond and two shelter caves. The field inspection resulted in the relocation of the pond and one of two previously recorded habitation caves, in addition to a wall segment, an additional cave, and one artifact consisting of a drilled trumpet shell.

A 1990 survey of two adjacent parcels on the south-southeast side of the historic Hana Courthouse property (SIHP -1626, Figure 18) was completed for the Hana Cultural Center in order to determine any adverse impact for construction of a proposed replica of an ancient Hawaiian home (McQuagge 1990) (Figure 17). Historic material was encountered in trash pits located during hand testing within both lots, indicating previous use as a house site first occupied circa W.W.I. and continuing into the 1950s (McQuagge 1990:4).

During archaeological monitoring in 2001 (E. M. Fredericksen and Fredericksen) for installation of lighting at the Hana Ballpark (TMK 1-4-02: 021) (Figure 17), a previously unidentified burial site (SIHP -5190) was identified in one of the light pole trenches and

subsequently recorded (Figure 18). Human remains were partially impacted during excavation. The remains were recovered and the burial was capped with concrete before the trench was backfilled (E. M. Fredericksen and Fredericksen 2002:8). One pecking stone, two hammerstones, a 1940 U.S. penny, an Indian head nickel, ceramic sherds from a single small bowl, and a rectangular screw top pint liquor bottle were all collected from imported fill back dirt piles across the site (E. M. Fredericksen and Fredericksen 2002:5). Richard Border had performed reconnaissance and subsurface testing of a portion of this lot in 1981, during which no indications of archaeological or historic cultural activity were observed (Bordner 1981).

An inventory survey was conducted for the Hana Town Center project (TMK 1-4-03: 056) (Figure 17) in 2003, which resulted in the documentation of SIHP -5546 (Figure 18), a historic refuse area containing bottle glass from the late 1800s to early 1900s (Chaffee and Dega 2004:5 and 26). No other historic properties were encountered during the survey.

Perzinski and Dega (Perzinski and Dega 2011) conducted an archaeological inventory survey of a portion of TMK 1-4-03:09 (Figure 17), resulting in the documentation of one historic property. SIHP -6807 consists of a historic terrace constructed of stacked cobbles and boulders located in the northwest portion of the project area (no site location information available). No cultural material or other archaeological features were observed during the surface survey or subsequent subsurface testing.

A 1985 (Sinoto) reconnaissance survey of the proposed Hana Ranch Garden Cottages was conducted due to the proximity of SIHP -1482, Kauiki Hill (Figure 17 and Figure 18). No surface remains were identified. An aerial photograph from 1970 of the property showed approximately 20 houses in the area which had since been demolished. The parcel was determined to have been through extensive previous disturbance. A few years later a human skull was collected by the Hana Police along Kauiki Hill Beach, within the same parcel, though the exact location of retrieval was not documented (Pietrusewsky 1989).

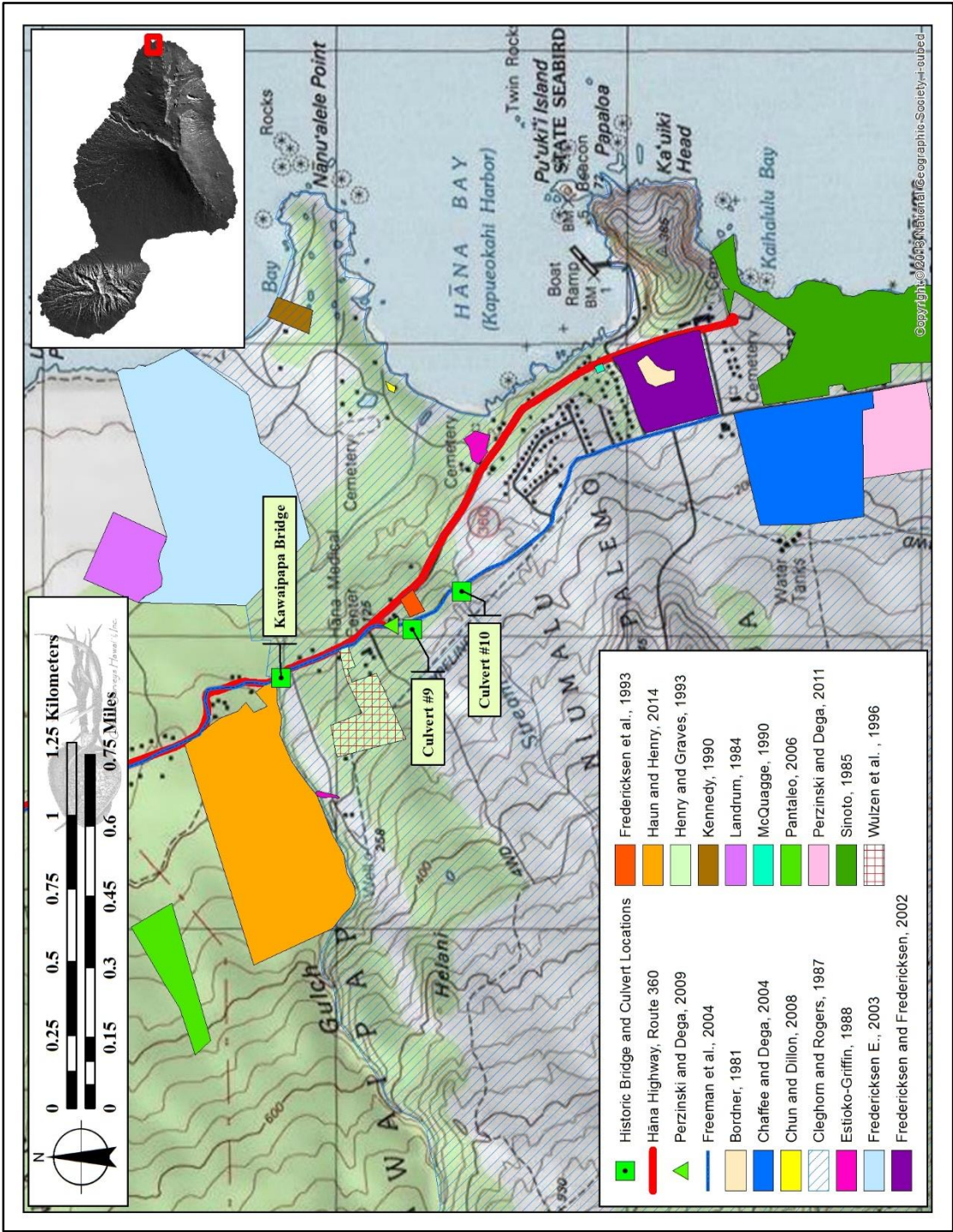
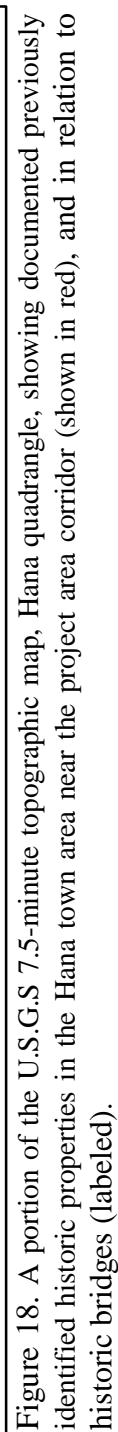


Figure 17. A portion of the U.S.G.S 7.5-minute topographic map, Hana quadrangle, showing previous archaeological studies in the Hana town area near the project area corridor (shown in red).



3.3 Settlement Pattern and Predictive Model

There have been a number of chronological models in the past couple of decades proposed for the initial colonization; as well as the establishment and development of the pre-Western contact population of the Hawaiian archipelago (R. Cordy 1981; Dye and Komori 1992; Graves and Addison 1996; Hommon 1976, 1986; Kirch 1985, 1990; Spriggs 1988; Spriggs and Anderson 1992). Prior to the turn of the twentieth century, two chronology models for colonization and population establishment were put forward. The short chronology looked at initial colonization occurring after A.D. 500 and between A.D. 700-800, while the long chronology looked at the founding population arriving by A.D. 100-200 (Graves and Addison 1996). Based on an analysis of an array of radiocarbon dates from stratified sites on Oahu and Hawaii Island, Kirch (1985:299), as well as Graves and Addison (1996), supported a middle ground between the two ranges by postulating in that colonization of the Hawaiian archipelago occurred between A.D. 200-600.

Advancements in radiocarbon dating however, and tightening of the types of sample materials submitted for analysis, along with consideration of paleo-environmental evidence for human presence, has led to a re-examination and/or re-calibration of previously published data (Athens et al. 2014; Rieth et al. 2011; Wilmshurst et al. 2011) and analyses of curated samples from early stratified sites with rigorous provenience documentation (Dye and Pantaleo 2010; Mulrooney et al. 2014). This work has led Kirch to reconsider his published 1985 chronology, and now suggests that initial Hawaiian colonization of the archipelago took place between A.D. 1000 and 1200 (Kirch 2011). This is a range in keeping with the re-evaluation of published data for wood charcoal from short-lived species at Ordy Pond on Oahu where initial settlement appears to have occurred between A.D. 970-1130 (Athens et al. 2014), as well as an analysis of curated samples from the early cultural layers at the O18 site at Bellows, Oahu which returned a date range of A.D. 1040-1219, roughly 400-900 years later than originally thought (Dye and Pantaleo 2010). On Hawaii island, a re-evaluation of dates places colonization between A.D. 1220-1261 (Rieth et al. 2011), while the analysis results of curated samples from Waiahukini Rockshelter in Kau, Hawaii Island came back with a date range of A.D. 1320 to 1440 (Mulrooney et al. 2014), six centuries later than initially thought (Emory and Sinoto 1969). Though the Hawaii Island ranges do not fall within Kirch's revised time span for initial colonization, it is poignant to note that the earliest layers of a site that was considered an example of the early or initial settlement Hawaii Island and documented prior to the rigor currently employed for selecting samples for radiocarbon dating has come back with significantly later dates. Rieth and others (2011) also make a compelling comparison with regard to the timing of colonization in Hawaii Island when considering that of Aotearoa and Rapa Nui in that the 13th century dates are consistent, thus potentially indicating a rapid dispersal from central eastern Polynesia to the outer limits of Polynesia. With the revised date ranges for colonization based on updated radiocarbon dates, it is clear that the establishment of the population of Hawaii, expansion within the archipelago, and intensification of settlement due to a growing populace occurred rapidly.

Hommon (1976, 1986) refers to a later phase of intransland settlement (A.D. 1400-1600) representing large-scale population expansion into more inland areas of the islands within the archipelago with the caveat that small scale or sporadic use of inland areas would have occurred earlier. Spriggs (1988) also proposed two phases of settlement, an Early Phase (A.D. 1100-1400) and Late Phase (A.D. 1400-1600). According to Spriggs (1988:60-61), during the Early Phase new

settlements would have been initiated in the previously unsettled dry leeward regions but primarily in favorable protected spots such as inlets, bays, or natural fishponds; the Late Phase would have been associated with the founding of larger-scale agricultural field complexes in the inland areas of the leeward sides, such as valley bottoms and sides.

Kirch (1985:142) provided the first summary of radiocarbon dates for Maui, indicating that the majority of settlements tested up to that time dated to between the mid-14th and mid-15th centuries. One sample collected from a small rock shelter within the crater of Haleakala in 1963 returned a date of cal A.D. 660-1030 (Hunt and Holsen 1991; Kirch 1985:137). Shortly after Kirch's summary was published in 1985, three more samples returned early radiocarbon dates on Maui. A sample from Keokea dated to cal. A.D. 850-1000 (Brown et al. 1989 in Hunt and Holsen 1991:151), a Polynesian rat bone from Puunaio dated to cal A.D. 898-1440 (James et al. 1987 in Hunt and Holsen 1991:151), and a sample from Makena resulted in a date of cal A.D. 980-1260 (Hunt and Holsen 1991:151). Based on the recent re-evaluation of the radiocarbon dates from sites considered as early examples of settlement on Oahu and Hawaii Island as elaborated upon above, it may be prudent to revisit some of the published dates for Maui's earliest sites as well. Understanding and refining the time frame for the initial colonization of Maui Island in the context of the recent re-evaluation of radiocarbon dates from early archaeological contexts of other islands within the archipelago notwithstanding, the following settlement pattern and predictive model for identifying historic properties on the landscape has emerged for the *moku* of Hamakualoa, Koolau, and Hana.

3.3.1 Hamakualoa District

In the early historic era (1795-1880), the Hamakualoa District was the scene of protracted warfare. The agricultural systems in use were able to support a native population large enough to support an army with the ability to engage attacking forces in battles that were said to last for months (Fornander 1878). Handy and others (1991) attribute the abundance of *ahupuaa* in the *moku* of Hamakualoa to a population dense enough to require the subdivision of larger *ahupuaa*. There is a lack of chronological analysis within the *ahupuaa* of Hamakualoa to establish an accurate timeline for the initial occupation of the region.

As foreign trade was developed for sugar, so too was the need for taro and sweet potato agriculture to be further intensified. Sweet potato was a main crop for the whaling and merchant ships, and the purchase of pigs, salt, oranges and other items are noted in many ship journals. With the establishment of land ownership under the terms of the Great Mahele, individual claims for land awards were made for both both *loi* (wetland) and *kula* (dryland) plots. This suggests that the traditional farming of taro for subsistence was still taking place, augmented by sugar cane production for sale to nearby sugar mills. Much of inland Hamakualoa became planted with sugar cane. The steep gulch areas, unsuitable for cultivation, survived most of the dramatic changes in the landscape brought about during the early 20th century.

In the gulch and valley areas surrounding Hana Highway, Route 360, the ancient landscape known to support wetland taro is present in small pockets protected from the commercial cultivation of sugar cane and pineapple. Pre-contact habitation complexes, ceremonial sites, and irrigation systems have been identified during archaeological surveys, along with historic plantation-era ditches, flumes, tunnels, and the remains of construction laborer camps.

Because habitation sites, ceremonial sites, and traditional pre-contact burials have been located during archaeological surveys in the area, the likelihood of finding the remnants of these types of sites exists along the project corridor. The Hamakualoa settlement pattern appears to be based largely on the use of valleys and gulches for traditional *loi* wetland taro agriculture, and the use of the ridgetop flatlands for traditional *kula* (dryland) agriculture. However, the drastic changes in the landscape brought about by historic commercial cultivation practices and military training uses have altered other investigation areas to the point where any sign of traditional use has been cleared away. Because the present project involves bridges traversing streams and a gulches, the predictive model is favorable for pre-contact remnants of wetland taro farming in the vicinity of these crossings.

3.3.2 Koolau District

The initial occupation of this portion of Maui first occurred along the coastal region about AD 1200 (A. E. Haun et al. 2004). The accepted pre-contact settlement pattern for the region of Keanae/Wailuanui centers on the series of occupational episodes that utilized the Palauhulu Stream for taro (*Colocasia esculenta*) cultivation. A cultural landscape study (Group 70 International et al. 1995) recorded the intensive use of the Keanae and Wailuanui region for taro, identified three separate field systems, and noted the processes by which community cooperation led to the field system operation.

Evidence of a cohesive population is perhaps best described by the first Europeans to visit Keanae. From the journal of William Richards (1829), a Protestant missionary, comes information that the region between Honomanu and Wailua was densely populated:

We went on board the canoe, and rowed a few miles, avoiding some difficult *paries* [steep cliffs]. After landing, we walked a few miles further, to Wailua, where we put up for the Sabbath. Very early the morning [of the Sabbath], the horns, summoning the people to the house of God, were heard in every direction; and we soon perceived that the call had not been heard with indifference. At the early hour, the house was thronged with attentive worshippers. [The next day] we examined the schools, which were large. About 10 oclock, A.M., the princess [Nahienaena] arrived, and addressed the people; after which, we proceeded on our way [to Hana]. (Richards et al. 1829:249)

According to the Group 70 International, Inc. et al. (1995) cultural landscape study, over 490 LCAs claimed taro patches of various sizes at Keanae and Wailuanui during the time of the Great Mahele [beginning in 1848]. Several LCAs included claims for pools and fishponds. In addition, evidence of densely-grouped regional *heiau* and smaller shrines was the subject of specialized studies dating from the turn of the 20th century (Thrum 1908) to more recent work by Maria E. Orr (1990).

Background research into the land use patterns of the surrounding vicinity indicated that the area was intensively used for pre-contact agricultural pursuits, permanent and temporary habitation and traditional ceremony, as well as historic-era agriculture represented by taro *loi*, sweet potato, rice, and other staple crop cultivation. Early settlement patterns for the area seem to have focused primarily on valley and gulch lands, from river mouths to *mauka* lands. In the river gulches, it is expected that the soils are rich and fertile and conducive to agriculture. In addition, the constant

supply of fresh water would have supported fairly intense agricultural pursuits. Within these valleys intensive agriculture would have likely been taking place in association with habitation activities. Toward the river mouths, the widening gulches would have provided ample areas for small communities and access to marine resources, as well as additional *loi*.

Based on available archaeological evidence and interpretations, it is possible that historically significant subsurface cultural deposits representing both traditional and historic agriculture, as well as midden and other cultural material concentrations representing both traditional and historic habitation may occur within the area.

3.3.3 Hana District

The pre-contact settlement pattern is influenced by the environment in Hana. Because of the lack of perennial streams, there was very little wetland agriculture. Dry-land agriculture occurred on the mountain slopes above the coastal zone with associated dispersed settlement. Dispersed settlement also occurred along the coast where ocean resources were accessible. Religious features occur within one thousand feet of the coastal shoreline with more concentrated habitation settlements near these features. Concentrated habitation settlements also occurred near the limited boat landings offered by sheltered small bays along the Hana coast.

The mid-1800s Land Commission Awards testimonies and register documents indicate that the settlement pattern at contact and into the mid-1800s was one of dispersed households living and farming within a relatively narrow coastal zone (0-600 ft. a.m.s.l.). While this same coastal zone continued to be the focus of land utilization, the overall majority of the population settled around the mill and port of Hana due to the shift in economic focus and the development of the sugar plantation and ranching activities.

During the span of time from contact (A.D. 1778) to the present, the settlement pattern remained stable; with only population levels changing through time. The plantation era would have centered the population at Hana Town itself, but in the same coastal zone where the population had been concentrated in pre-historic times. Subsistence-based economy would have given way to a market/import economy as cane took over former subsistence plots. This overview clearly indicates that the pasture vistas characterizing modern Hana are the result of commercial sugar cane operations followed by cattle ranching. The cane operations evolved from small farms within LCAs and grants, and eventually culminated in Hana/Kaeleku Plantation which included some 14,000 acres. Following the liquidation of the Kaeleku Plantation, former sugar cane lands were transformed into cattle pasture and run by the Hana Ranch into the modern era.

Based on the historic text and map research, previous archaeology, and apparent settlement pattern for the area, there is a potential for both pre-contact traditional sites as well as post-contact sites along the project corridor. Pre-contact historic properties would include those consistent with traditional dry-land agriculture, such as terrace features and mulch pit features, in addition to both temporary and permanent habitation structures. Probable post-contact properties would be associated with both historic sugar cultivation and historic ranching operations including water-control features that may be represented by built-up water tank terrace features, ditches, and/or flume beds.

Previous archaeological research in the area verifies the above settlement pattern for the coastal habitation zone. There is definitive evidence of pre-contact land use and long-term historic

habitation. Therefore, additional cultural materials consistent with pre-contact (e.g. hearths, midden deposits, structural remnants) and post-contact (e.g. trash pit remnants, house foundation remnants, privy pits) habitation may be present in a subsurface context along the Hana Highway, Route 360 corridor. It is also possible that additional unmarked pre-contact burials and post-contact gravesites that have lost their headstones during the 1946 tsunami inundation are also present.

Section 4 Summary and Interpretation

From previous archaeological studies and historic accounts it appears that habitation and intensive agriculture were widespread across the lands traversed by Hana Highway, Route 360. In coastal Hamakualoa, small, intense irrigated complexes are found within the larger valley systems with permanent stream flow. Within these valleys, concentrated agricultural pursuits, such as the growing of wetland taro (*loi kala*), native sugar, and sweet potato are found (Shideler et al. 2000). It is likely that low inland areas were used for less intensive cultivation of patches of sweet potato, *pia*, (arrowroot) and *wauke* (paper mulberry) and the gathering of *hala*, (pandanus fiber) *kukui* nuts (the oils having medicinal applications) and other resources. The coastal portion of the *ahupuaa* would have been the focus for permanent habitation, collection of marine resources, ceremonial activities, and burials. The archaeology of the region appears to support these assumptions. The frequency and location of *heiau* reported by Thrum, Stokes, and Walker, support the idea that the coastal population of Hamakualoa was large, and of a permanent nature.

Koolau Moku is largely known for its abundant rainfall, sheer valleys, waterfalls, and the traditional pond field agricultural settlement of the Keanae peninsula developed in ancient times and in use today. Keanae was a settlement focused in the uplands until an ancient chief ordered his subjects to gather mud from the uplands and with this mud fill in the lava of the Keanae peninsula thus creating the *loi* systems present today. Because of the more suitable farming and fishing grounds developed there, the lands of Keanae and Wailua supported the most substantial villages in the Koolau Moku.

The brief overview of legendary and traditional accounts indicates the particular importance attributed to Hana during pre-contact times. The accounts suggest that the productivity of the Hana area, in terms of food resources, was the main reason for its desirability. The productivity of the ocean, enhanced by fishponds, allowed direct access to fish protein for the chiefly class (*alii*) while residing in Hana. The relatively gentle slope of the Hana plain, having fertile volcanic soils combined with up to 80 inches of rain per year, probably reduced the need for labor-intensive irrigation, while still supplying abundant vegetable resources. The combination of ocean and terrestrial food sources would have likely made Hana one of the richer resource areas within all the Hawaiian Islands.

Section 5 Project Effect and Recommendations

Based on the number of historic properties and previous archaeological findings in the vicinity of Hana Highway, Route 360, specifically along the stream drainages and gulches of East Maui, it is clear that the proposed project will have a potentially negative impact on historic properties along the project corridor.

An archaeological inventory survey is strongly recommended for the proposed uses of this project. The proposed undertaking poses a potentially substantial impact to the integrity of previously recorded historic properties, as well as potential historic properties that have yet to be formally documented. An inventory survey would allow project planners to adopt formal mitigation steps in order to alleviate adverse impacts to historic properties. The scope of this survey should be established in consultation with the Hawaii State Historic Preservation Division.

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APPENDIX 2

Transportation Management Plan – Hana Highway Bridge Preservation Plan

TRANSPORTATION MANAGEMENT PLAN – HANA HIGHWAY BRIDGE PRESERVATION PLAN

HANA, MAUI, HAWAII

FINAL DRAFT

September 11, 2015

Prepared for:

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**TRANSPORTATION MANAGEMENT PLAN
HANA HIGHWAY BRIDGE PRESERVATION PLAN**
Hana, Maui, Hawaii

FINAL DRAFT

Prepared for
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Prepared by
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September 11, 2015

TABLE OF CONTENTS

	<u>Page</u>
1. INTRODUCTION.....	1
1.1 ROLES AND RESPONSIBILITIES.....	1
2. PROJECT DESCRIPTION	3-10
2.1 Project Type	3
2.2 Project Goals and Objectives.....	3
2.3 General Schedule and Timeline	3
3. EXISTING CONDITIONS	11-15
3.1 Roadway Descriptions	11
3.2 24-Hour Traffic Volume.....	11
4. CONSTRUCTION CONDITIONS	15-21
4.1 Construction Constraints.....	16
4.1.1 Construction Funding Constraints	16
4.1.2 Detour Bypass Route Constraints	16
4.1.3 Bridge Repair Work Area Constraints	16
4.1.4 Right-of-Way Constraints	16
4.1.4.1 Temporary Bridge Structures	16
4.1.4.2 Construction Staging Area.....	17
4.1.5 Topographic Constraints	17
4.1.6 Height and Weight Constraints.....	17
4.1.7 Roadway Alignment Constraints.....	17
4.2 Temporary Bridge Structures.....	17
4.3 Roadway Lane Closure Alternatives	18
4.3.1 Partial Single-Lane Closure	18

4.3.2 Full Two-Way Lane Closure	19
4.3.2.1 HDOT Determination	19
4.3.2.2 Implementation Strategy.....	19
4.3.2.3 Construction Incentive & Disincentive Provision	20
4.3.3 Public Information.....	20
4.3.4 Emergency Vehicles.....	21
5. RECOMMENDATIONS	22-24
5.1 Early Planning and Coordination.....	22
5.2 Temporary Bridge Structure.....	22
5.3 Construction Staging Area	22
5.4 Lane Closures.....	23
5.4.1 Partial Single-Lane Closure	23
5.4.2 Full Two-Way Lane Closure	23
REFERENCES	25

TABLES

1.1	HDOT Determination of a Significant Highway Project	2
2.1	Recommended Project Bridge Improvements	7-8
2.2	Recommended Project Hillside Bridge Improvements	9
2.1	Recommended Project Culvert Improvements	10

FIGURES

2.1	Project Bridge Location	4
2.2	Project Hillside Bridge Location	5
2.3	Project Culvert Location	6
3.1	24-Hour Plot MP 6.0	12
3.2	24-Hour Plot MP 13.1	13
3.3	24-Hour Plot MP 25.6	14
3.4	24-Hour Plot MP 32.4	15

APPENDICES

- A. TRAFFIC COUNT DATA
- B. FHWA TRAFFIC ANALYSIS TOOLS VOLUME IX: WORK ZONE MODELING AND SIMULATION



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TRANSPORTATION MANAGEMENT PLAN

FOR THE HANA HIGHWAY BRIDGE PRESERVATION PLAN

Hana, Maui, Hawaii

1. INTRODUCTION

This Transportation Management Plan (TMP) provides recommendations to reduce and minimize the traffic impacts resulting from the proposed lane/roadway closures on Hana Highway for the rehabilitation/replacement of bridges and culverts (hereinafter referred to as the "Project").

According to criteria in the 2007 State of Hawaii Department of Transportation, Highways Division (HDOT), Transportation Management Plan Guidelines and the Work Zone Safety and Mobility Process, a significant project for the HDOT would be where the existing traffic volume exceeds 1,000 passenger cars per lane per hour (pc/lh/hr) during the normal working hours. All transportation management strategies should also comply with standards and guidance from the latest version of the A Policy on Geometric Design of Highways and Streets (hereinafter referred to as "The Green Book"), published by American Association of State Highways and Transportation Officials (AASHTO) and the Manual on Uniform Traffic Control Devices (MUTCD), published by Federal Highway Administration (FHWA). HDOT's Work Zone Safety and Mobility Process document provides a flowchart for the Determination of a Significant Highway Project for TMP's, which is shown on Page 2.

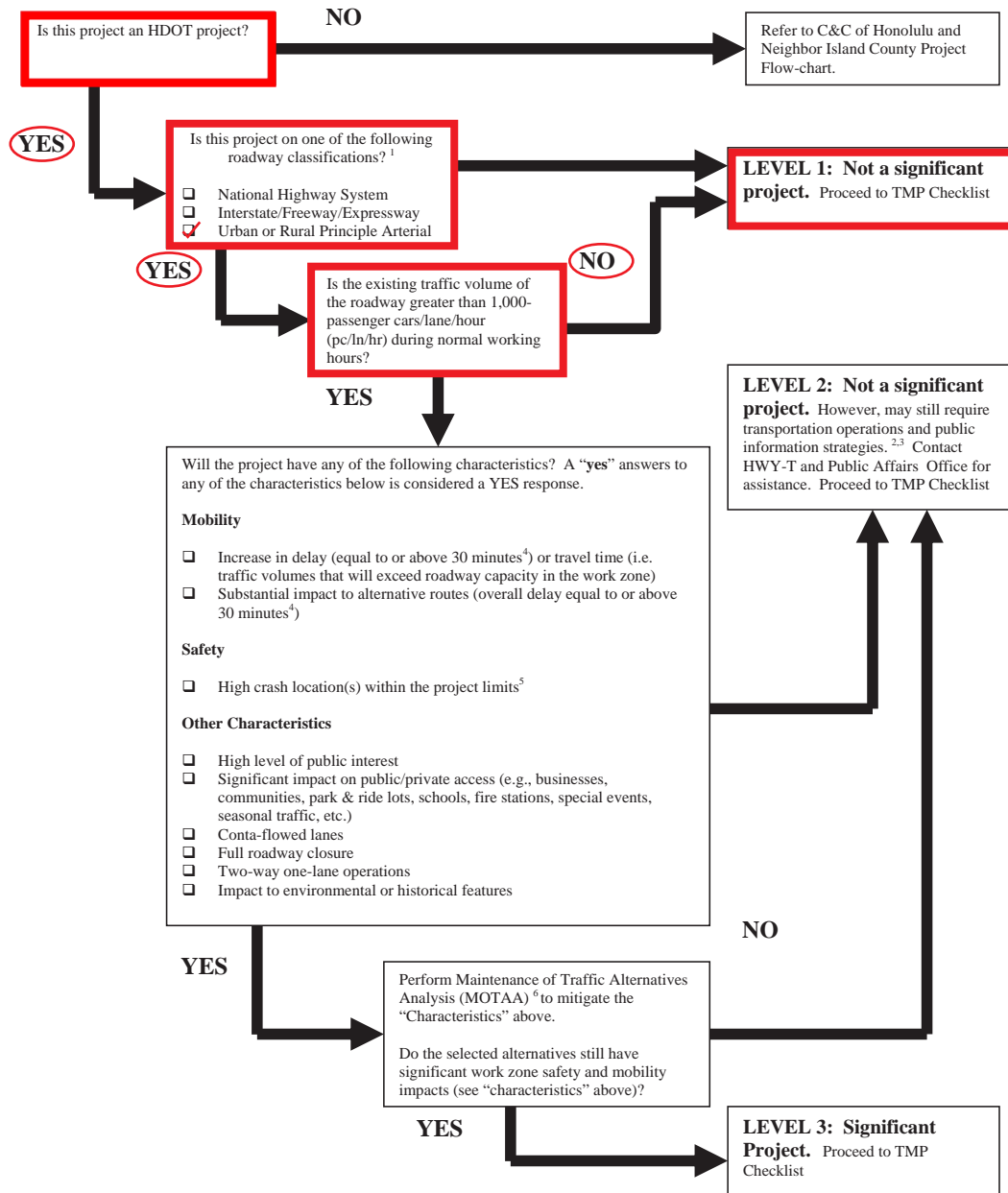
1.1 ROLES AND RESPONSIBILITIES

TMP Manager:	HWY-TO and HWY-OC, To be determined
Author:	Austin, Tsutsumi & Associates, Inc.
Stakeholders/Review Committee:	HWY-TD, HWY-OC and HWY-TO
TMP Monitor:	HWY-OC, To be determined
Emergency Contacts:	To be determined

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DETERMINATION OF A SIGNIFICANT HIGHWAY PROJECT

Hawaii Department of Transportation Projects



Notes:

- Roadway classification can be found on the Straight Line Diagram or contact HWY-P
 - Some projects may not fall under the Significant Project definition, but may still benefit from transportation operations and/or public information strategies. For example, projects that impact a moderated number of travelers with moderated public interest, such as single lane closures in urban areas or commercial business districts. The preparation of a TMP should be considered for these types of projects.
 - A project in the Interstate system that are within the boundaries of a designated Transportation Management Area (TMA) and occupies a location for more than three days with either intermittent or continuous lane closures will require the submittal of an exception request. Contact the Traffic Branch to determine if your project is within a TMA.
 - Reference CalTrans Transportation Management Plan Guidelines, June 11, 2001.
 - High crash locations are determined by requesting a crash analysis for the segment of roadway or intersection within the project limits. HWY-T should be contacted to perform the crash analysis.
 - The Maintenance of Traffic Alternatives Analysis (MOTAA) is intended to develop and evaluate the best combination of construction phasing/staging, project design options, temporary traffic control, transportation operations strategies, public information, and outreach strategies. The MOTAA should be conducted during analysis of detailed alternatives, before each final alternative is selected to proceed to design. Each alternative's ability to conform to the Work Zone Mobility Process should be reviewed at this stage.
- Guidance on performing a MOTAA can be obtained from the HDOT - Design Branch or the Traffic Branch.



2. PROJECT DESCRIPTION

The Hana Highway Historic District was listed on the Hawaii State Register of Historic Places on March 19, 2001 and the National Register on June 15, 2001. This Project includes the development of a preservation plan for forty-three (43) bridges, seven (7) hillside bridges and twelve (12) culverts located within the Hana Highway Historic District, between mileposts 5.09 and 34.0. See Figure 2.1 to 2.3 for each historic bridge, hillside bridge and culvert location.

Project construction will require lane/roadway closures along Hana Highway. This report aims to provide recommendations to minimize the traffic impacts resulting from the closures. The proposed Project improvements are included in Table 2.1 to 2.3.

2.1 Project Type

This Traffic Management Plan for the Hana Preservation Plan is federally funded.

2.2 Project Goals and Objectives

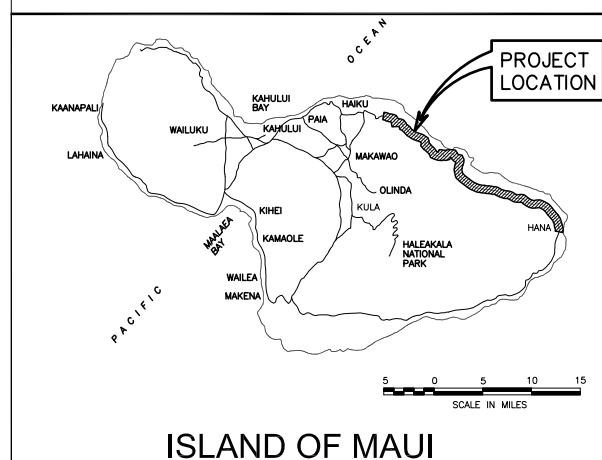
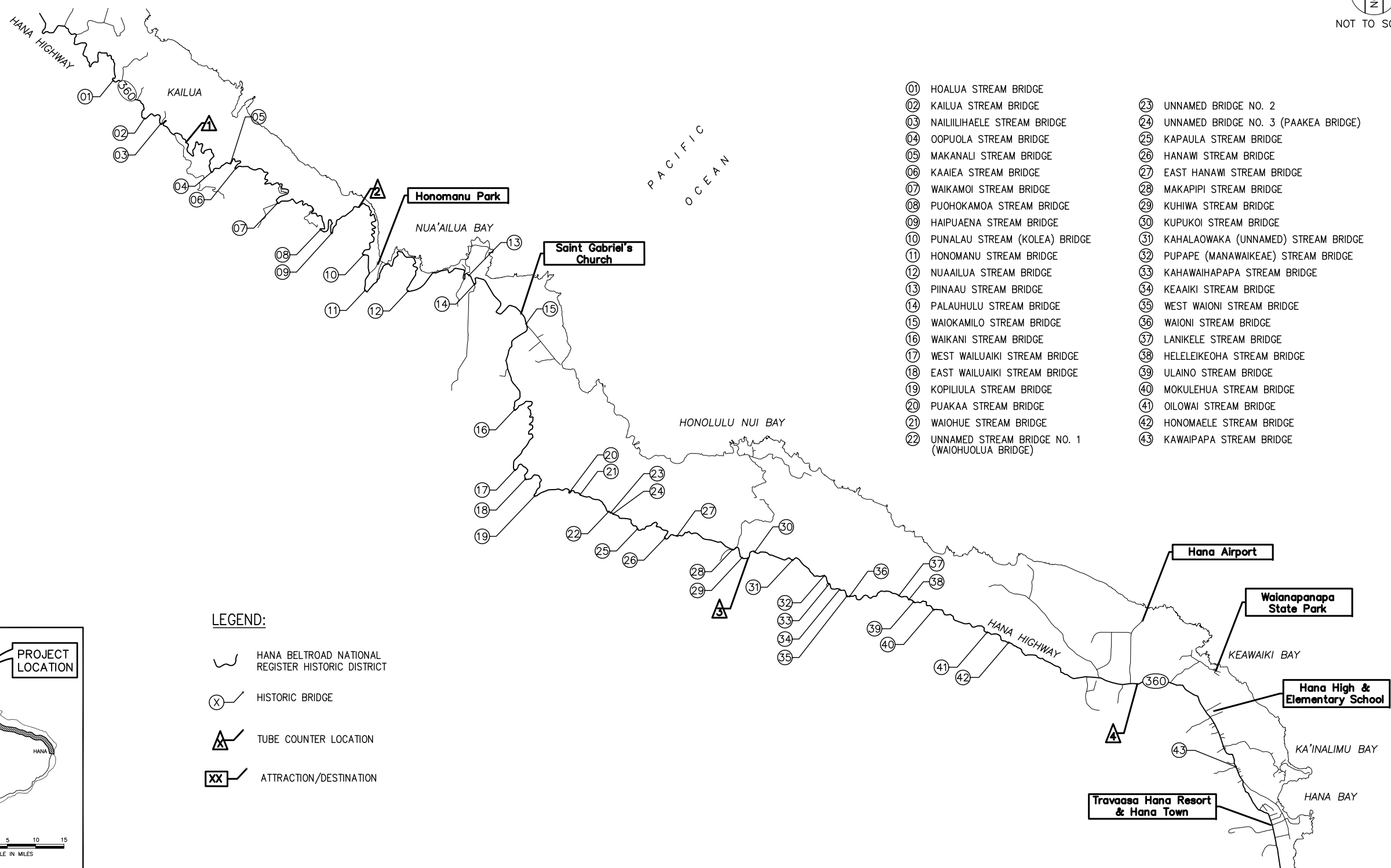
- Coordinate and inform the Hana community, businesses and agencies on the Hana bridge preservation plan and process.
- Evaluate and provide for the historic qualities of each bridge, bridge conditions, public safety, funding option, and community/agency input.
- Upgrade and rehabilitate bridges and culverts with minimal traffic disruption. Some of these upgrades and repairs include but are not limited to the following:
 - Bridge railings, guardrails & approaches.
 - Concrete parapet
 - Bridge columns, piers & CRM walls
 - Bridge abutment/base
 - Cracks/Spalls on girders and decks
 - Bridge roadway widening
 - AC Pavement/potholes

2.3 General Schedule and Timeline


Construction schedule is to be determined.



NOT TO SCALE



TRANSPORTATION MANAGEMENT
PLAN – HANA HIGHWAY BRIDGE
PRESERVATION PLAN

 **AUSTIN, TSUTSUMI & ASSOCIATES, INC.**
ENGINEERS, SURVEYORS HONOLULU, HAWAII

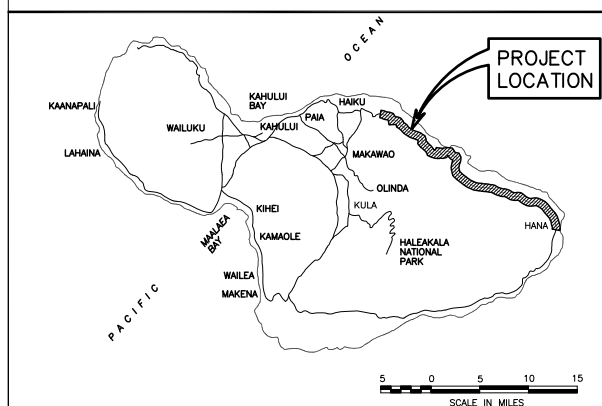
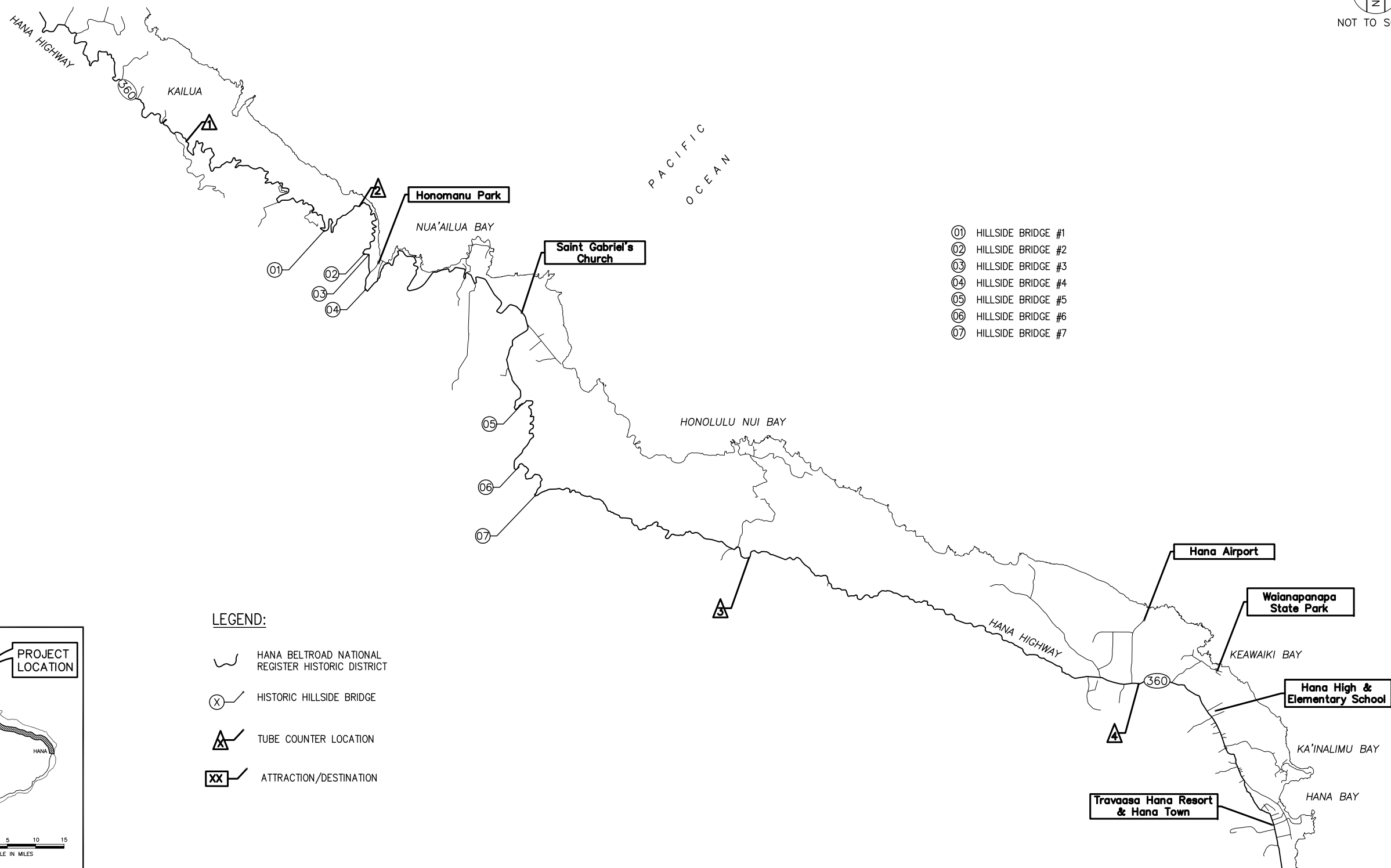
PROJECT BRIDGE LOCATIONS

FIGURE

2.1



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ISLAND OF MAUI

TRANSPORTATION MANAGEMENT
PLAN – HANA HIGHWAY BRIDGE
PRESERVATION PLAN

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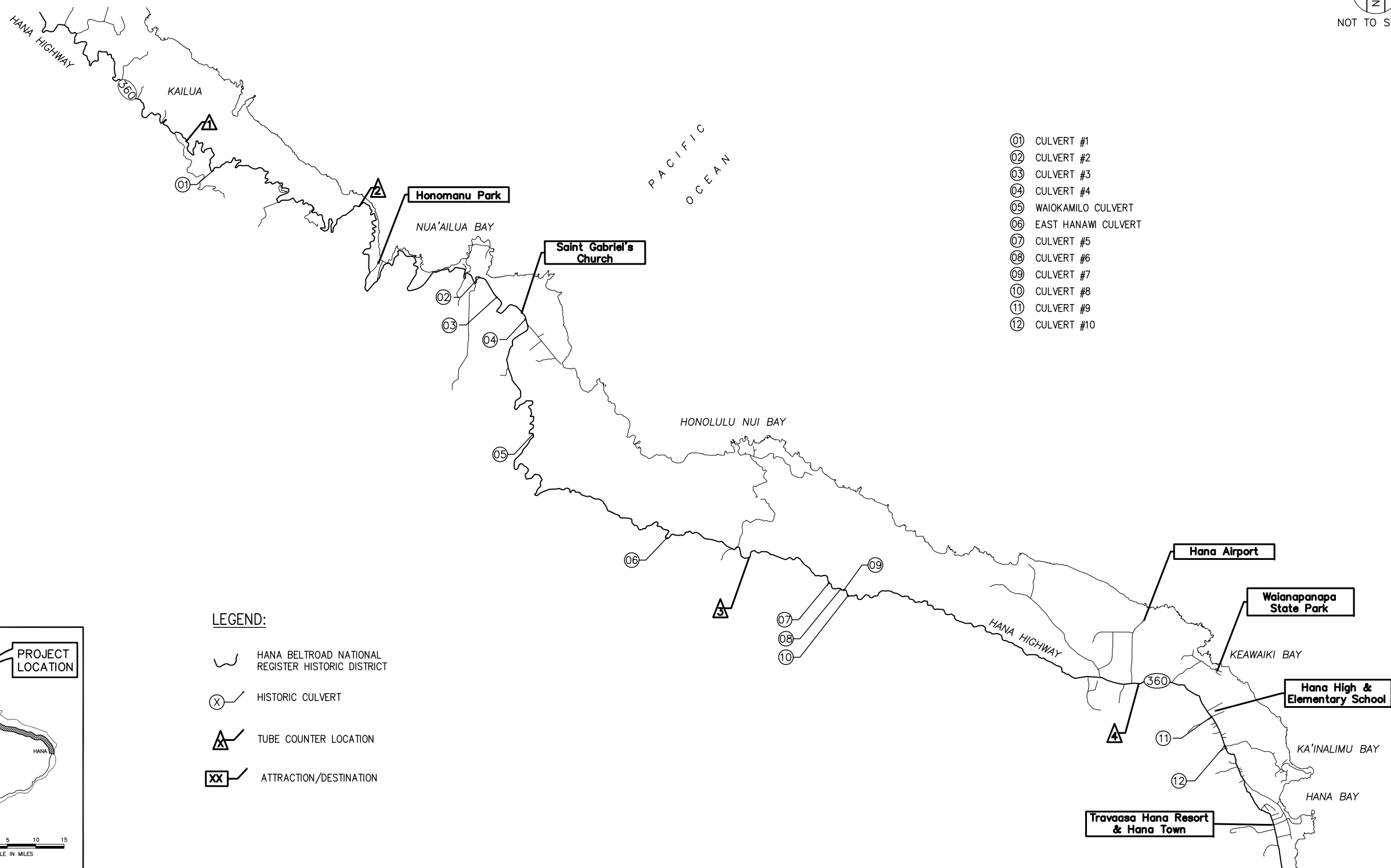
PROJECT HILLSIDE BRIDGE LOCATIONS

FIGURE

2.2



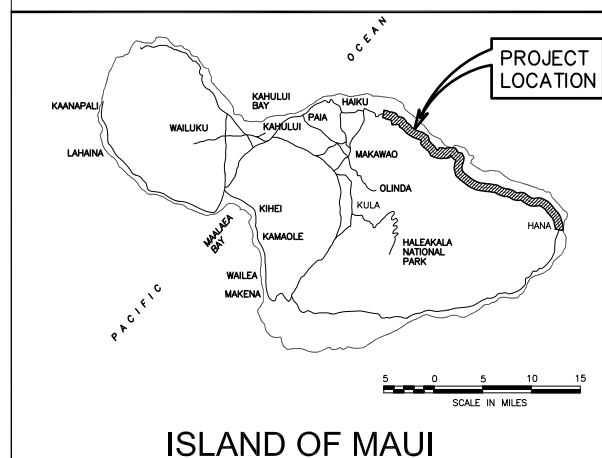
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- 01 CULVERT #1
- 02 CULVERT #2
- 03 CULVERT #3
- 04 CULVERT #4
- 05 WAIOKAMILO CULVERT
- 06 EAST HANAWI CULVERT
- 07 CULVERT #5
- 08 CULVERT #6
- 09 CULVERT #7
- 10 CULVERT #8
- 11 CULVERT #9
- 12 CULVERT #10

LEGEND:

- HANA BELTROAD NATIONAL REGISTER HISTORIC DISTRICT
- HISTORIC CULVERT
- TUBE COUNTER LOCATION
- ATTRACTION/DESTINATION



TRANSPORTATION MANAGEMENT
PLAN – HANA HIGHWAY BRIDGE
PRESERVATION PLAN

 **AUSTIN, TSUTSUMI & ASSOCIATES, INC.**
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PROJECT CULVERT LOCATIONS

FIGURE

2.3

Table 2.1 - Recommended Project Improvements

Bridge	Treatment Recommendation
1. Hoalua Stream Bridge	Preservation/Rehabilitation
2. Kailua Stream Bridge	Preservation/Rehabilitation
3. Nailiilihaele Stream Bridge	Preservation/Rehabilitation
4. Oopuola Stream Bridge	Preservation/Rehabilitation
5. Makanali Stream Bridge	Preservation/Rehabilitation
6. Kaaiea Stream Bridge	Preservation/Rehabilitation
7. Waikamoi Stream Bridge	Preservation/Rehabilitation
8. Puohokamoa Stream Bridge	Preservation/Rehabilitation
9. Haipuaena Stream Bridge	Preservation/Rehabilitation
10. Punalau Stream (Kolea) Bridge	Preservation/Rehabilitation
11. Honomanu Stream Bridge	Replacement
12. Nuaailua Stream Bridge	Preservation/Rehabilitation
13. Pinaau Stream Bridge	Preservation/Rehabilitation
14. Palauhulu Stream Bridge	Preservation/Rehabilitation
15. Waiokamilo Stream Bridge	Preservation/Rehabilitation
16. Waikani Stream Bridge	Preservation/Rehabilitation
17. West Wailuaiki Stream Bridge	Preservation/Rehabilitation
18. East Wailuaiki Stream Bridge	Preservation/Rehabilitation
19. Kopiliula Stream Bridge	Preservation
20. Puaakaa Stream Bridge	Preservation/Rehabilitation
21. Waiohue Stream Bridge	Preservation/Rehabilitation
22. Unnamed Bridge #1 (Waiohuolua Bridge)	Preservation/Rehabilitation
23. Unnamed Bridge #2	Preservation/Rehabilitation
24. Unnamed Bridge #3 (Paakea Bridge)	Preservation/Rehabilitation
25. Kapaula Stream Bridge	Preservation/Rehabilitation
26. Hanawi Stream Bridge	Preservation/Rehabilitation
27. East Hanawi Stream Bridge	Preservation/Rehabilitation
28. Makapipi Stream Bridge	Preservation/Rehabilitation
29. Kuhiwa Stream Bridge	Preservation/Rehabilitation
30. Kupukoi Stream Bridge	Preservation/Rehabilitation
31. Kahalaowaka (Unnamed) Stream Bridge	Preservation/Rehabilitation
32. Pupape (Manawaikeae) Stream Bridge	Preservation/Rehabilitation
33. Kahawaihapapa Stream Bridge	Preservation/Rehabilitation
34. Keaiki Stream Bridge	Preservation/Rehabilitation
35. West Waioni Stream Bridge	Preservation/Rehabilitation
36. Waioni Stream Bridge	Preservation/Rehabilitation
37. Lanikele Stream Bridge	Preservation/Rehabilitation
38. Heleleikeoha Stream Bridge	Preservation/Rehabilitation

Table 2.1 - Recommended Project Improvements

39. Ulaino Stream Bridge	Preservation/Rehabilitation
40. Mokulehua Stream Bridge	Preservation/Rehabilitation
41. Oilowai Stream Bridge	Preservation/Rehabilitation
42. Honomaele Stream Bridge	Preservation/Rehabilitation
43. Kawaipapa Stream Bridge	Preservation/Rehabilitation

Table 2.2 - Recommended Project Improvements

Hillside Bridge	Treatment Recommendation
1. Hillside Bridge #1	None
2. Hillside Bridge #2	None
3. Hillside Bridge #3	None
4. Hillside Bridge #4	None
5. Hillside Bridge #5	None
6. Hillside Bridge #6	None
7. Hillside Bridge #7	None

Table 2.3 - Recommended Project Improvements

Culvert	Treatment Recommendation
1. Culvert #1	Preservation/Rehabilitation
2. Culvert #2	Preservation/Rehabilitation
3. Culvert #3	Preservation/Rehabilitation
4. Culvert #4	Preservation/Rehabilitation
5. Waiokamilo Culvert	Preservation/Rehabilitation
6. East Hanawi Culvert	Preservation/Rehabilitation
7. Culvert #5	Preservation/Rehabilitation
8. Culvert #6	Preservation/Rehabilitation
9. Culvert #7	Preservation/Rehabilitation
10. Culvert #8	Preservation/Rehabilitation
11. Culvert #9	Preservation/Rehabilitation
12. Culvert #10	Preservation/Rehabilitation



3. EXISTING CONDITIONS

3.1 Roadway Descriptions

The below are descriptions of the existing roadway network in the vicinity of the Project:

Hana Highway - This roadway is generally a meandering east-west, two-way, two-lane, undivided arterial roadway. The posted speed limit varies between 15 miles per hour (mph) to 35 mph in the study area. Due to the winding alignment of Hana Highway and frequency of narrow travel lanes, sharp turns and one-lane bridges, warning signs recommend reduced speeds of 10 or 20 mph. This roadway runs along Maui's coastline providing regional connectivity between Kahului and Kaupo. Bridges along Hana Highway are primarily two-way, one-lane bridges, while some bridges provide for two-way, two-lane travel.

Typical warning signs along this corridor include the following:

- "One-Lane Bridge" sign
- "Road Narrows" sign
- Impending Yield approach sign

Typical regulatory signs along the Hana Highway corridor include the following:

- "Do Not Pass" sign
- "No Passing Zone" sign
- "Yield" sign
- Speed limit sign

Hana Highway provides access to residences, agricultural land uses, the Hana High & Elementary School (K-12; enrollment is 350 students), Travaasa Hana Resort, and the Hana Airport, which provides flights to and from local as well as mainland destination. Refer to Figure 2.1 for their locations.

3.2 24-Hour Traffic Volumes

ATA conducted 24-hour traffic counts at four locations along Hana Highway between June 20 and 25, 2014. See Figure 3.1 for the 24-hour plot for the first tube counter located on Hana Highway near milepost 6. See Figure 3.2 for the second tube counter located on Hana Highway near milepost 13.1. See Figure 3.3 for the third tube counter located on Hana Highway approximately at milepost 25.6. See Figure 3.4 for the fourth tube counter located on Hana Highway approximately at milepost 32.4.

Hana Highway is typically a two-lane roadway with one through lane in each direction. During construction, Hana Highway may experience partial one-lane or full two-lane roadway closures. As discussed earlier, a significant project according to the HDOT would be considered when the existing traffic volume during normal working hours exceeds 1,000 pc/l/h. Since the traffic volumes, total of both directions does not exceed the 1,000 pc/l/h threshold at any of the four tube count locations, the Project would be deemed as "Level 1: Not a Significant Project."

Figure 3.1 (Highest Volume Day)
24-Hour Plot - Mile Post 6.0 (6/23/2014)

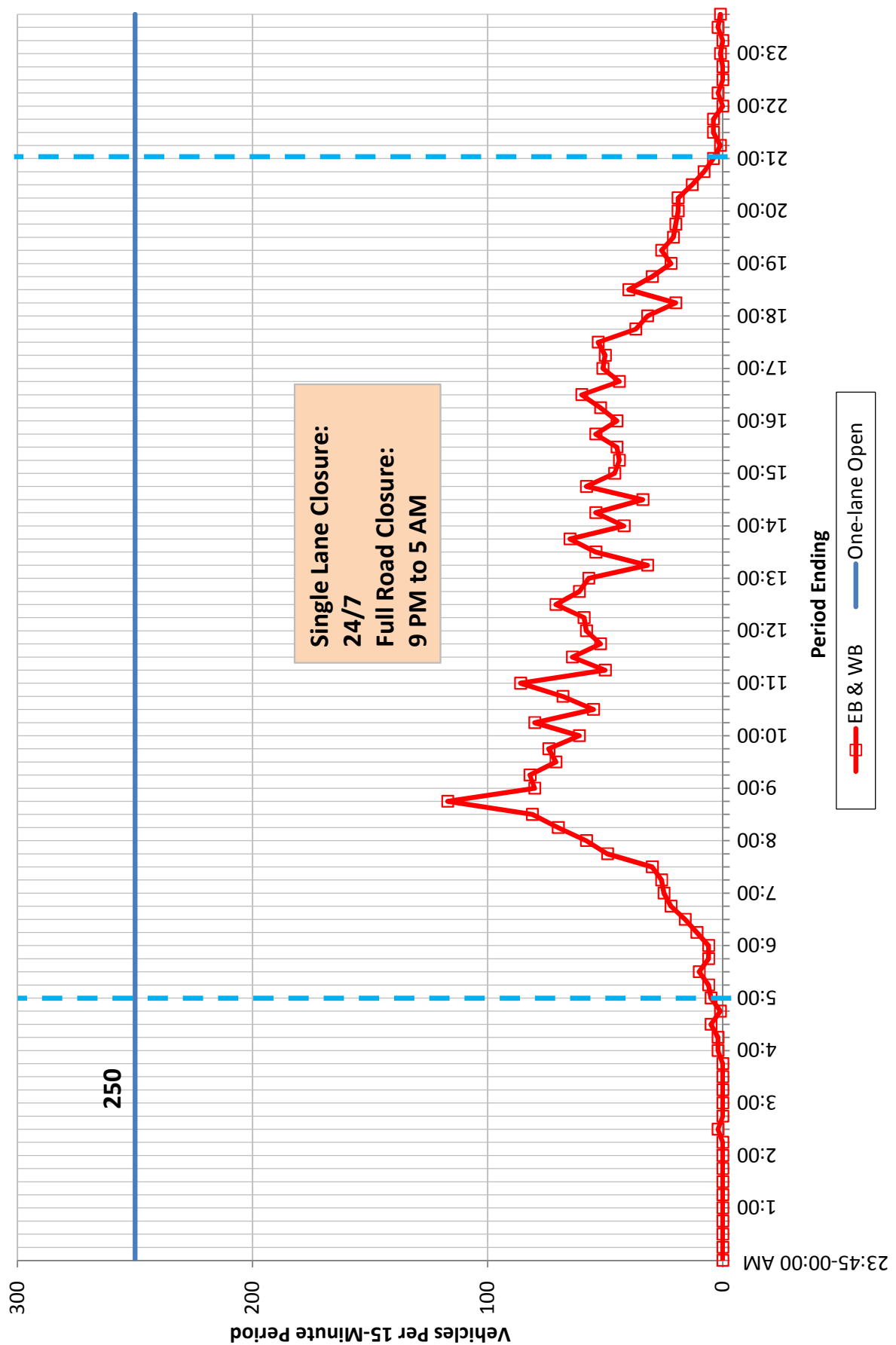


Figure 3.2 (Highest Volume Day)
24-Hour Plot - Mile Post 13.1 (6/24/2014)

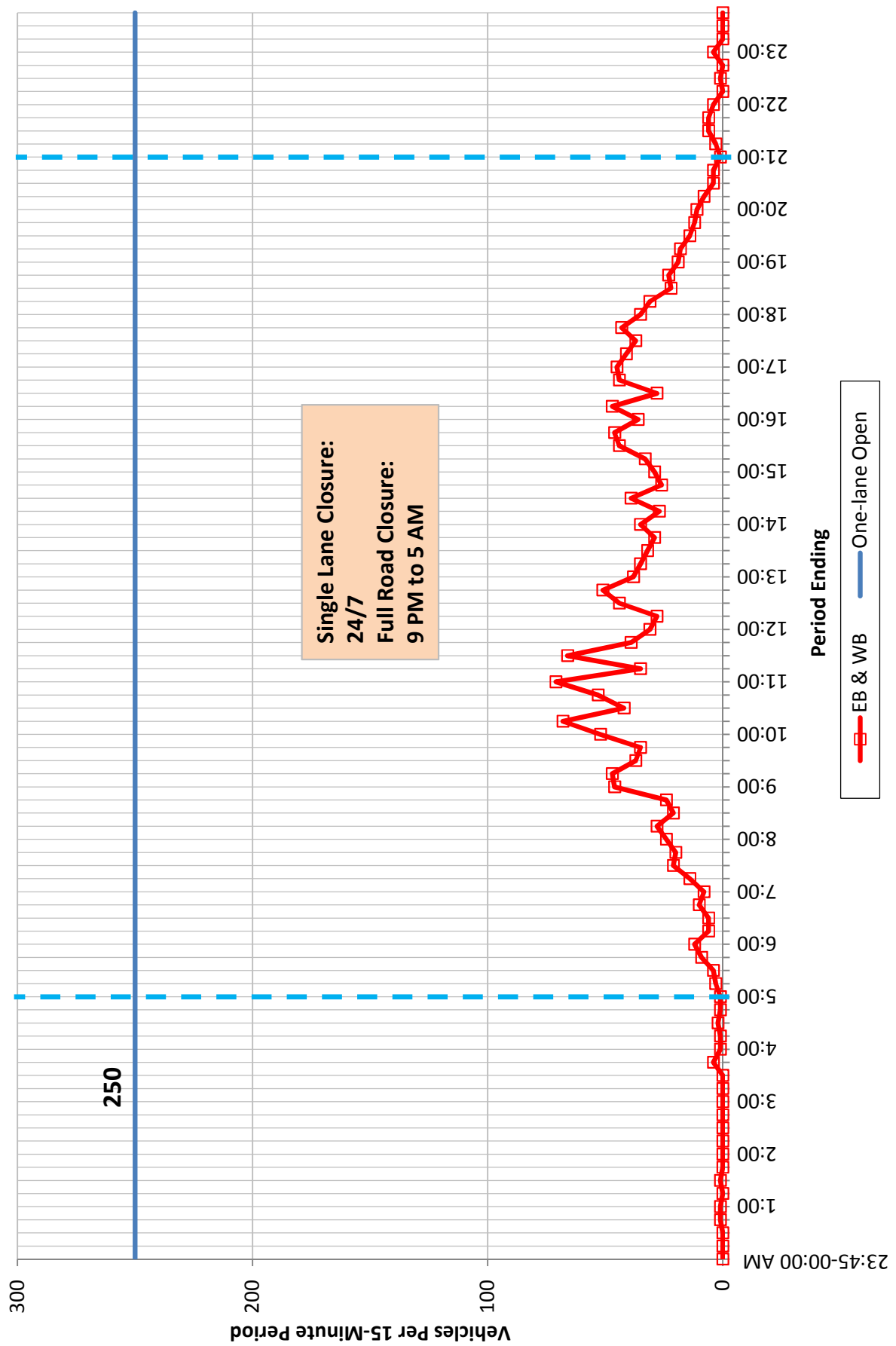


Figure 3.3 (Highest Volume Day)
24-Hour Plot - Mile Post 25.6 (6/23/2014)

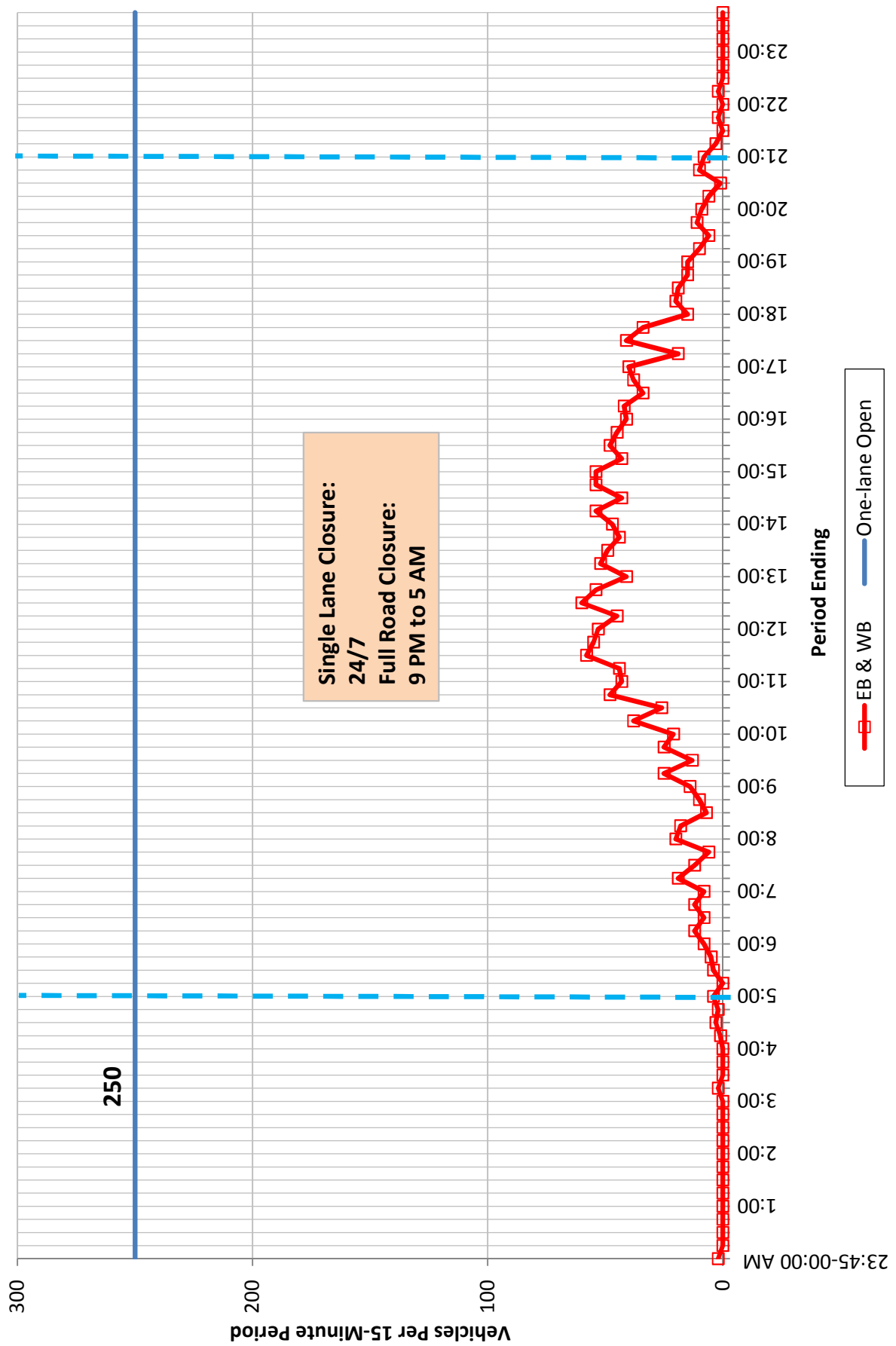
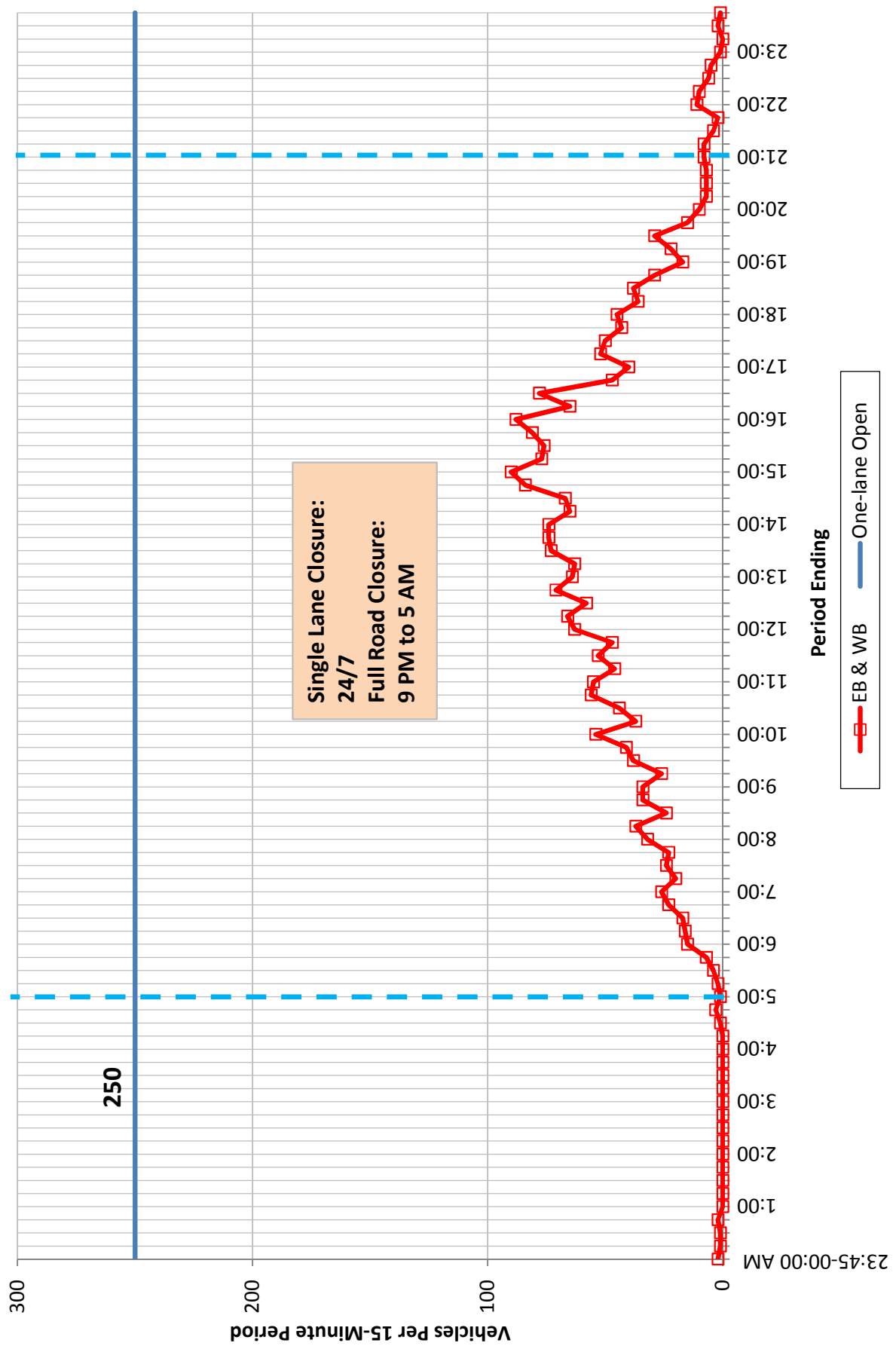


Figure 3.4 (Highest Volume Day)
24-Hour Plot - Mile Post 32.4 (6/24/2014)





4. CONSTRUCTION CONDITIONS

As discussed in Section 2 of this TMP, 43 bridges, 7 hillside bridges and 12 culverts will be rehabilitated with various upgrades and repairs. This document aims to provide a set of transportation management strategies, not limited to those listed, in order to minimize traffic impacts. This section discusses various components of the construction phase that will help determine appropriate TMP strategies and alternatives.

4.1 Construction Constraints

Each bridge has unique characteristics and will have varying degrees of challenges and constraints associated with it. Therefore, transportation management strategies should be implemented on a case-by-case basis. The following are some likely constraints that will be considered to determine the appropriate TMP measures to employ:

4.1.1 Construction Funding Constraints

Upgrades and repairs assessed for each bridge in the Hana Highway Bridge Preservation Plan will be constrained by an allotted construction fund. Construction for each bridge will need to be coordinated and planned to remain within budget.

4.1.2 Detour Bypass Route Constraints

The Hana Highway corridor in the Project study area does not provide any feasible detour routes in the immediate vicinity of bridge locations for vehicles to bypass construction activities. This eliminates the alternative to provide a detour bypass route to facilitate continuous two-way traffic flow near the construction area.

4.1.3 Bridge Repair Work Area Constraints

Many bridges are currently one-lane bridges or provide a narrow cross section for two-way vehicular travel. Repair work on each bridge may require single-lane or full roadway closures of the bridge and installation of temporary bridge structures to facilitate vehicular traffic around each bridge location.

4.1.4 Right-of-Way (ROW) Constraints

In many cases it may be necessary for DOT to enter into a construction easement agreement with adjacent landowners for use of adjacent properties during the construction phase. Adjacent lands will be necessary for implementation of temporary bridge structures and construction staging/work zone areas, which are discussed in further detail below.

4.1.4.1 Temporary Bridge Structures

Since many of the bridges are currently one-lane bridges or two-lane bridges with narrow cross sections, during construction the staging/work areas will likely require prohibiting access to the bridges. As a result, it may be necessary to construct a temporary bridge structure near to the existing bridge to maintain two-way traffic flow along Hana Highway, which in many cases, encroaches into private and/or County owned lands. Lane closures will likely be required for the installation and removal of the temporary bridge structure abutting the existing Hana Highway corridor.



4.1.4.2 Construction Staging Area

During the construction of the temporary bridge and bridge repair work, a construction staging area is needed for storage of construction equipment, supplies and vehicles and to provide adequate space for construction related activities to occur. The staging area will help to keep traffic flowing while bridge repair work is being done. The staging area would need to be located adjacent to the bridge structure and outside of the vehicular travel lanes along Hana Highway. Depending on each bridge location, it may not be feasible for staging areas to be placed within State DOT ROW and may encroach into private and/or County owned lands.

Given the topography of steep embankments and large hillside cliffs adjacent to the bridges, the staging areas may be forced to be placed within the vehicular travel way along Hana Highway and require roadway closures. In addition, transport of construction equipment and supplies between the staging area and bridge work area may require temporary lane closures.

4.1.5 Topographic Constraints

Available ROW bridge repair work space can be constrained by steep embankments, hillside cliffs, overgrown foliage, large trees and/or residential dwellings.

4.1.6 Height and Weight Constraints

Heavy machinery and equipment such as cranes may be restricted by the surrounding settings of each work zone area. Temporary bridges should be designed to accommodate heavy vehicles and construction supplies that may require transport over temporary bridge structures.

4.1.7 Roadway Alignment Constraints

Some bridges are located at the apex of relatively sharp horizontal curved alignments. Any detour or temporary bridge structure would need to be designed to provide for minimum turning radius curves to allow all vehicles to safely negotiate travel along curves at or near the bridge work zone area. Temporary bridge abutments need to also account for adequate sight distance for vehicles.

4.2 Temporary Bridge Structures

As discussed above, each bridge work area will likely be constrained by various factors that limit the ability for traffic to continuously flow through the construction area. Many bridges are currently one-lane bridges or provide a narrow cross section for two-way vehicular travel. In the event that two-way roadway closures are required, a temporary bridge structure should be considered as a detour to ongoing bridge construction work, while maintaining two-way traffic flow during the construction phase. Implementation of a temporary bridge should be determined based on the following considerations:

- The type of bridge repair work involved during bridge construction.
- Feasibility of constructing a temporary bridge based on site location (ROW, topography, alignment, sight distance).
- Determination of the cost of temporary bridge for budgetary purposes.
- Anticipated delays in overall bridge repair work with installation/removal of temporary bridge structure.



- Overall reduction of full two-way roadway closures that otherwise would occur if a temporary bridge was NOT implemented.

Temporary bridges will be constructed out of prefabricated modular steel components. These components are typically transported to and assembled on site, typically requiring little to no heavy equipment. Upon completion of bridge repair work, temporary bridges should be removed. Installation and removal of temporary bridges may require some form of roadway closures for a period of time. It is recommended that the contractor and engineers coordinate directly with suppliers of the temporary bridge structure to determine the extent of the above construction constraints and develop a method for installation of temporary bridges and any subsequent lane closures that would be of least impact to traffic.

4.3 Roadway Lane Closure Alternatives

Ideally, all lanes should remain open during construction activities along HDOT roadways. However, given the potential constraints identified at bridge locations along Hana Highway in Section 4.1, some form of lane closures may be required. When possible, a single travel lane should remain open at all times to maintain traffic flow through the construction area along the Hana Highway corridor.

4.3.1 Partial Single-Lane Closure

In the event that minimal bridge repair work will occur and it is determined that a temporary bridge will not significantly reduce traffic impacts, partial single-lane closures should be considered as the primary lane closure alternative where feasible. Single-lane closures will at a minimum, maintain one through lane for vehicular travel one direction at a time. Single-lane closures for the construction area should comply with standards obtained from AASHTO and MUTCD and account for the following considerations:

- Advanced warning signs that warn drivers of impending construction work and or delays related to single-lane closures.
- Police officers or flaggers that will be placed on either end of the work area to coordinate the start and stop of traffic through the single through lane and facilitate safe and continuous travel for emergency vehicles during construction. Traffic control should place police officers at safe locations preferably near a barrier for safety due to the abundance of sight distance issues.
- Appropriate speed limits and delineation along the roadway to negotiate travel through construction area.
- Proper lighting for travel through the construction area.
- Determination of work hours
 - The 24-hour traffic counts collected by ATA in 2014 at four locations along Hana Highway and shown in Figures 3.1-3.4 were utilized to determine the most favorable work hours during the single-lane closure along Hana Highway.
 - The traffic volume would be below 250 pc/l/15 minutes during all hours of the day and thus not considered a significant Project according to HDOT.
 - In addition, according to the Federal Highway Administration (FHWA) Work Zone Modeling and Simulation – Traffic Analysis Tools Volume IX, the capacity for a



1600 ft two-way, one-lane work zone is approximately 800 vehicles per hour and is shown in Appendix B. Based on Figures 3.1-3.4, no peak hour approaches the 800 vehicles per hour threshold and thus, single-lane closures at each bridge location along Hana Highway could be allowed during any hour of the day.

4.3.2 Full Two-Way Lane Closure

Full two-way lane closures are not ideal and should be avoided if at all possible. Since there are no feasible local detour/bypass routes available for vehicles traveling between the Project's study limits, both local and regional travelers may experience excessive delays and lengthy detour routes in the event of full two-way lane closures. In addition, detour routes will likely occur via the south coast of Maui, which traverses uncomfortably narrow and winding terrain through which buses and rental vehicles may not be able to traverse. The following two examples show the extent of potential reroutes and increase in travel times as a result of full two-way lane closures:

- Local Detour Example 1: Consider a vehicle that typically drives 30 miles along Hana Highway between Mile Post (MP) 1 and Hana Town (MP 31). In the event of a full two-way lane closure, the vehicle will need to reroute towards the south coast of Maui via Piilani Highway-Kula Highway-Kaupakalua Road for approximately 66 total miles for the one-way trip.
- Regional Detour Example 2: Consider a vehicle that typically travels 20 miles along Hana Highway between Mile Post (MP) 1 and the Kahului Airport. In the event of a full two-way lane closure, the vehicle will need to reroute towards the south coast of Maui via Piilani Highway-Kula Highway-Haleakala Highway for approximately 95 total miles.

As discussed in Section 4.2, in the event two-way traffic flow cannot be provided at a bridge location during ongoing construction work, a temporary bridge structure may be used to temporarily detour traffic along Hana Highway and facilitate two-way travel along the corridor. However, installation and removal of temporary bridge structures may require some form of lane closure with the potential implementation of full two-way lane closures. If it is determined that full two-way road closures are absolutely unavoidable, the following should apply:

4.3.2.1 HDOT Determination

Although the HDOT Determination on page 2 deemed this Project as a "Level 1: Not a Significant Project" based on existing 24-hour traffic counts in the study area, HDOT's Transportation Management Plan Guidelines dated October 3, 2007, provides guidance that indicates any full two-way road closures requires the Project to be reviewed similar to a "Level 3: Significant Project". A Level 3 determination would result in an additional approval process that may require supplemental information, analyses and evaluations specific to each full two-way road closure. Final approval on any full two-way road closure would need to be vetted to the HDOT Traffic Branch and obtain final approval by the HDOT Director or its designated representative.

4.3.2.2 Implementation Strategy

In order to minimize impacts of full two-way road closures, the following strategy should be employed where feasible:



- HDOT defines a “significant traffic impact” as equal or above 30 minutes of normal recurring traffic delay on the facility (or the delay threshold set by the Administration). Therefore, full two-way road closures should be administered on an interval-basis to NOT delay a vehicle longer than 30 minutes at a time.
- Full two-way road closures should be restricted to non-peak periods of the day.
 - The 24-hour traffic counts collected by ATA in 2014 at four locations along Hana Highway and shown in Figures 3.1-3.4 were utilized to determine the most favorable work hours for full two-lane closure during a typical day between Monday-Friday.
 - With the intent of minimizing traffic impacts, it was determined that if full two-lane closures be implemented, it is recommended that closures be limited to nighttime hours between 9:00 PM to 5:00 AM, when traffic volumes are typically very light; between these hours, no more than 13 total vehicles per hour in both directions, traversed the four traffic count locations between MP 6 and MP 32.4. In addition, the majority of hourly volumes during this duration remained under 5 vehicles in both directions.
- Full two-way road closures beyond the period between 9:00 PM and 5:00 AM, if necessary, should only be implemented when public schools are not in session, to minimize impacts to students, parents and teachers.
- Any full two-way road closure at a specific bridge location should be coordinated and scheduled concurrently with other nearby bridge locations where possible to reduce the overall amount of implemented full two-way road closure, provided that the road closure maintains a detour route for any residence or neighborhood and does not confine them between two full two-way road closures.
- Any full two-way road closure should be coordinated and scheduled with other HDOT or County of Maui projects to determine the best strategy to employ full two-way roadway closures.
- Special provisions should be made prior to any full two-way road closures to provide for emergency services or major government agencies.

4.3.2.3 Construction Incentive & Disincentive Provision

In the event full two-way lane closures are implemented, State DOT can look into creating incentive and disincentive provisions with the contractor to manage the length of time full two-way lane closures remain in effect. Various construction tasks can be broken down to an agreed upon timeframe when full two-way lane closures will be allowed. Construction contractors could then be rewarded if tasks are completed less than the specified time frame or penalized if tasks are completed beyond the specified time frame.

4.3.3 Public Information

All construction activities and/or road closures will have a significant impact on the communities in the vicinity of the Project. As a result, all information should be planned and coordinated with the following considerations in mind:



- Prior to any construction, any roadway closures should be discussed with communities in the area. Roadway closures will be coordinated with residents, businesses, churches government agencies, airport, schools and emergency services.
- Similar to other road closure projects done previously in the area, a 24-hour telephone hotline should be established prior to the start of construction, providing information regarding any road closures and impending construction work. The hotline should remain in effect until all construction work and roadway closures are completed.
- Notification of construction work and roadway closures should be transmitted through the following outlets:
 - Residential/Business Mail Notices
 - Newspapers
 - Paid Advertisements
 - Flyers
 - Community Information Meetings
 - Government & News Website Notice
- Utilize electronic message boards two (2) weeks prior to the start of construction so motorists are aware of the Project. Electronic message boards should be updated regularly to minimize confusion.

4.3.4 Emergency Vehicles

Any partial and/or full two-way lane closures should be coordinated with the nearby health and emergency services (fire, police and ambulance services), prior to implementation of any roadway closures. Special provisions should be made to allow emergency vehicles travel through the construction zone unimpeded and without lengthy delays.

- Police: In the vicinity of the study area, the Maui County Police Department currently provides two police stations in the Wailuku and Kahului regions. The Hana region is serviced by the Hana Police Station approximately ¼ mile south of the Kawaipapa Bridge at the Hana Highway/Uakea Road intersection.
- Fire and Public Safety: In the vicinity of the study area, the Maui County Department of Fire and Public Safety provides stations in the Wailuku, Kahului, Kula and Paia regions. The Hana region is serviced by the Hana Fire Station approximately ¼ mile south of the Kawaipapa Bridge at the Hana Highway/Uakea Road intersection.
- Emergency Medical Service: In the vicinity of the study area, Maui County provides paramedic stations (Medic 1, 2, 10, 11, respectively) in the Wailuku, Makawao, Kahului and Kula regions. Maui Memorial Medical Center is the only acute care hospital on Maui and is located in Wailuku. The Hana region is serviced by the Hana Community Healthcare Center, with emergency medical service provided by Medic 6.



5. RECOMMENDATIONS

5.1 Early Planning and Coordination

Plan and coordinate all construction activity, traffic management strategies and any lane closure operations at the earliest possible stage prior to start of construction with the following agencies, businesses and organizations:

- Hana residents, businesses, churches and government agencies
- State Department of Education
- Hana Airport
- Maui Police Department
- Maui Fire Department
- Maui County Emergency Services

5.2 Temporary Bridge Structure

During the design phase, the contractor and engineer should work with suppliers of the temporary bridge structure to determine the feasibility and best method for implementing and removing temporary bridge structures at each bridge location to reduce traffic impacts. Need to consider constraints related to the following:

- Availability for construction of temporary bridge structure to remain within DOT ROW.
- Topographic constraints related to adjacent embankments, hillside cliffs, overgrown foliage, large trees and roadway alignments.
- Height and weight constraints for temporary bridge structure.
- Sight distance.
- Lane closures.
- Duration and time-of-day for implementation of roadway closures.

5.3 Construction Staging Area

During the design phase, the engineer should work with the contractor to determine the feasibility and best method to provide for a staging area at each bridge location for storage of construction equipment, supplies and vehicles and to provide adequate space for construction related activities that can reduce traffic impacts. Need to consider constraints related to the following, but shall not be limited to:

- Available staging area space to remain within DOT ROW.
- Location of staging area, which would ideally be located adjacent to the bridge work area.
- Topographic constraints related to adjacent embankments, hillside cliffs, overgrown foliage, large trees and roadway alignments.



- Feasibility for transport of construction equipment and supplies between staging area and bridge work area.

5.4 Lane Closures

While it is preferred that at least a single lane of travel be maintained along Hana Highway during construction, it is possible that full two-way lane closures will be required. It is recommended that if possible, full two-way lane closures be limited to between 9:00 PM and 5:00 AM, where traffic volumes are minimal.

5.4.1 Partial Single-Lane Closure

- Advanced warning signs should warn drivers of impending construction work and or delays related to single-lane closures.
- Police officers or flaggers should be placed on either end of the work area to coordinate the start and stop of traffic through the single through lane and facilitate safe and continuous travel for emergency vehicles during construction. Traffic control should place police officers at safe locations due to sight distance issues.
- Appropriate speed limits and delineation should be provided along the roadway to negotiate travel through construction area.
- Proper lighting should be provided for travel through the construction area.
- Single-lane closures at each bridge location along Hana Highway should be allowed during any hour of the day.

5.4.2 Full Two-Way Lane Closure

- Full two-way lane closures should be avoided if at all possible.
- With no feasible detour routes available for vehicles traveling between the Project's study limits, both local and regional travelers may experience lengthy detour routes in excess of 3 hours greater than their normal route.
- If it is determined that full two-way road closures are unavoidable, each full two-way road closure will be reviewed similar to a Level 3 determination and result in an additional approval process that may require supplemental information, analyses and evaluations specific to each full two-way road closure. Final approval on any full two-way road closure would need to be vetted to the HDOT Traffic Branch and obtain final approval by the HDOT Director or its designated representative.
- In order to minimize impacts of full two-way road closures, the following strategy should be employed where feasible:
 - Full two-way road closures should be administered on an interval-basis to NOT cause a delay a vehicle longer than 30 minutes.
 - Full two-way road closures should be restricted to nighttime hours between 9:00 PM to 5:00 AM.
 - If full two-way road closures are necessary outside of the hours specified above, the closures should be implemented when public schools are not in session, to minimize impacts to students, parents and teachers.



- Any full two-way road closure at a specific bridge location should be coordinated and scheduled concurrently with other nearby bridge locations to reduce the overall amount of implemented full two-way road closure, provided that the road closure maintains a detour route for any residence or neighborhood and does not confine them between two full two-way road closures.
- Any full two-way road closure should be coordinated and scheduled with other HDOT or County of Maui projects to determine the best strategy to employ full two-way roadway closures.
- Special provisions should be made prior to any full two-way road closures to provide for emergency services or major government agencies.



6. REFERENCES

1. Federal Highway Administration (FHWA), Traffic Analysis Tools Volume IX: Work Zone Modeling and Simulation, December 2000.
2. M&E Pacific, Inc., Hana Highway Improvements, Uakea Road to Keawa Place Draft Environmental Assessment, February 2009.
3. State of Hawaii Department of Transportation Highways Division, Transportation Management Plan Guidelines, October 2007.
4. Wilson Okamoto & Associates, Inc., Paihi Bridge Replacement Final Environmental Assessment, August 2002.

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APPENDICES



APPENDIX A

Traffic Count Data

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501 Sumner suite 521

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Page 5

Site Code: Mile Post 6.0
Station ID: 24670
Hana Highway Bridge Preservation

Latitude: 0' 0.0000 Undefined

Start Time	23-Jun-14 Mon	Eastbound		Hour Totals		Westbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	37			0	21				
12:15		0	33			0	26				
12:30		0	37			0	34				
12:45		0	31	0	138	0	30	0	111	0	249
01:00		0	29			0	28				
01:15		0	19			0	13				
01:30		0	30			0	24				
01:45		0	31	0	109	0	34	0	99	0	208
02:00		0	22			0	20				
02:15		0	26			0	28				
02:30		1	12			1	22				
02:45		0	22	1	82	0	36	1	106	2	188
03:00		0	14			0	32				
03:15		0	16			0	28				
03:30		0	21			0	24				
03:45		0	18	0	69	0	36	0	120	0	189
04:00		1	21			1	24				
04:15		1	16			1	36				
04:30		2	18			3	42				
04:45		1	14	5	69	0	30	5	132	10	201
05:00		3	13			2	38				
05:15		3	18			3	32				
05:30		7	18			3	35				
05:45		3	13	16	62	3	24	11	129	27	191
06:00		3	8			3	24				
06:15		6	5			5	15				
06:30		9	14			7	26				
06:45		11	7	29	34	11	23	26	88	55	122
07:00		13	7			12	15				
07:15		16	9			10	17				
07:30		16	8			14	13				
07:45		29	6	74	30	20	14	56	59	130	89
08:00		32	9			26	10				
08:15		40	10			30	9				
08:30		47	8			34	5				
08:45		61	5	180	32	56	3	146	27	326	59
09:00		45	3			35	1				
09:15		51	0			31	1				
09:30		42	2			29	2				
09:45		43	3	181	8	31	1	126	5	307	13
10:00		37	0			24	0				
10:15		49	2			31	0				
10:30		37	0			18	0				
10:45		50	0	173	2	18	0	91	0	264	2
11:00		55	1			31	0				
11:15		30	0			20	0				
11:30		38	1			26	1				
11:45		30	1	153	3	22	0	99	1	252	4
Total		812	638			561	877			1373	1515
Percent		56.0%	44.0%			39.0%	61.0%			47.5%	52.5%

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Page 6

Site Code: Apollyon
Station ID: SN:024574
Hana Highway Bridge Preservation
Site Code: Mile Post 13.1
Latitude: 0' 0.0000 Undefined

Start Time	24-Jun-14 Tue	Westbound		Hour Totals		Eastbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	5			0	26				
12:15		0	3			0	25				
12:30		0	11			0	33				
12:45		1	9	1	28	0	42	0	126	1	154
01:00		0	10			1	28				
01:15		0	13			0	22				
01:30		1	8			0	24				
01:45		0	8	1	39	0	21	1	95	2	134
02:00		0	14			0	21				
02:15		0	15			0	12				
02:30		0	22			0	17				
02:45		0	11	0	62	0	15	0	65	0	127
03:00		0	17			0	12				
03:15		0	17			0	16				
03:30		0	34			0	10				
03:45		1	37	1	105	3	9	3	47	4	152
04:00		1	26			0	10				
04:15		1	38			0	9				
04:30		2	20			0	8				
04:45		0	30	4	114	1	14	1	41	5	155
05:00		1	34			0	11				
05:15		2	33			1	8				
05:30		4	29			0	8				
05:45		6	33	13	129	3	10	4	37	17	166
06:00		4	26			8	9				
06:15		4	26			2	5				
06:30		3	16			3	6				
06:45		8	17	19	85	2	6	15	26	34	111
07:00		3	15			5	4				
07:15		8	12			6	6				
07:30		11	12			10	2				
07:45		8	12	30	51	12	0	33	12	63	63
08:00		12	7			12	4				
08:15		9	5			19	3				
08:30		5	4			16	0				
08:45		8	2	34	18	16	2	63	9	97	27
09:00		10	1			36	0				
09:15		6	1			41	2				
09:30		7	1			30	5				
09:45		5	4	28	7	30	2	137	9	165	16
10:00		8	3			44	1				
10:15		6	0			62	0				
10:30		1	0			41	1				
10:45		7	0	22	3	46	0	193	2	215	5
11:00		13	1			58	3				
11:15		0	0			35	0				
11:30		12	0			54	0				
11:45		7	0	32	1	32	0	179	3	211	4
Total		185	642			629	472			814	1114
Percent		22.4%	77.6%			57.1%	42.9%			42.2%	57.8%

Austin Tsutsumi & Associates

501 Sumner suite 521

Honolulu, HI 96817

Ph. (808) 533-3646 F. (808) 526-1267

Page 5

Site Code: Apollyon
Station ID: SN:024667
Hana Highway Bridge Preservation
Site Code: Mile Post 25.6
Latitude: 0' 0.0000 Undefined

Start Time	23-Jun-14 Mon	Westbound		Hour Totals		Eastbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		1	7			1	46				
12:15		0	8			0	37				
12:30		0	18			0	42				
12:45		0	14	1	47	0	40	1	165	2	212
01:00		0	14			0	27				
01:15		0	12			0	40				
01:30		0	14			0	35				
01:45		0	18	0	58	0	26	0	128	0	186
02:00		0	25			0	22				
02:15		0	24			0	30				
02:30		0	22			0	21				
02:45		0	25	0	96	0	29	0	102	0	198
03:00		0	30			0	24				
03:15		1	23			1	20				
03:30		0	28			0	20				
03:45		0	26	1	107	0	19	1	83	2	190
04:00		0	26			0	15				
04:15		1	28			0	14				
04:30		2	20			1	14				
04:45		1	24	4	98	1	14	2	57	6	155
05:00		4	30			0	10				
05:15		0	11			0	8				
05:30		4	31			0	10				
05:45		3	22	11	94	2	12	2	40	13	134
06:00		7	11			1	4				
06:15		6	14			6	6				
06:30		6	13			2	6				
06:45		9	13	28	51	3	2	12	18	40	69
07:00		6	11			2	4				
07:15		14	6			5	4				
07:30		10	4			2	2				
07:45		3	8	33	29	3	3	12	13	45	42
08:00		8	5			12	4				
08:15		8	4			10	2				
08:30		2	0			5	1				
08:45		2	5	20	14	8	5	35	12	55	26
09:00		8	3			6	5				
09:15		10	1			15	2				
09:30		6	0			7	0				
09:45		9	1	33	5	16	1	44	8	77	13
10:00		8	0			13	0				
10:15		10	1			28	1				
10:30		3	0			23	0				
10:45		12	0	33	1	36	0	100	1	133	2
11:00		5	0			38	0				
11:15		5	0			39	0				
11:30		13	0			45	0				
11:45		9	0	32	0	46	0	168	0	200	0
Total		196	600			377	627			573	1227
Percent		24.6%	75.4%			37.5%	62.5%			31.8%	68.2%

Site Code: 00000000000000000000

Station ID: 000000000000000024668

Hana Highway Bridge Preservation

Milepost 32.4

Latitude: 0' 0.0000 Undefined

Start Time	23-Jun-14 Mon	Eastbound		Hour Totals		Westbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	48			2	12				
12:15		0	34			0	26				
12:30		0	37			1	20				
12:45		0	51	0	170	1	21	4	79	4	249
01:00		0	51			1	21				
01:15		0	43			0	23				
01:30		1	48			0	23				
01:45		0	42	1	184	0	34	1	101	2	285
02:00		0	51			0	35				
02:15		0	39			0	30				
02:30		0	37			0	38				
02:45		0	36	0	163	0	32	0	135	0	298
03:00		0	50			0	32				
03:15		0	39			1	34				
03:30		1	35			0	40				
03:45		0	38	1	162	0	44	1	150	2	312
04:00		0	36			1	26				
04:15		0	24			0	38				
04:30		1	21			0	22				
04:45		2	33	3	114	3	30	4	116	7	230
05:00		1	22			0	18				
05:15		2	21			2	35				
05:30		1	19			3	32				
05:45		5	20	9	82	5	24	10	109	19	191
06:00		4	12			7	24				
06:15		9	9			6	24				
06:30		8	7			9	26				
06:45		12	10	33	38	8	29	30	103	63	141
07:00		5	7			16	8				
07:15		10	8			15	9				
07:30		12	6			10	9				
07:45		17	7	44	28	16	7	57	33	101	61
08:00		16	3			17	6				
08:15		17	6			12	7				
08:30		18	6			11	6				
08:45		19	5	70	20	13	3	53	22	123	42
09:00		13	4			18	4				
09:15		18	6			9	2				
09:30		24	2			15	2				
09:45		17	0	72	12	14	1	56	9	128	21
10:00		30	2			18	3				
10:15		17	2			12	2				
10:30		25	2			21	0				
10:45		29	1	101	7	17	0	68	5	169	12
11:00		28	0			14	3				
11:15		35	0			17	0				
11:30		27	0			12	0				
11:45		36	0	126	0	14	1	57	4	183	4
Total		460	980			341	866			801	1846
Percent		31.9%	68.1%			28.3%	71.7%			30.3%	69.7%



APPENDIX B

FHWA Traffic Analysis Tools Volume IX: Work Zone Modeling & Simulation

WORK ZONE MOBILITY AND SAFETY PROGRAM

Traffic Analysis Tools Volume IX: Work Zone Modeling and Simulation A Guide for Analysts

Wisconsin DOT Work Zone Signal Optimization

Wisconsin DOT Work Zone Signal Optimization	
Work Zone Characteristics	
Transportation Analysis:	
Approach	Traffic Signal Optimization
Modeling Tools	Synchro/SimTraffic
Work Zones:	
Type	Type I and IV
Network Configuration	Isolated
Geographic Scale:	
Work Zone Size	Small
Analysis Area	Local

Use of Signal Optimization Tools in Work Zone Traffic Analysis

Signal optimization tools such as Passer, Synchro/SimTraffic, and Transyt 7F have a variety of applications for work zone analysis, especially in urban and suburban environments. Broadly speaking, these applications can be grouped in three categories:

1. Preparing timing plans for temporary signals used to manage traffic within a construction site.
2. Adjusting signal timing on corridors that are directly impacted by construction.
3. Adjusting signal timing to improve progression on corridors that serve as alternate routes or detours around a work zone.

Temporary Signals. Figure 29 shows an example of the use of Synchro/SimTraffic to optimize the timing of a temporary traffic signal. In this case, two-way one-lane operation will be in effect during a bridge construction project (in other words, eastbound and westbound traffic will be sharing a single lane). Synchro's Ring/Barrier Editor was used to create a configuration that mimics the operation of the temporary signal by alternately sending eastbound and westbound traffic along the restricted section. Synchro's signal optimization algorithm was then used to establish a timing plan that minimizes traffic delays. The analysis also provides an indication of the extent of queuing on the approaches to the one-lane segment, which is useful in determining whether access to side roads will be blocked by queued traffic.

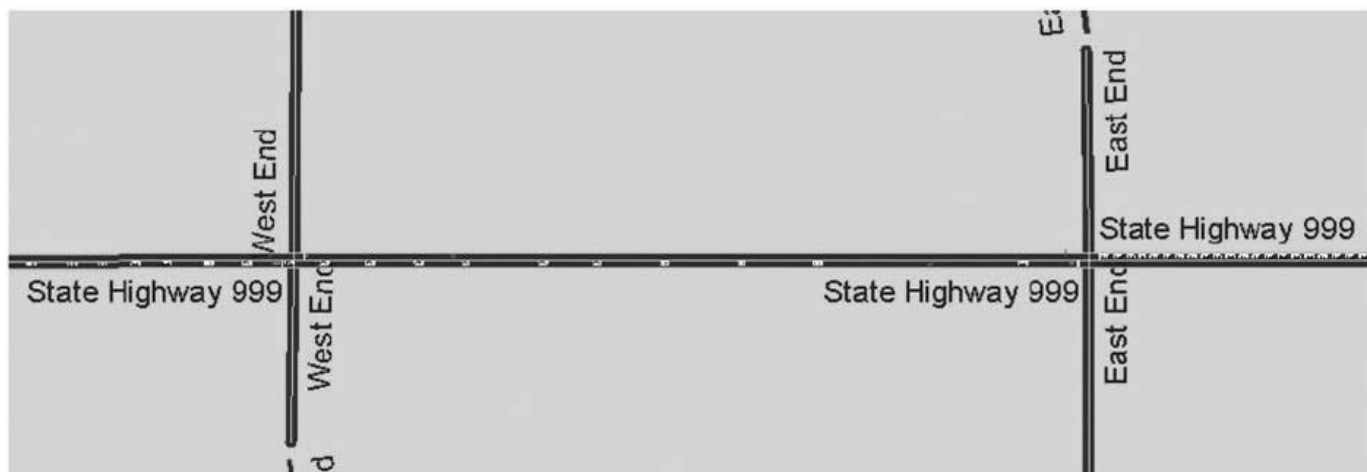


Figure 29 Synchro/SimTraffic Model of a Work Zone with Two-Way One-Lane Operation

*Note the westbound vehicles queuing while eastbound traffic is allowed to proceed.

This method can also be used to evaluate the impact of work zone length on capacity and throughput for sites with two-way one-lane operations. As shown in Figure 30, the capacity of two-way one-lane sections is sensitive to the length of the restricted section. Therefore, in many cases there is a trade-off between what is convenient for construction operations and what is acceptable in terms of traffic impact.

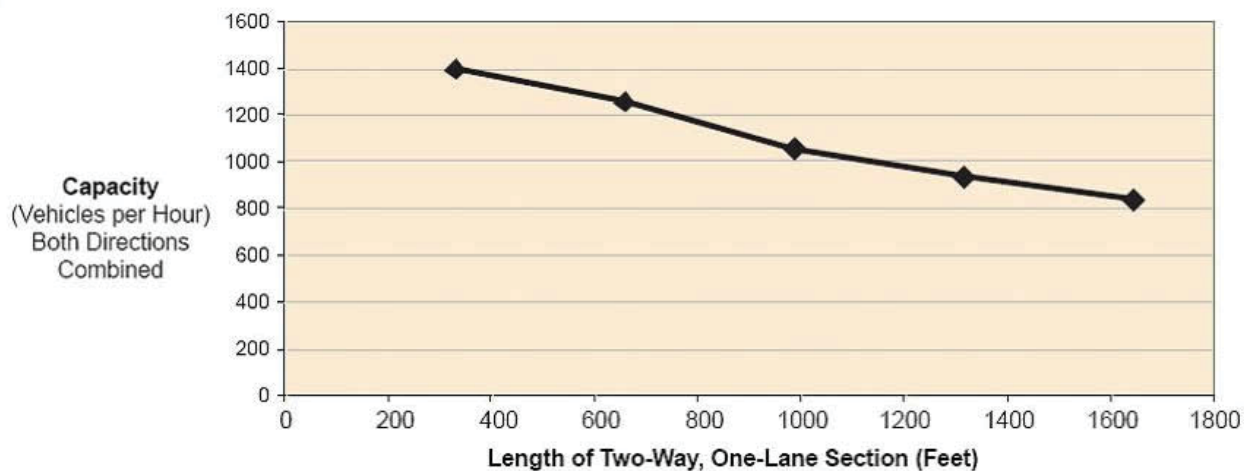


Figure 30 Capacity vs Length for Two-Way One-Lane Flagging Operations

Adjusting Timing on Corridors Affected by Construction. Normally, signal timing plans are developed based on the assumption that all of the lanes that exist at each intersection will be available for traffic to use. This assumption may not be true during construction. For example, take an intersection where a two of the three lanes have been closed to traffic. In this case, all traffic is directed to use the right lane, severely impacting the capacity of the signalized intersection.

In such situations, to avoid excessive queuing and delay it may be necessary to make fundamental changes in the signal timing at individual intersections or along an entire corridor. In the example shown in the photo, it may be desirable to increase the cycle length to compensate for the fact that left, thru, and right turning vehicles are sharing a single lane. To maintain good traffic progression along the corridor, signal offsets may need to be adjusted to account for reduced travel speeds. In addition, temporary changes in access to business properties along the corridor may affect turn patterns, requiring adjustments in signal phasing and splits. The use of a signal optimization tool allows all of these variables to be addressed comprehensively.

Adjusting Timing on Parallel Routes. The Daniel Webster Hoan Memorial Bridge carries Interstate 794 over the Milwaukee River in Milwaukee, Wisconsin. As shown in Figure 31, on December 13, 2000 there was a structural failure on one span of the bridge. The failure required immediate lane closures, resulting in diversion of all traffic to other routes.

To accommodate increased traffic on the arterial street that runs directly parallel to I-794, the City of Milwaukee used signal optimization tools to prepare a revised traffic signal timing plan for the Kinnickinnic Avenue/First Street corridor (WIS 32). The revised signal timing plan was implemented less than 48 hours after the incident occurred (and at minimal cost). It increased the green time allocated to north-south thru traffic, and reduced the amount of time allocated to side streets. The revised signal timing is believed to have been instrumental in reducing traffic delays and minimizing the overall impacts of the bridge failure and subsequent reconstruction activities.



Figure 31 Structural failure on Daniel Webster Hoan Memorial Bridge, December 13, 2000.

[Table of Contents](#) | [Previous](#) | [Next](#)

APPENDIX 3

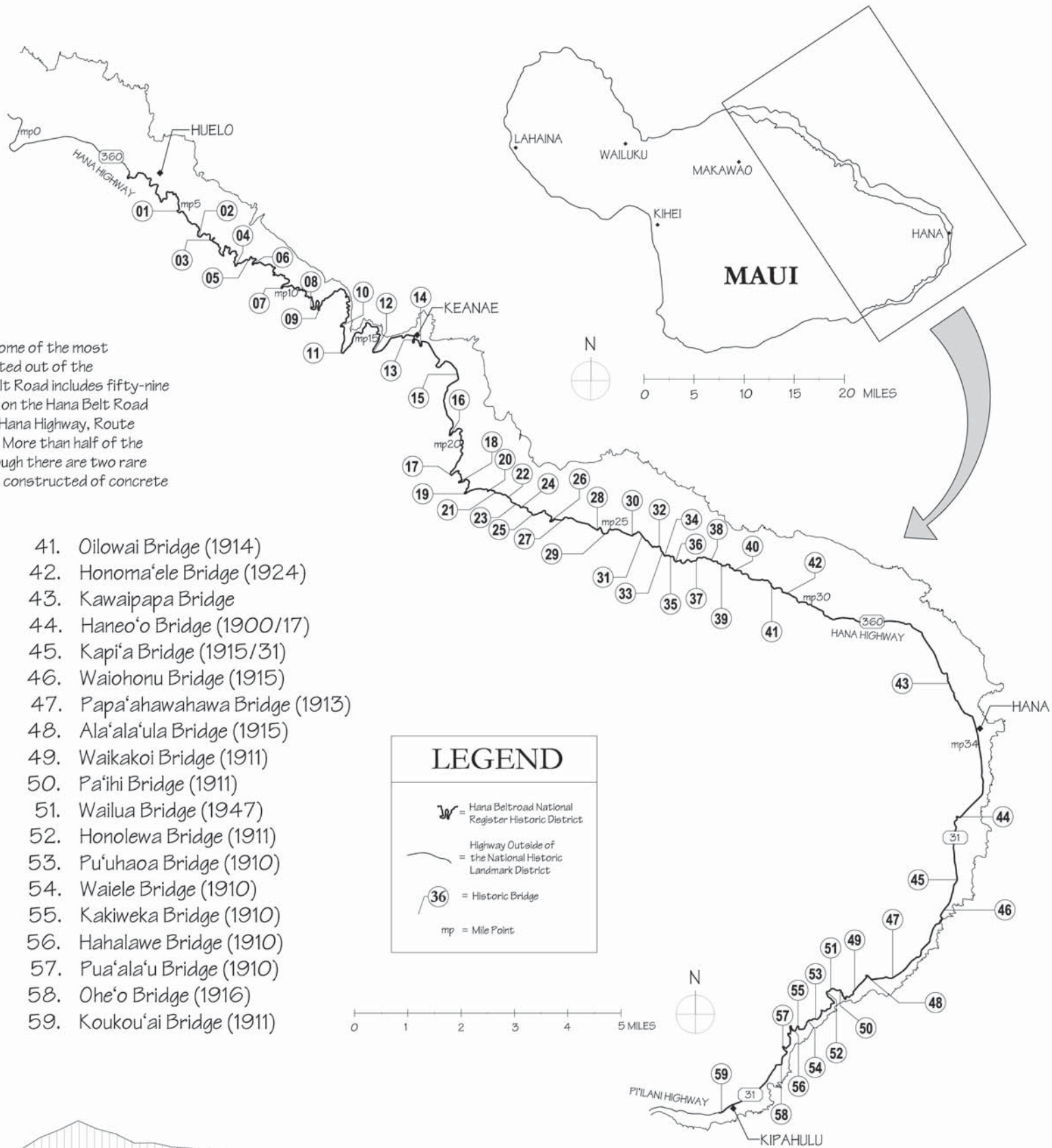
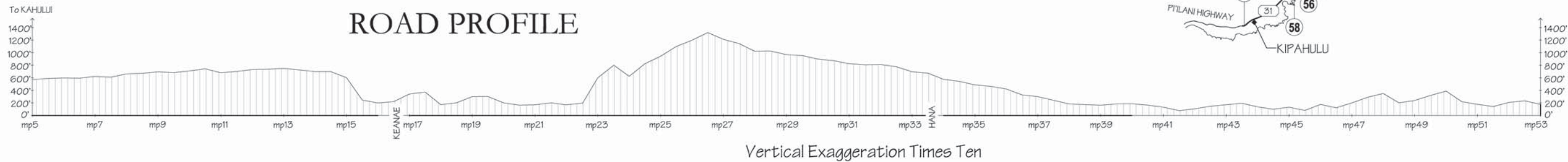
Hana Belt Road Measured
Drawings from HAER HI-75

HISTORIC BRIDGES OF THE HANA BELT ROAD

The island of Maui is comprised of two shield volcanoes joined by an isthmus, which constitutes east and west Maui. East Maui, where the Hana Belt Road is located, is the immense Haleakala, a dormant volcano more than 10,000 feet in elevation. Lava flows from earlier times had poured into the ocean, which created the jagged coastline along which the road is aligned. Centuries of stream erosion from the wet, trade-wind climate on Haleakala's windward (northeastern) slope cut a rugged terrain of great sea-cliffs and v-shaped valleys. The wet climate has allowed dense forests to grow over the rough terrain making the Hana District in East Maui one of Hawaii's most isolated and inaccessible areas.

Chiseled into the precipitous cliffs and winding around more than 600 curves, the Hana Belt Road offers some of the most spectacular scenery in the Hawaiian islands and is a marvel of early road engineering. Miles of road were blasted out of the mountainsides and many bridges were required to carry the road across streams and gulches. The Hana Belt Road includes fifty-nine bridges and numerous culverts constructed between 1908 and 1947. Sixteen of these bridges are located on the Hana Belt Road south of Hana (Pi'ilani Highway, Route 31) and forty-three on the Hana Belt Road between Hana and Huelo (Hana Highway, Route 360). The narrowest bridges are approximately 12'-6" wide and the widest bridge is approximately 20'-6". More than half of the bridges are single span. The majority of bridges were constructed of reinforced cast-in-place concrete, though there are two rare surviving examples of masonry arch construction. Many of the bridges have wingwalls, abutments and piers constructed of concrete rubble masonry with basalt (lava rock).

- | | | |
|----------------------------------|-------------------------------------|----------------------------------|
| 01. Holua Bridge (1929) | 21. Waiohue Bridge (1926/37) | 41. Oilowai Bridge (1914) |
| 02. Kailua Bridge (1929) | 22. Waiohuo'lua Bridge (1920/70) | 42. Honoma'ele Bridge (1924) |
| 03. Na'ililihaele Bridge (1930) | 23. Bridge #2 (1920) | 43. Kawaipapa Bridge |
| 04. O'opuola Bridge (1925) | 24. Pa'akea Bridge (1920) | 44. Haneo'o Bridge (1900/17) |
| 05. Makanali Bridge (1928) | 25. Kapa'ula Bridge (1926) | 45. Kapi'a Bridge (1915/31) |
| 06. Ka'aiea Bridge (1928) | 26. Hanawi Bridge (1926) | 46. Waiohonu Bridge (1915) |
| 07. Waikamoi Bridge (1911) | 27. East Hanawi Bridge (1926) | 47. Papa'ahawahawa Bridge (1913) |
| 08. Puohokamoa Bridge (1912) | 28. Makapipi Bridge (1926) | 48. Ala'ala'ula Bridge (1915) |
| 09. Haipua'ena Bridge (1912) | 29. Kuhiwa Bridge (1926) | 49. Waikakoi Bridge (1911) |
| 10. Punalua Bridge (1911) | 30. Kupukoi Bridge (1926) | 50. Pa'ihii Bridge (1911) |
| 11. Honomanu Bridge (1911) | 31. Kahalaowaka Bridge (1926) | 51. Wailua Bridge (1947) |
| 12. Nua'ailua Bridge (1911/40) | 32. Pupape-Manawikeae Bridge (1926) | 52. Honolewa Bridge (1911) |
| 13. Pi'ina'au Bridge (1916) | 33. Kahaiwaihapapa Bridge (1922) | 53. Pu'uhaoa Bridge (1910) |
| 14. Palahulu Bridge (1916) | 34. Kea'a'iki Bridge (1921) | 54. Waiele Bridge (1910) |
| 15. Waiokamilo Bridge (1921/37) | 35. West Waioni Bridge (1920) | 55. Kakiweka Bridge (1910) |
| 16. Waikani Bridge (1926) | 36. Waioni Bridge (1920) | 56. Hahalawe Bridge (1910) |
| 17. West Wailuaiki Bridge (1926) | 37. Lanikele Bridge (1917) | 57. Pua'ala'u Bridge (1910) |
| 18. East Wailuaiki Bridge (1926) | 38. Helele'ike'oha Bridge (1917) | 58. Ohe'o Bridge (1916) |
| 19. Kopili'ula Bridge (1926) | 39. Ula'ino Bridge (1914) | 59. Koukou'ai Bridge (1911) |
| 20. Pua'aka'a Bridge (1926) | 40. Mokulehua Bridge (1908) | |



DELINATED BY: DANIEL SCHABELE, 2005

HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HANA BELT ROAD (HANA HIGHWAY)
BETWEEN HAIKU AND KIPAHULU/STATE HIGHWAY 360/COUNTY HIGHWAY 31

HANA VICINITY

HAWAII

SHEET
2 OF 13

HISTORIC AMERICAN
ENGINEERING RECORD

HI-75

MAUI

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BRIDGE TYPOLOGIES

OF THE HANA BELT ROAD

The Hana Belt Road Bridges illustrate the history of bridge construction in Hawaii during the late-nineteenth and early-twentieth centuries. Two Concrete rubble masonry structures are fine examples of a bridge type common in the late 1800's. As early as 1908, engineers began designing reinforced-concrete bridges to replace Hawaii's aging collection of timber and steel bridges. Reinforced-concrete structures became the standard as these bridges would last for the ages.

The majority of the Hana Coast bridges were built with reinforced-concrete flat slabs or girders. Flat-slab bridges (and culverts) were constructed when short spans were required. For longer spans, Tee-beam girder bridges were utilized. Some structures, particularly those with very thick parapets such as Pa'ini Bridge, used Tee-beam girders with cross members, which were poured with the parapets so that all members worked together to support the roadway. Three barrel-arch bridges, built in 1916 and 1926, utilized a solid concrete arch

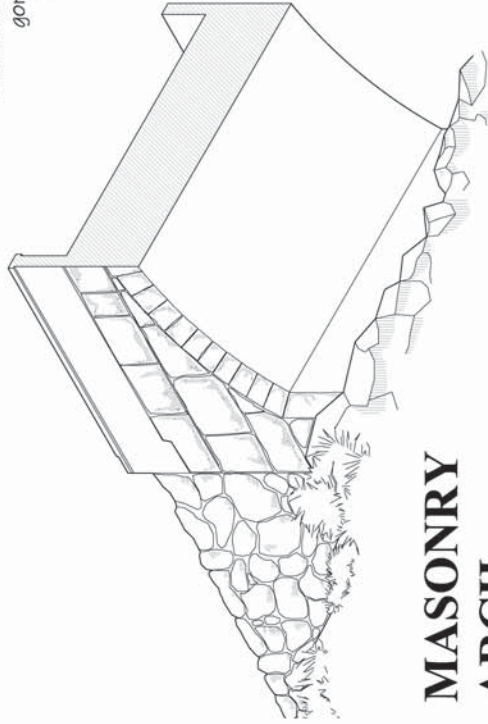
with fill material above the arch to carry the roadway. Two open-spandrel rib-arch bridges,

Kou'kou'ai (1911) and Waiauani (1926), were built to span high, rocky

gorges. These structures carried the load on the rib

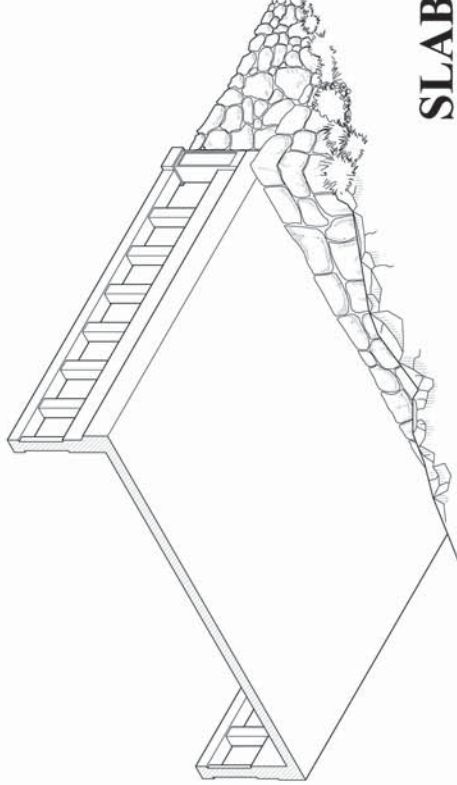
arches, which were further strengthened with

cross-struts and spandrel columns.



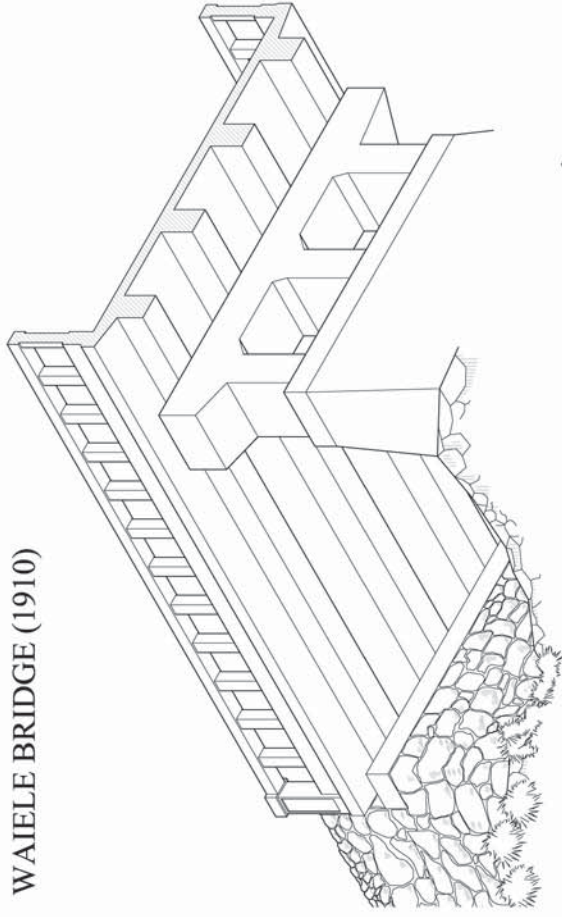
**MASONRY
ARCH**

WAELE BRIDGE (1910)



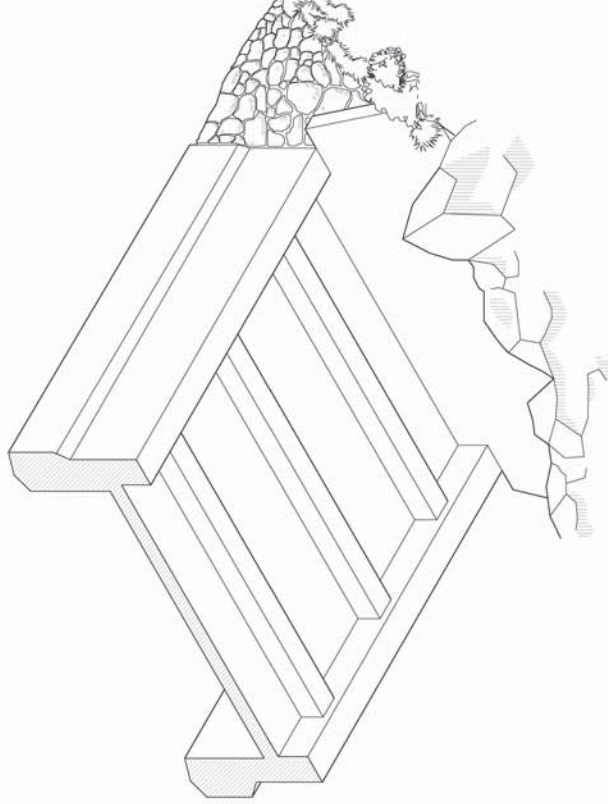
SLAB

MAKANALI BRIDGE (1928)



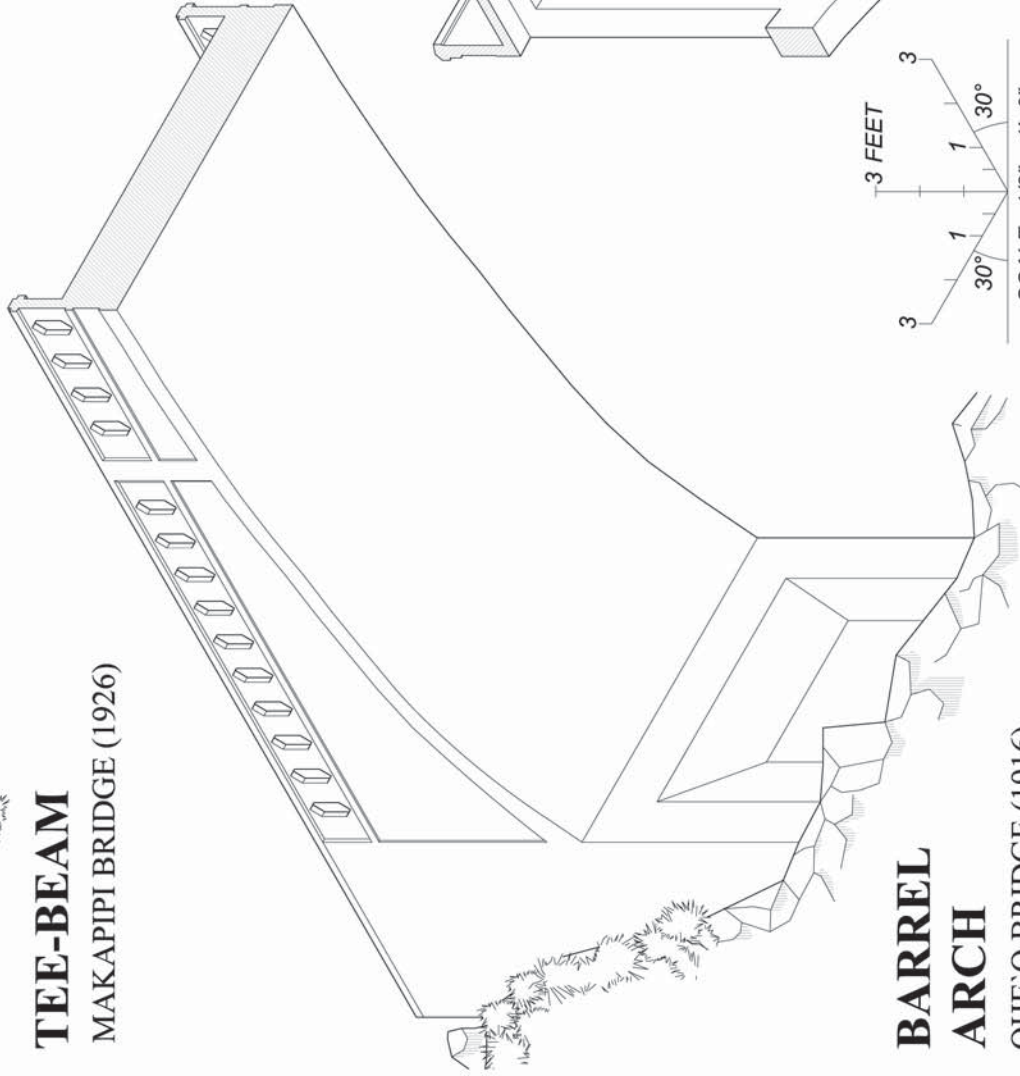
TEE-BEAM

MAKAPII BRIDGE (1926)



**GIRDER WITH
CROSS MEMBERS**

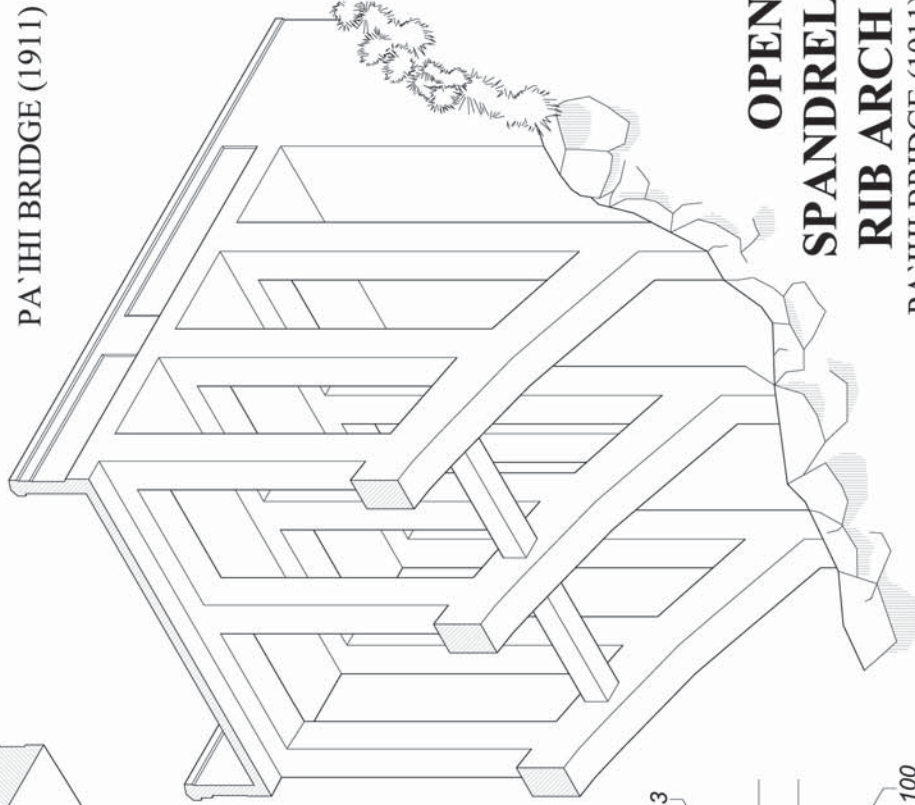
PA' IHI BRIDGE (1911)



**BARREL
ARCH**

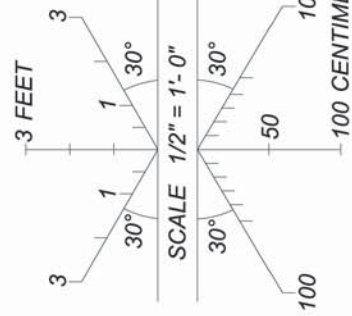
OHE'O BRIDGE (1916)

Note: Bridges shown as seen from below to better illustrate the structure.



**OPEN
SPANDREL
RIB ARCH**

PA' IHI BRIDGE (1911)



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BETWEEN HAIKU AND KIPAHULU/STATE HIGHWAY 360/COUNTY HIGHWAY 31

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HAWAII

SHEET
3 OF 13

HISTORIC AMERICAN
ENGINEERING RECORD

HI-75

BRIDGE OF CONSTRUCTION
INDEX NUMBER

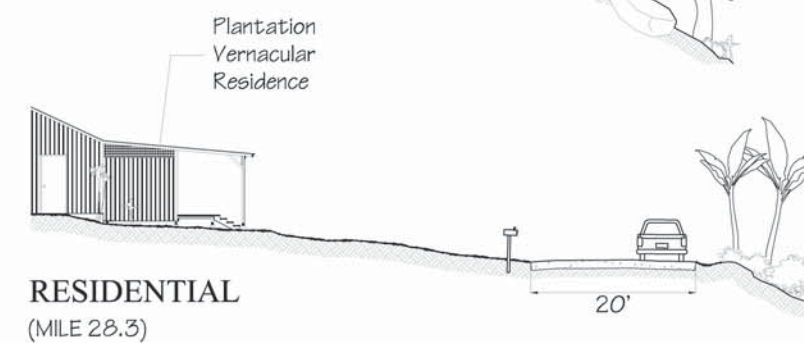
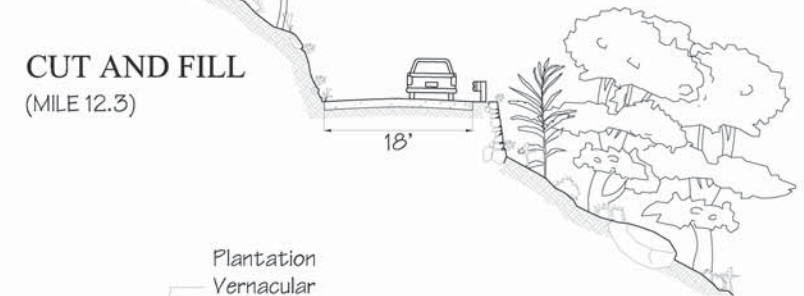
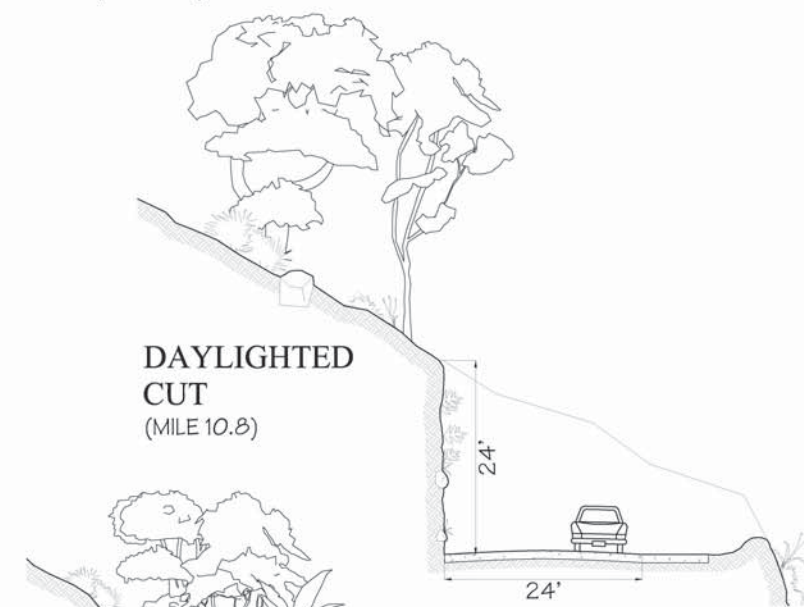
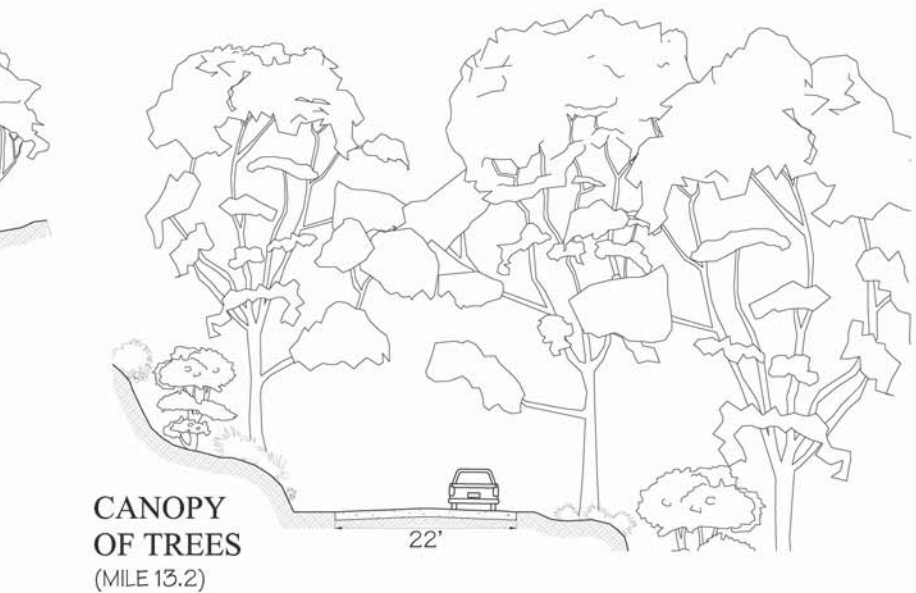
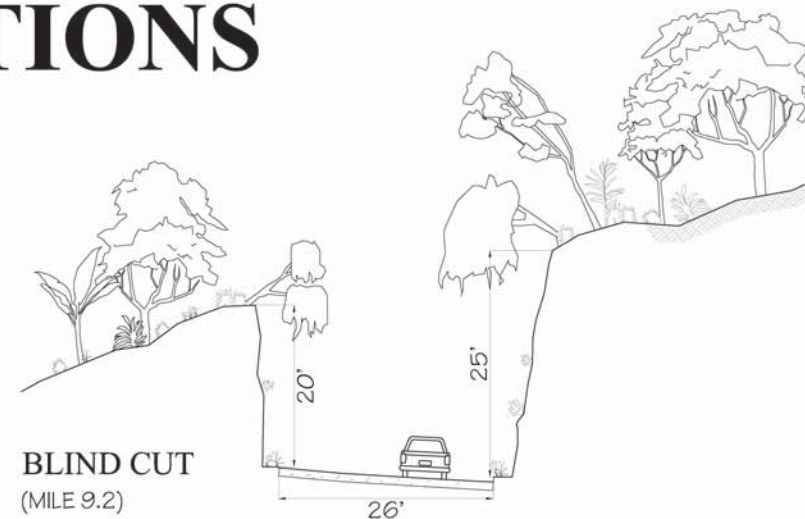
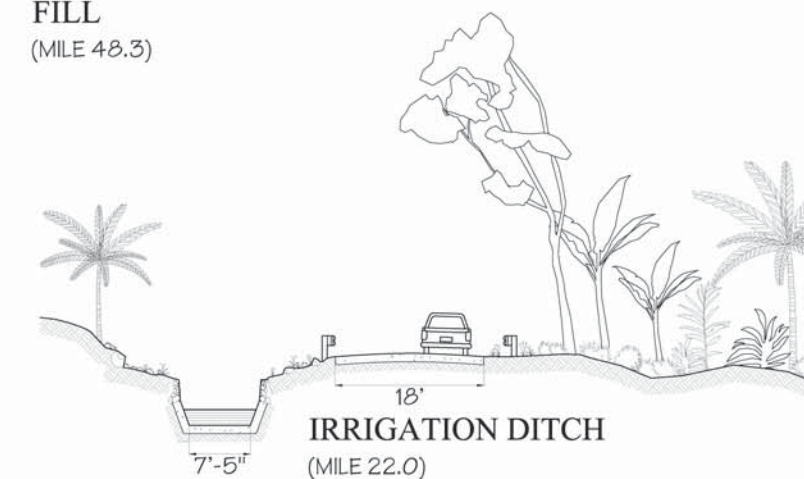
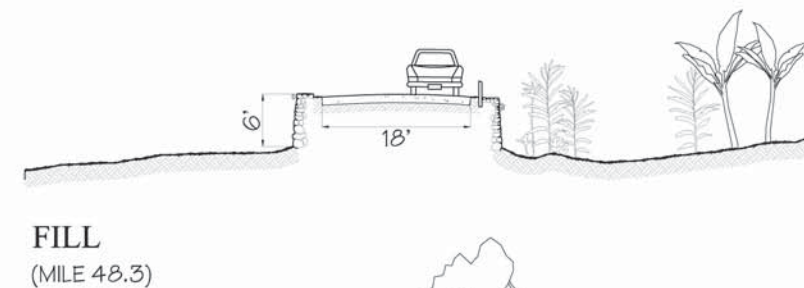
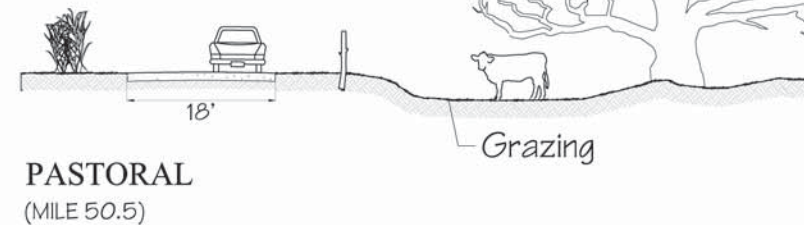
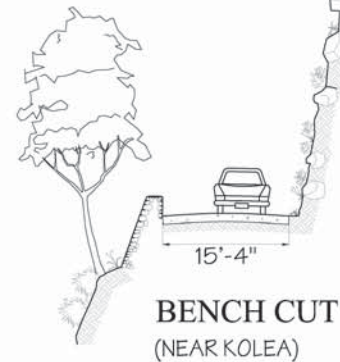
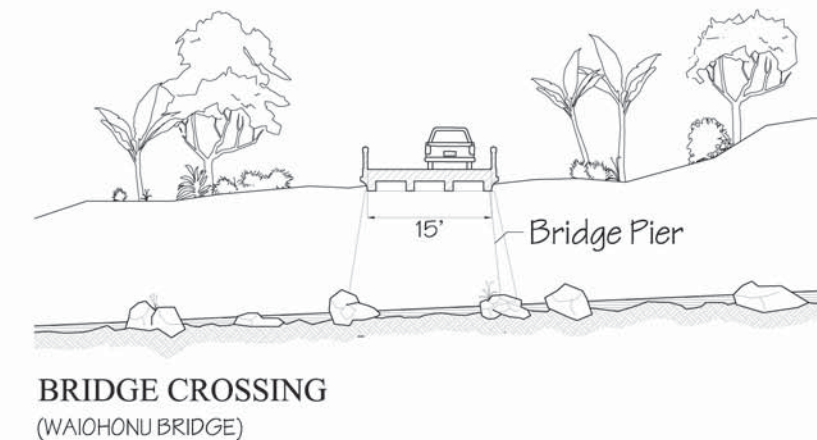
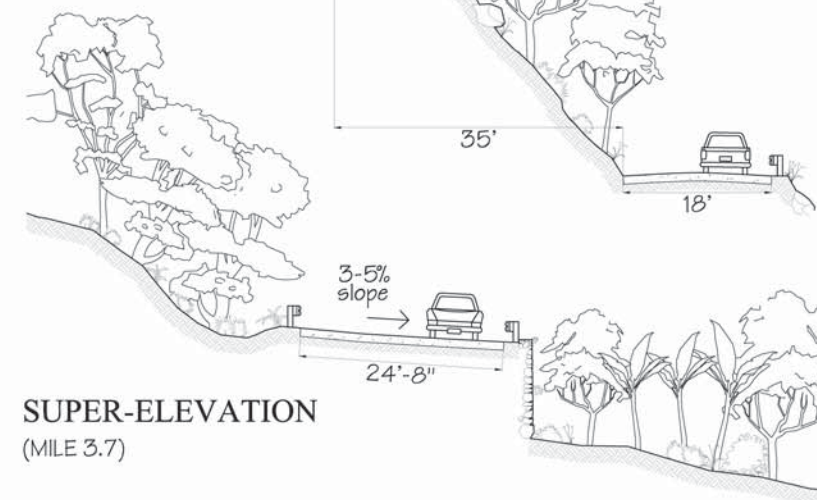
TYPICAL CROSS-SECTIONS OF THE HANA BELT ROAD

By 1920, the Hana Belt Road from central Maui to Kailua was suitable for modern automobile traffic. Between 1923 and 1926 the remaining portions which included the most challenging topography were completed. The road was originally designed as one-lane built on a 16'-wide bench, with a pavement width of 12'-0". The road has been widened to around 18' in most areas. In a few places where there is more level topography, as through the villages near Huelo, the pavement is up to 22'-0" wide. The roadway largely follows the natural topography and is built into the cliff-side. In several locations new layers of asphalt have been added to super-elevate curves.

SCALE: 3/32" = 1'-0"

0 10 20 30 FEET

0 1 2 6 METERS



HANA BELT ROAD (HANA HIGHWAY)
BETWEEN HAIKU AND KIPAHULU/STATE HIGHWAY 360/COUNTY HIGHWAY 31

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HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

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REGIONAL PROJECT
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UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

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HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

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REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

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REGIONAL PROJECT
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UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

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HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

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HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

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HI-75

SHEET
4 OF 13

HAWAII

MAUI

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UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

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REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

HANA VICINITY

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REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

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REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

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HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

HANA VICINITY

DELINEATED BY: DANIEL SCHABELE, 2005
HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

HANA VICINITY

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HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

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HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

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HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

HANA VICINITY

DELINEATED BY: DANIEL SCHABELE, 2005
HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

HANA VICINITY

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HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

HANA VICINITY

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HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

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HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

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HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

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HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

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HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

HANA VICINITY

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HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

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HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

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HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

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HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

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HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

HANA VICINITY

DELINEATED BY: DANIEL SCHABELE, 2005
HANA HIGHWAY
REGIONAL PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

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REGIONAL PROJECT
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UNITED STATES DEPARTMENT OF THE INTERIOR

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

HAWAII

MAUI

MAUI

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HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

SHEET
4 OF 13

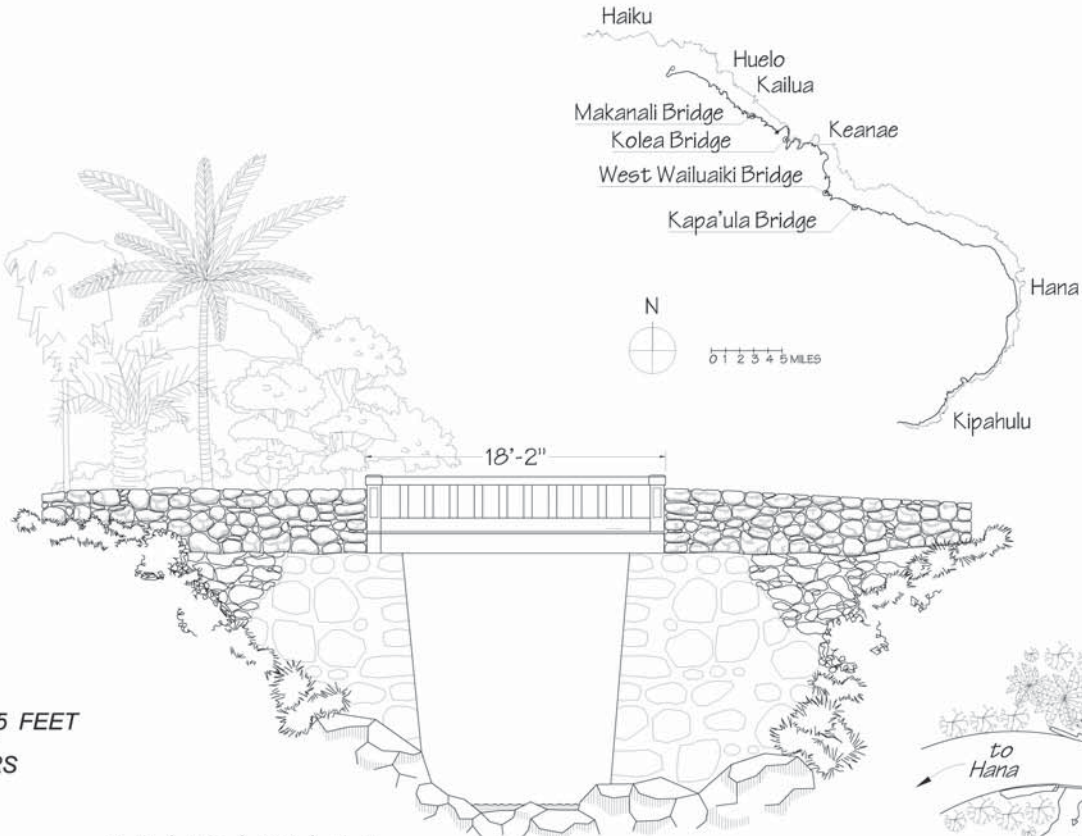
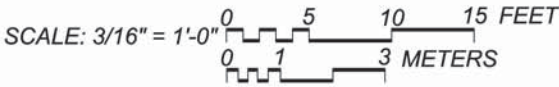
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SLAB AND GIRDER BRIDGES

OF THE HANA BELT ROAD

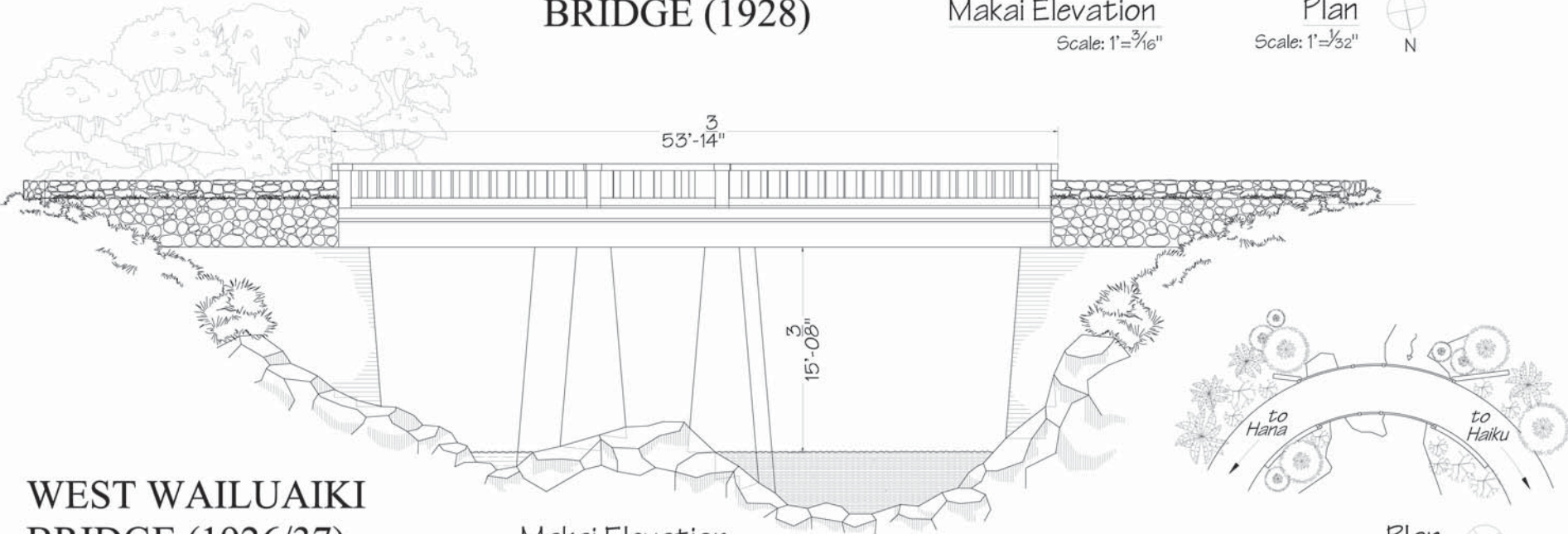
The majority of bridges on the Hana Belt Road were constructed using reinforced concrete flat slabs and t-beam girders. Flat-slab structures were built in Hawaii as early as 1908, when Hawaii's oldest remaining example, Mokulehua Bridge in Nahiku, was erected. Flat-slab structures such as Mekanali Bridge, were typically used to span short distances. By 1911, longer bridges were built using t-beam girders, which provided greater strength. Kapa'ula Bridge and West Wailuaiki Bridge are excellent examples of girder construction. Both structures also took advantage of the natural surroundings. Kapa'ula Bridge used a natural formation, a lava dike, to support its center pier. West Wailuaiki Bridge was a graceful, curved structure that complemented its scenic beauty at the end of a v-shaped valley.



MAKANALI
BRIDGE (1928)

Makai Elevation
Scale: 1" = 3/16"

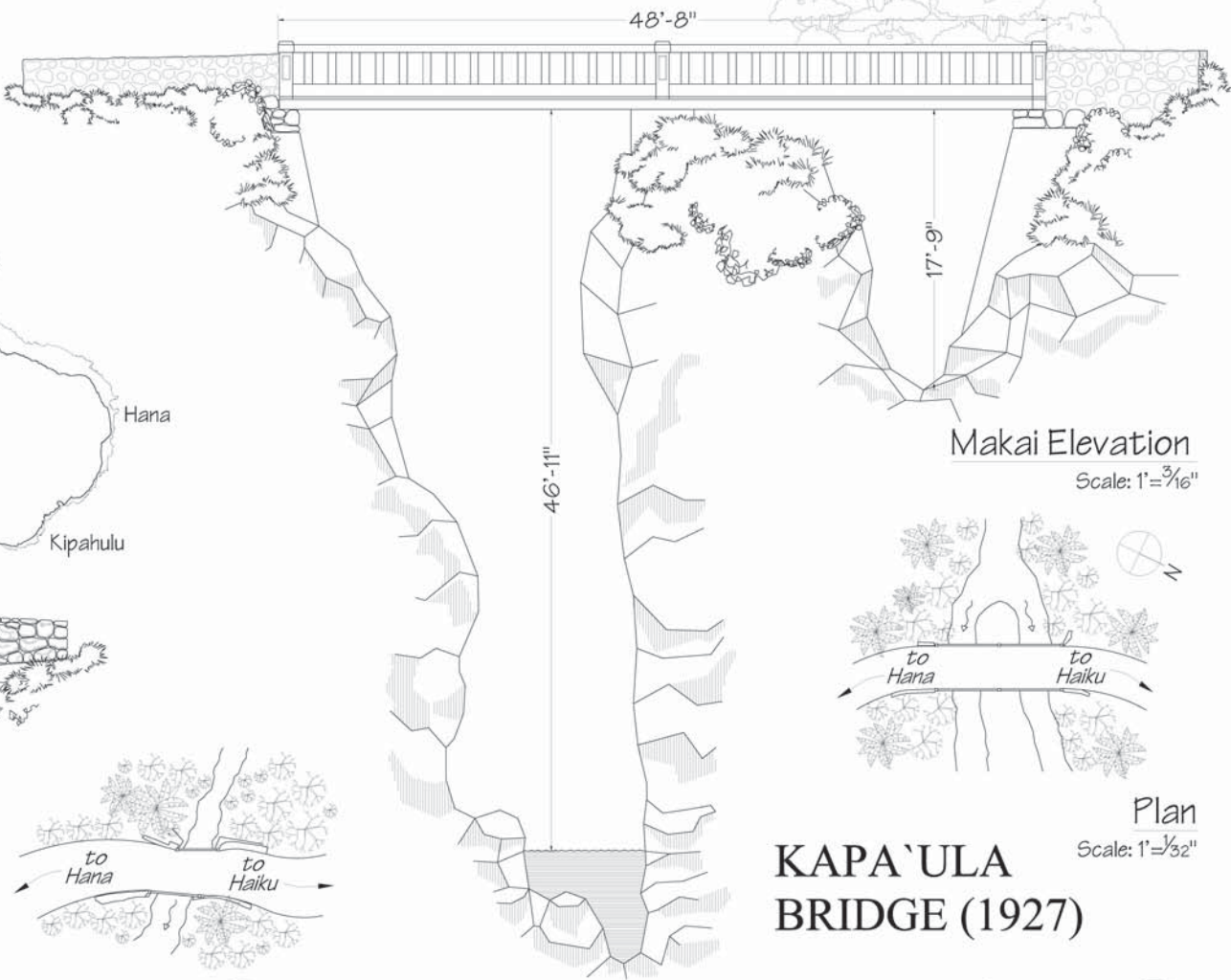
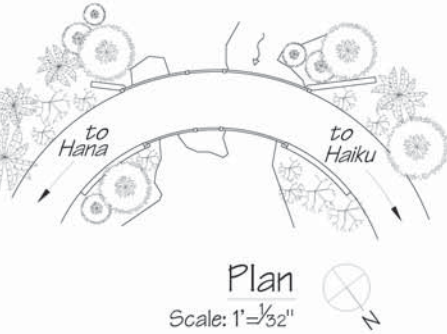
Plan
Scale: 1" = 1/32"



WEST WAILUAIKI
BRIDGE (1926/37)

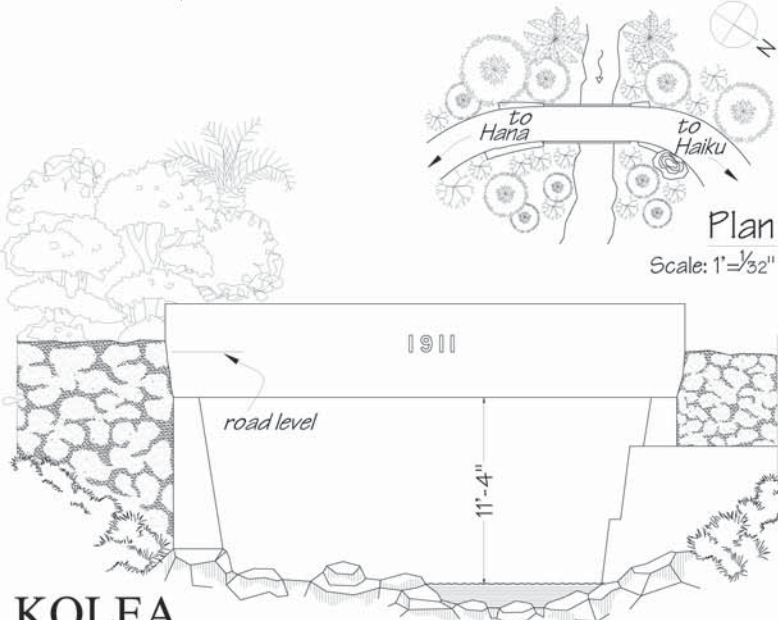
Makai Elevation
Scale: 1" = 3/16"

Plan
Scale: 1" = 1/32"



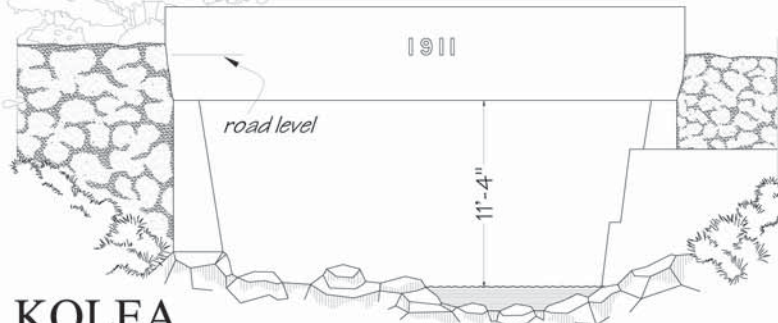
KAPA'ULA
BRIDGE (1927)

Plan
Scale: 1" = 1/32"



KOLEA
BRIDGE (1911)

Makai Elevation
Scale: 1" = 3/16"



DELINEATED BY: ELENA MOLINA CERPA, 2005
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HANA VICINITY

HANA BELT ROAD (HANA HIGHWAY)
BETWEEN HAIKU AND KIPAHULU/STATE HIGHWAY 360/COUNTY HIGHWAY 31

HAWAII

SHEET
5 OF 13

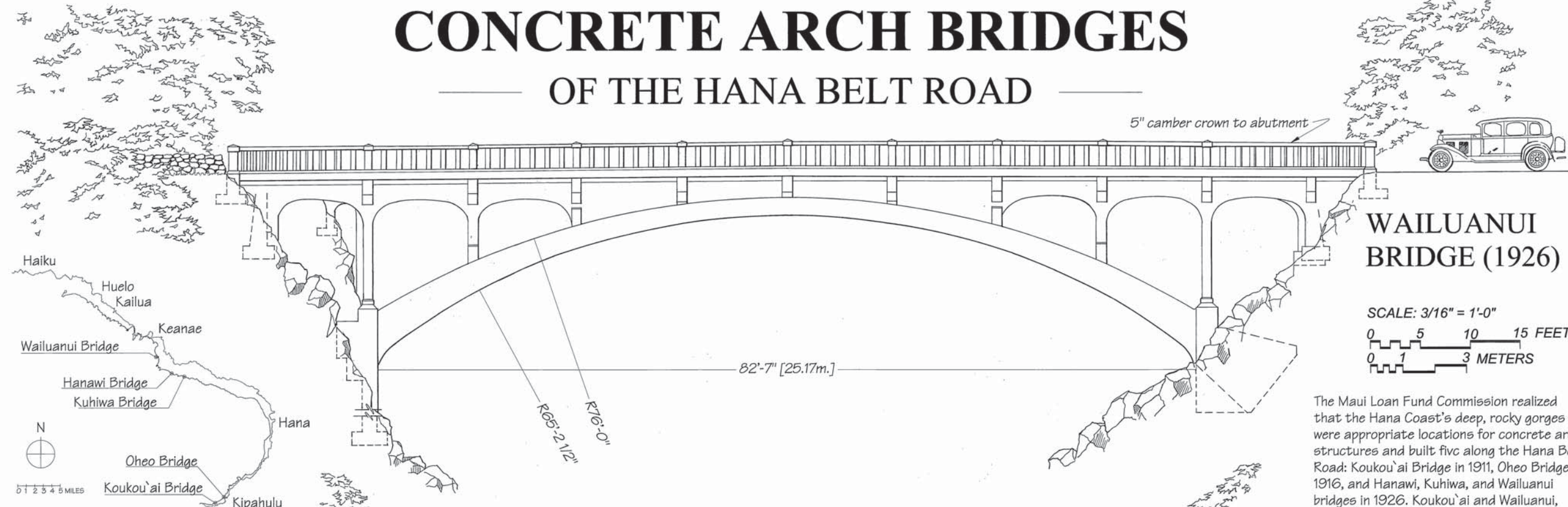
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INDEX: HAWAII

HI-75

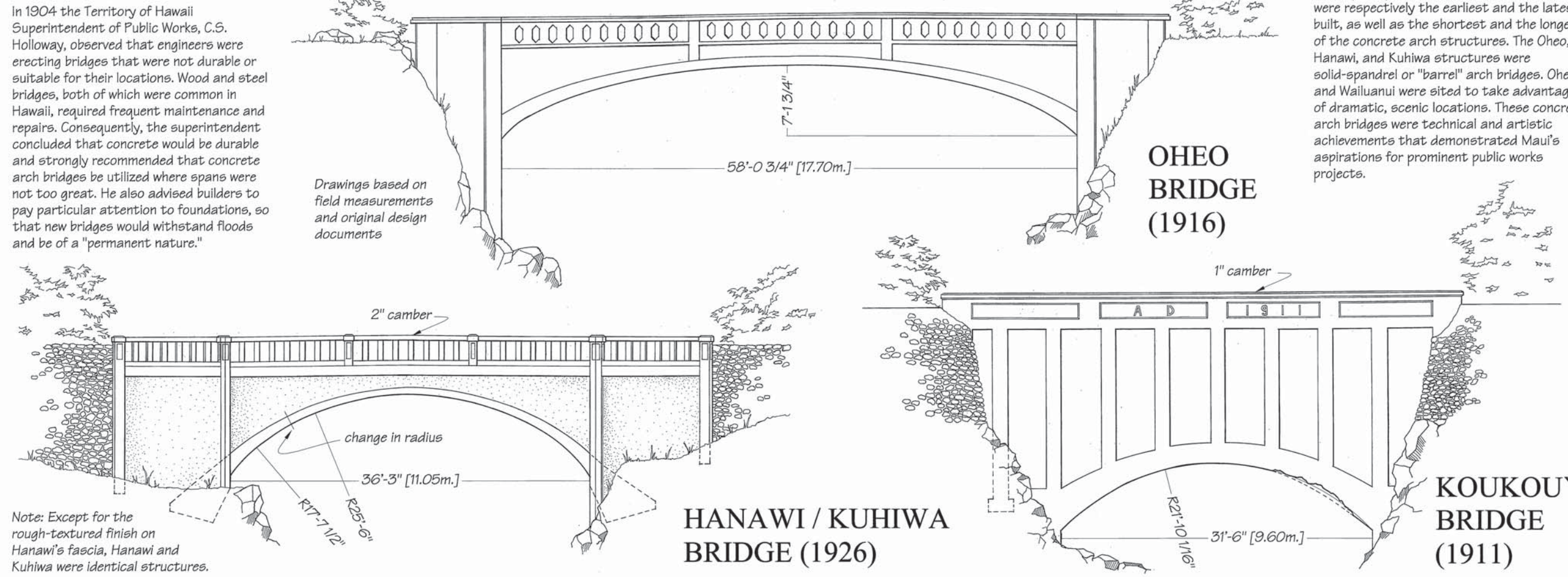
CONCRETE ARCH BRIDGES

OF THE HANA BELT ROAD



In 1904 the Territory of Hawaii Superintendent of Public Works, C.S. Holloway, observed that engineers were erecting bridges that were not durable or suitable for their locations. Wood and steel bridges, both of which were common in Hawaii, required frequent maintenance and repairs. Consequently, the superintendent concluded that concrete would be durable and strongly recommended that concrete arch bridges be utilized where spans were not too great. He also advised builders to pay particular attention to foundations, so that new bridges would withstand floods and be of a "permanent nature."

Drawings based on field measurements and original design documents



Note: Except for the rough-textured finish on Hanawi's fascia, Hanawi and Kuhiwa were identical structures.

The Maui Loan Fund Commission realized that the Hana Coast's deep, rocky gorges were appropriate locations for concrete arch structures and built five along the Hana Belt Road: Koukou'ai Bridge in 1911, Oheo Bridge in 1916, and Hanawi, Kuhiwa, and Wailuanui bridges in 1926. Koukou'ai and Wailuanui, both open-spandrel "ribbed" arch bridges, were respectively the earliest and the latest built, as well as the shortest and the longest of the concrete arch structures. The Oheo, Hanawi, and Kuhiwa structures were solid-spandrel or "barrel" arch bridges. Oheo and Wailuanui were sited to take advantage of dramatic, scenic locations. These concrete arch bridges were technical and artistic achievements that demonstrated Maui's aspirations for prominent public works projects.

DELINEATED BY: MAUREEN VOSMEK, 2005

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HANA VICINITY

HANA BELT ROAD (HANA HIGHWAY) BETWEEN HAIKU AND KIPAHULU/STATE HIGHWAY 360/COUNTY HIGHWAY 31

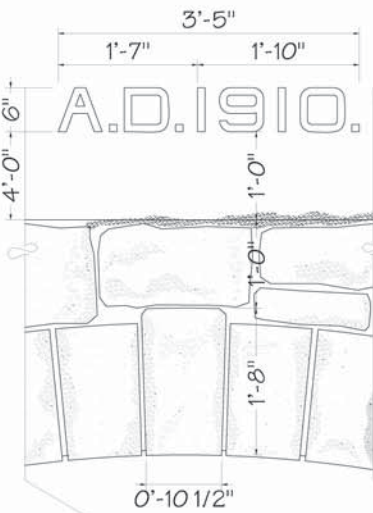
HAWAII

SHEET 6 OF 13

HISTORIC AMERICAN ENGINEERING RECORD

HI-75

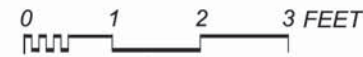
MADE BY CONCRETE INDEX NUMBER



Detail A

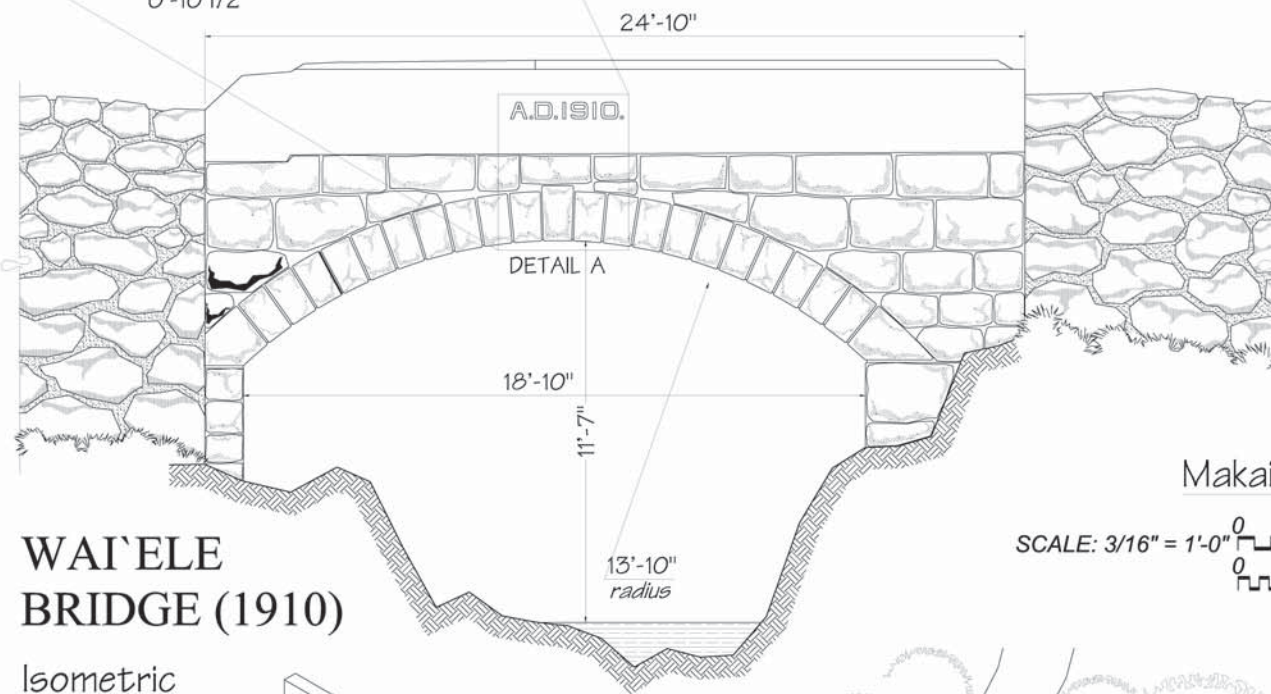
Key Stone and Lettering

SCALE: 1"=1'-0"



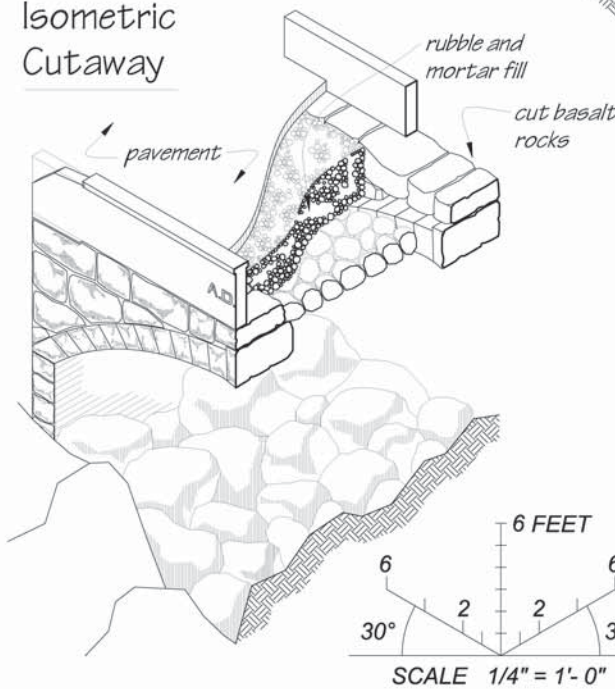
MASONRY ARCH BRIDGES OF THE HANA BELT ROAD

Masonry Arch Bridges were common in Hawai'i during the late nineteenth century. Two masonry arch structures, Hahalawe and Wai'e, are located on the road South of Hana. Both bridges utilized cut basalt (lava) blocks for the abutments, arch rings and fascia. This use of locally quarried stone allows the bridges to fit naturally with the surrounding landscape. The road bed is built up with uncut basalt rocks and rubble jointed with mortar. Although the parapets indicate a 1910 construction date, the masonry arch portion of the structures may have been built earlier. Hahalawe and Wai'e retain historic integrity and are considered rare surviving examples of a once common bridge type.

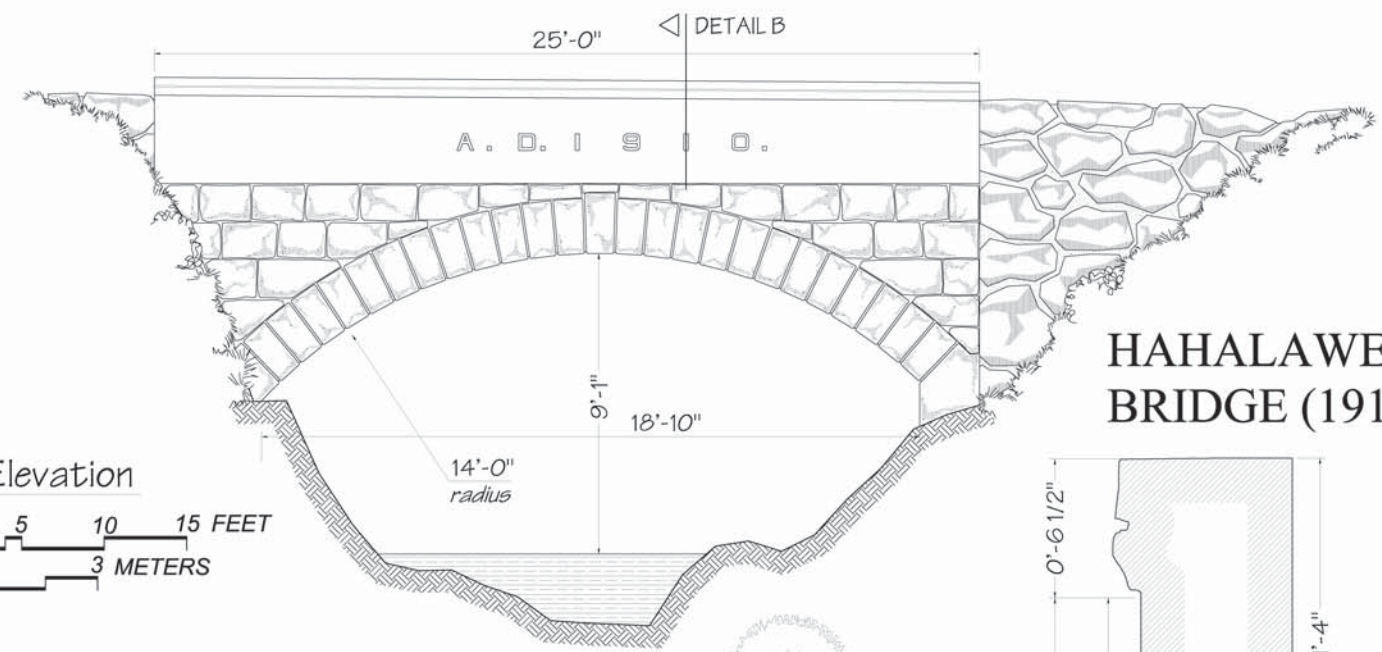


WAI'E
BRIDGE (1910)

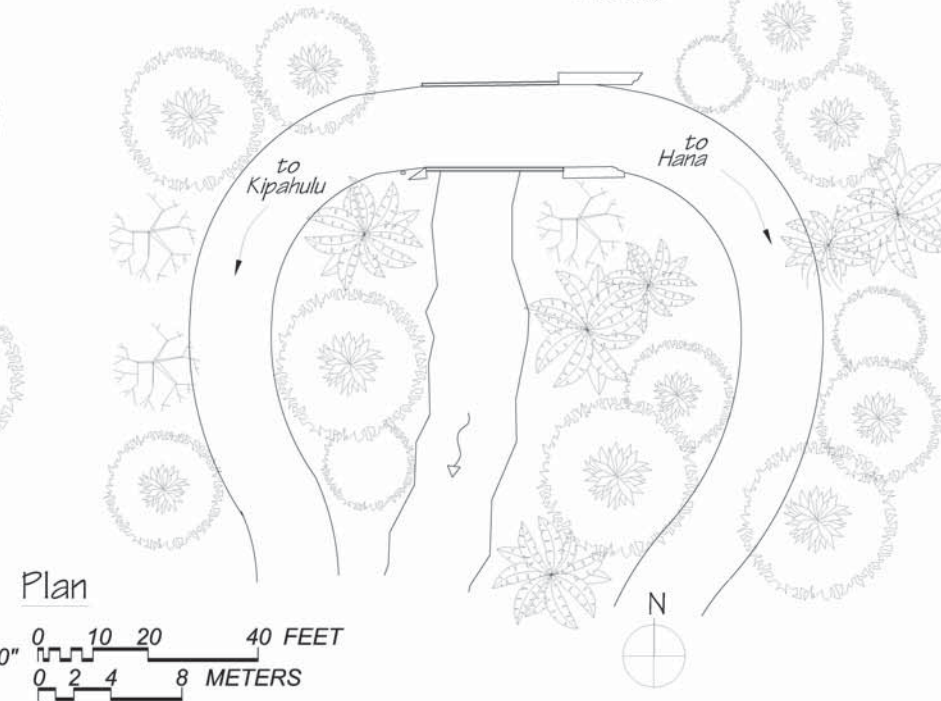
Isometric
Cutaway



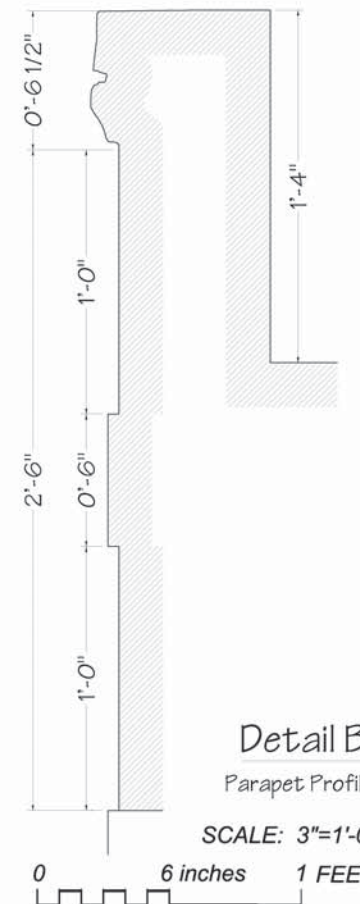
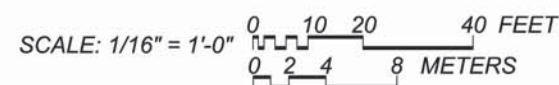
Makai Elevation



HAHALAWE
BRIDGE (1910)



Plan



Detail B

Parapet Profile

SCALE: 3"=1'-0"

DELINEATED BY: ELENA MOLINA CERPA, 2005

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RECONSTRUCTION
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HANA VICINITY

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BETWEEN HAIKU AND KIPAHULU/STATE HIGHWAY 360/COUNTY HIGHWAY 31

HAWAII

SHEET
7 OF 13

HISTORIC AMERICAN
ENGINEERING RECORD
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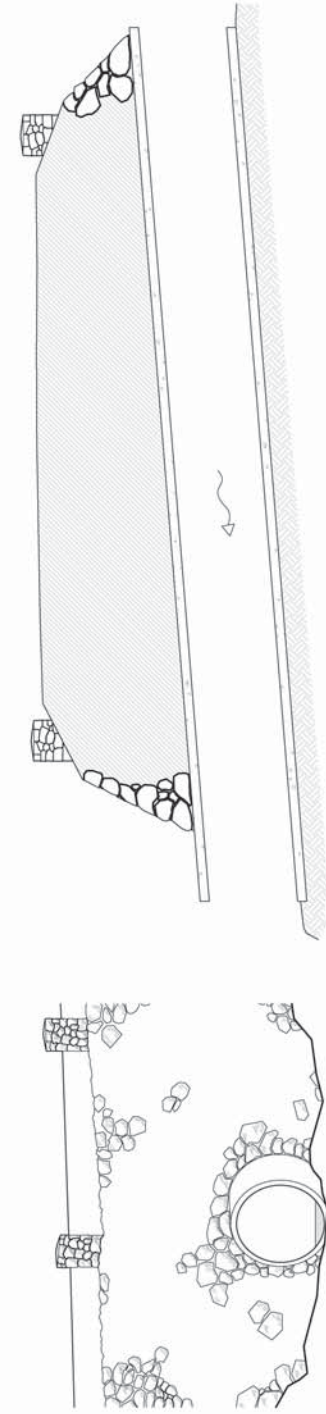
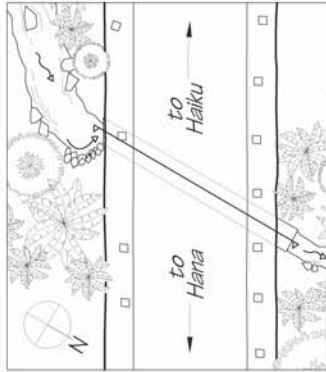
CULVERT TYPOLOGIES

OF THE HANA BELT ROAD

A culvert is a structure that allows water to be carried transversely beneath a roadway. Hundreds of culverts were required to provide drainage along the Hana Belt Road, and over the years, various types of structures were utilized. During the initial construction of the road, corrugated iron-pipe culverts and flat slab culverts were installed. Pipe culverts were built beneath the roadway and sloped at a two to three percent grade to direct the water runoff. Flat slab culverts were bridges with spans less than 20' in length. Just like other bridges on the road, the culverts were built with flat-slabs for the road deck with concrete or rubble masonry abutments and wingwalls. In more recent decades, concrete pipe culverts have been used. Drop culverts are a variation of the pipe culvert, with the defining characteristic being a vertically aligned catch basin that directs water into the pipe. The catch basin is typically built of dry-stacked or mortared lava rock. Pipe and drop culverts are practical where the road has little or no shoulder for an intake basin.

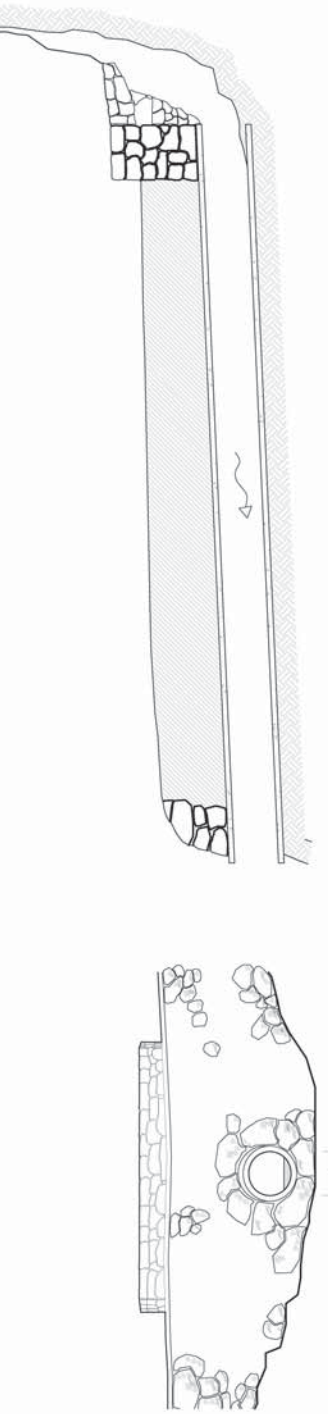
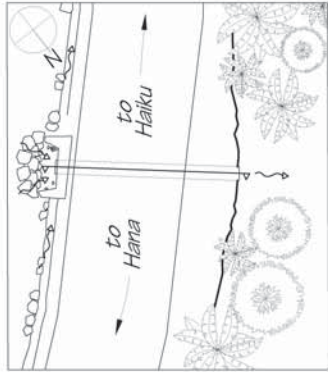
PIPE CULVERT

(MILE 8.9)



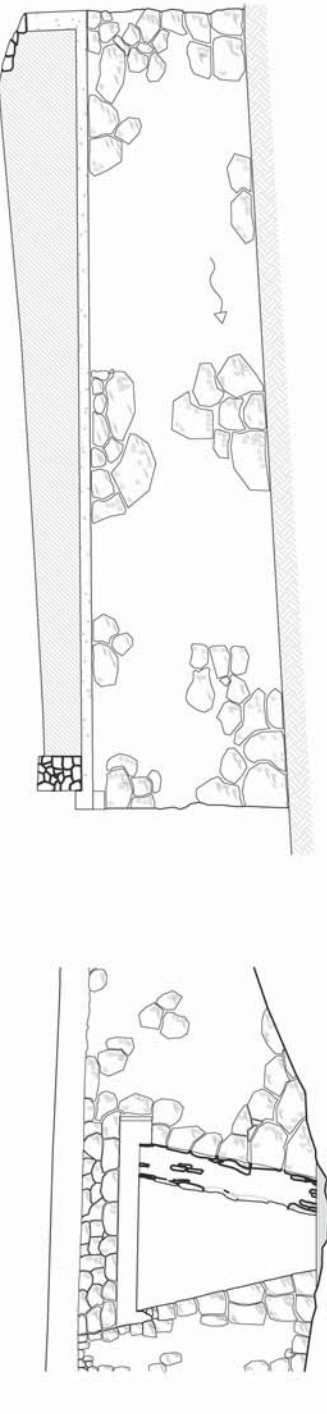
DROP CULVERT

(MILE 17.6)



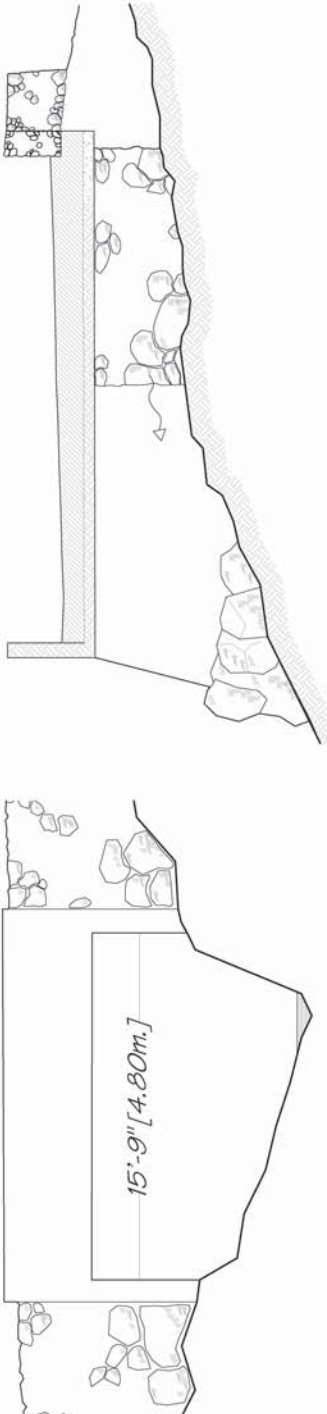
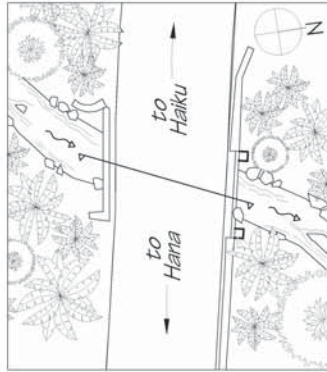
CRM CULVERT

(MILE 3.7)



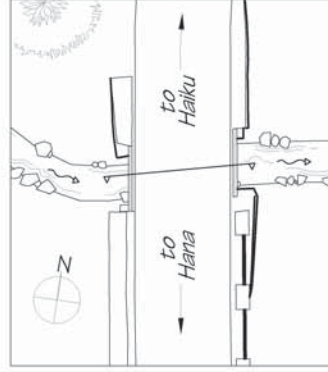
SLAB CULVERT

(MILE 17.5)



BOX CULVERT

(MO'OMONUI CULVERT)



Plan

SCALE: 1/16" = 1'-0"

0 10 20 40 FEET

Makai Elevation

SCALE: 1/4" = 1'-0"

0 5 10 FEET

Section

SCALE: 1/4" = 1'-0"

0 5 10 FEET

DELINEATED BY: DANIEL SCHAIBLE, 2005

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HANA VICINITY

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BETWEEN HAIKU AND KIPAHULU/STATE HIGHWAY 360/COUNTY HIGHWAY 31

MAUI

HAWAII

SHEET
8 OF 13

HISTORIC AMERICAN
ENGINEERING RECORD

HI-75

NUMBER OF COPIES
INDEX NUMBER

BRIDGE PARAPETS OF THE HANA BELT ROAD

Parapet styles on the Hana Belt Road bridges can be classified into two general categories: solid reinforced-concrete parapets and open parapets with simple vertical balusters. Many parapets also exhibit unique stylistic elements, including rail and post caps, panel details, and in some cases, the addition of dates or other inscriptions. A handful of structures, as illustrated, feature unique parapet designs.


SOLID WALL

Bridge name	Year	Bridge name	Year
WAKAMOI	1912	KAPIA (KAHAWAOKAPIA)	1915/31
PUHOKAMOA	1912	PAPA'AHAWAHAWA	1913
HAPIUA'ENA	1912	ALA'ALA'ULA	1915
KOLEA (PUNALAU)	1911	WAKAKOI	1911
HONOMANU	1911	SOUTH WAILUA (HONOIEWA)	1911
NUA'ALUA (*)	1911/40	WAELE (PAEHALA)	1910
WAIOHIE (**)	1926/37	KAKIWEKA (MAHALAWA)	1910
WAIOHIOLOUA	1920/70	HAHALAWE	1910
MOKULEHA	1908	PUA'ALUU	1910
HANEOO (KAHOLOPO)	1910/17	KOUKOU'AI	1911

(*) CONSTRUCTED 1911, ALTERED 1940. DIFFERENT PARAPETS. ORIGINAL SOLID WALL.

(**) CONSTRUCTED 1926, ALTERED 1937. DIFFERENT PARAPETS. NARROW AND WIDE SOLID WALLS.

TWO BRIDGES HAVE WIDER PARAPET WALLS. THESE SERVE AS A STRUCTURAL PART OF THE ORDER SYSTEM.

Bridge name	Year	Profiles	
KOPIU'ULA	1926	Kopili'ula Br.	Pa'ihl Br.
PA'IHI	1912		

Scale: 1/4

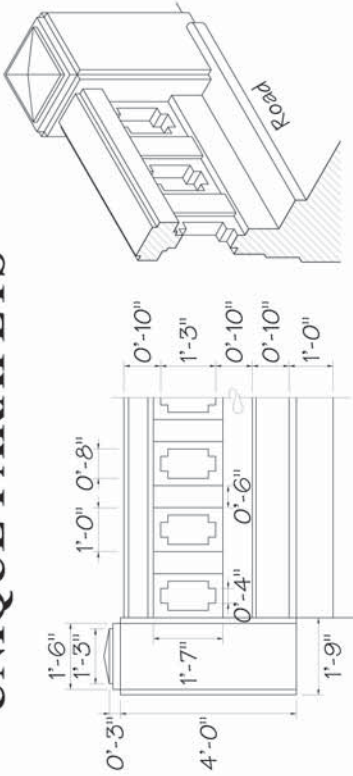
OPEN BALUSTER

ONE PANEL	TWO PANEL	THREE PANEL
Bridge name	Bridge name	Bridge name
O'OPUOLA	PA'AKEA	HOLUA
MAKANALI	KAPA'ULA	KAILUA
KA'AKEA	MAKAPII	NA'ILILHA'ELE
NUA'ALUA (*)	LANIKELE	WEST WAILUAKI
PINA'AU	ULA'INO	KAHAWAIIHAPAPA
PALAHULU	HONOMA'ELE	
EAST WAILUAKI		
PUA'AKA'A		
KUPUKOI		
KAHALAWAKA		
MANAWAKEAE		
KEA'A'IKI		
WEST WAIONI		
WAIONI		
HELELE'IKE OHA		
OLOWAI		

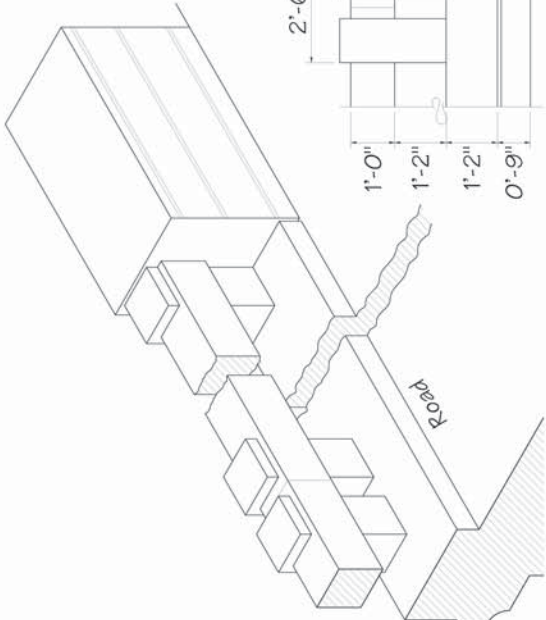
MORE THAN THREE PANEL

Bridge name	Year	Span
WAKANI	1926	8
HANAWI	1926	5
KUHWA	1926	5
WAIOHONU	1915	5

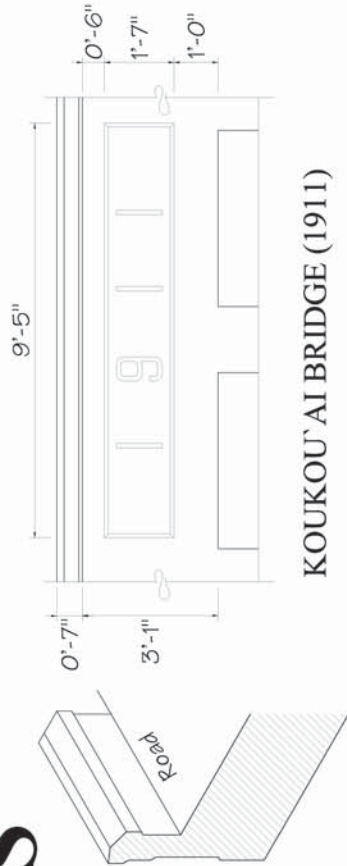
UNIQUE PARAPETS



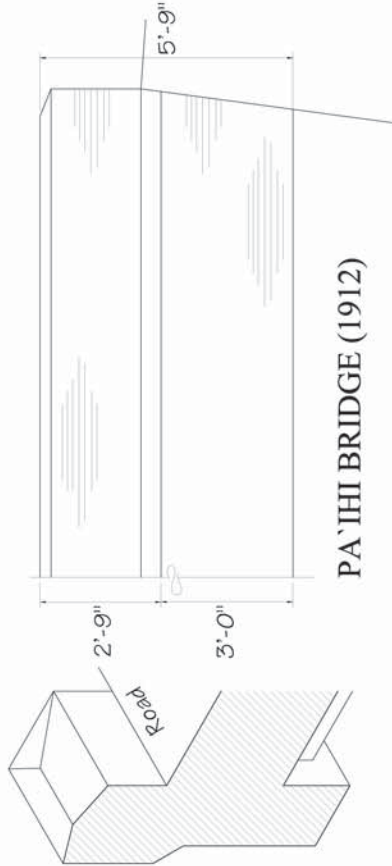
WAIOKAMILO BRIDGE (1937)



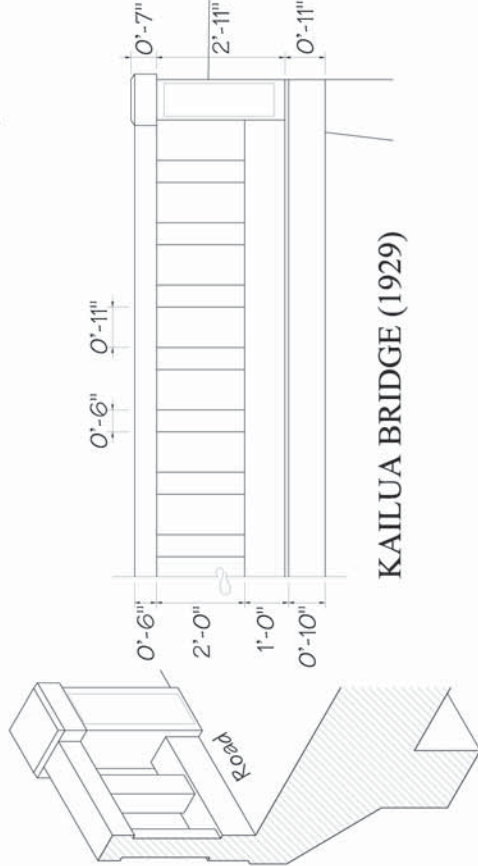
WAILUA BRIDGE (1947)



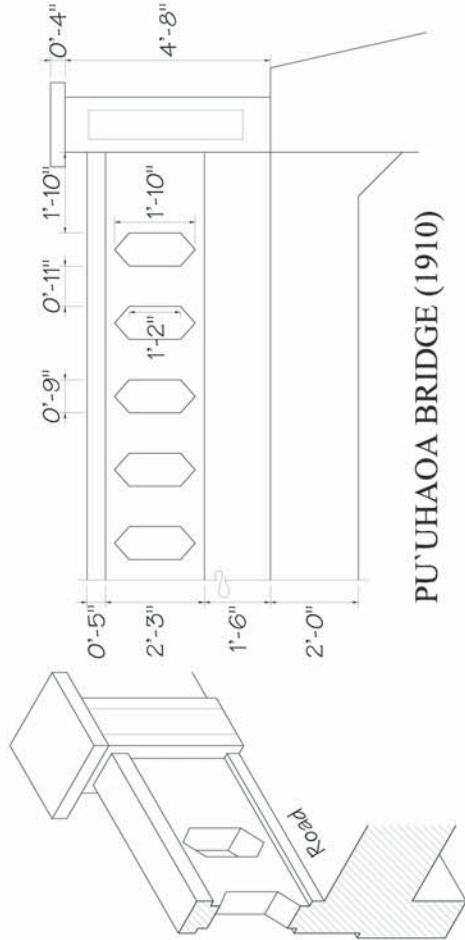
KOUKOU'AI BRIDGE (1911)



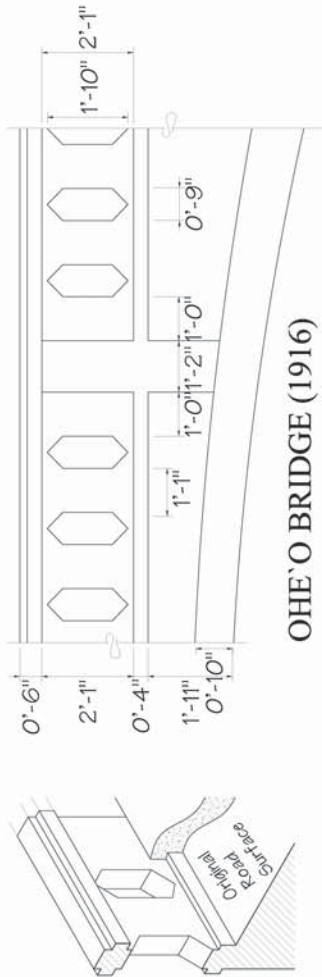
PA'IHI BRIDGE (1912)



KAILUA BRIDGE (1929)

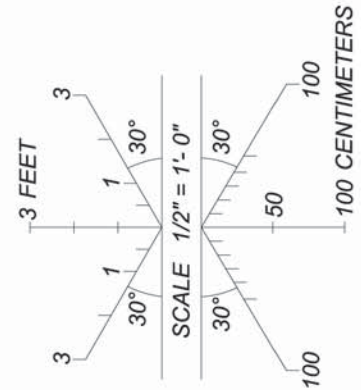


PU'UHAOA BRIDGE (1910)



OHE'O BRIDGE (1916)

SCALE: 1/2" = 1'-0" 0 1 2 3 4 5 FEET
0 50 100 150 CENTIMETERS



DELINEATED BY: ELENA MOLINA CERPA, 2005

HANA HIGHWAY
RECORDING PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HANA VICINITY

HANA BELT ROAD (HANA HIGHWAY)
BETWEEN HAIKU AND KIPAHULU/STATE HIGHWAY 360/COUNTY HIGHWAY 31
MAUI

HAWAII

SHEET
9 OF 13

HISTORIC AMERICAN
ENGINEERING RECORD

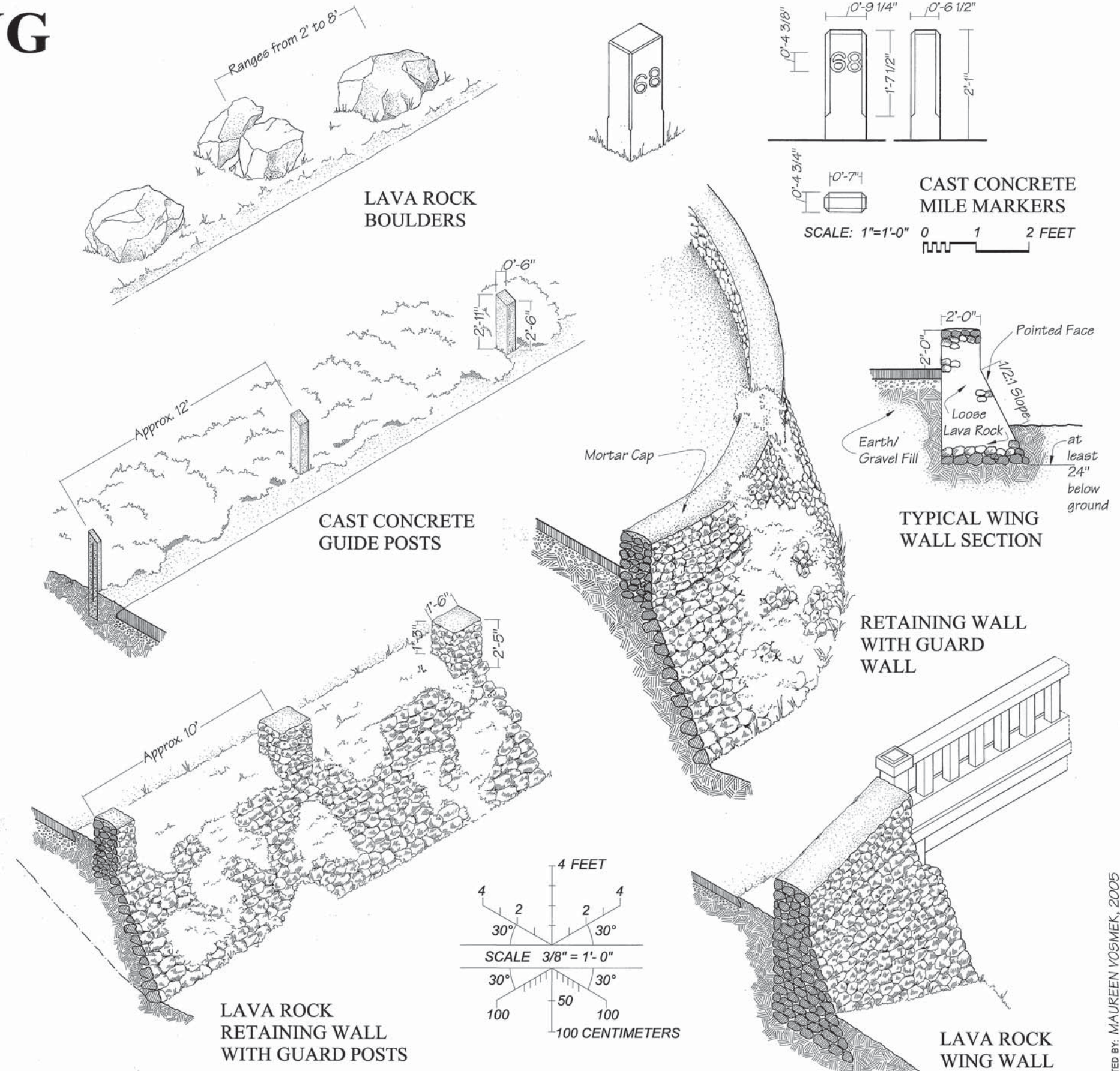
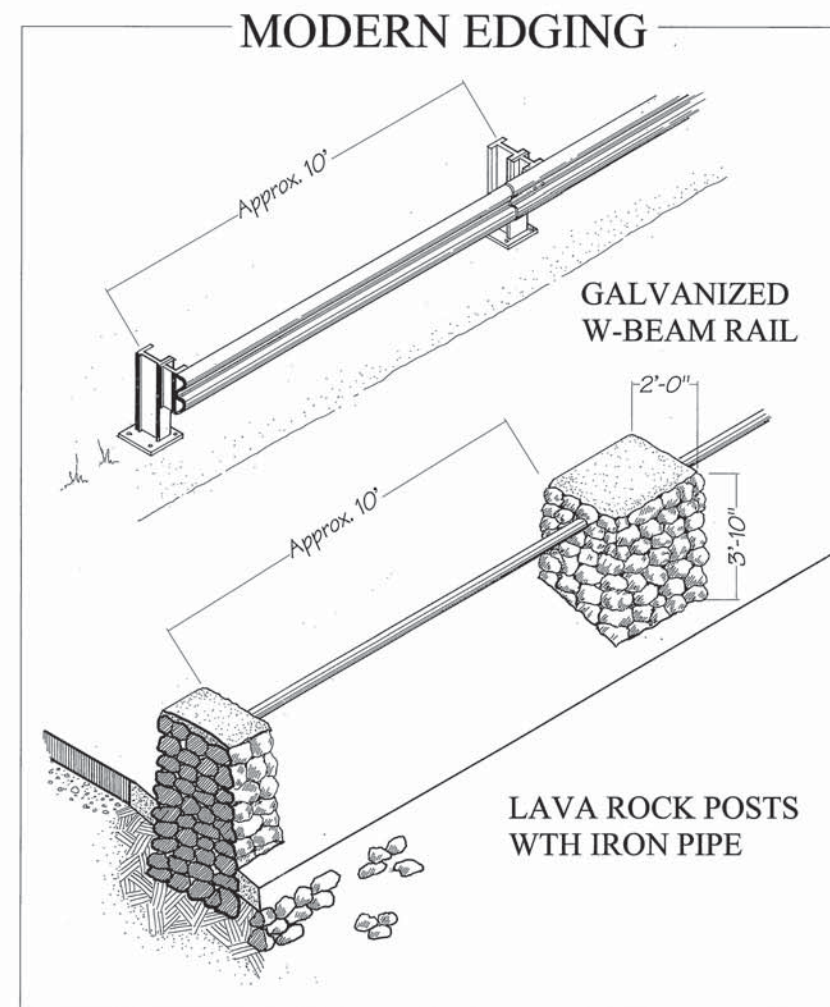
HI-75

NUMBER OF COPIES
INDEX NUMBER

ROADSIDE EDGING OF THE HANA BELT ROAD

When the Hana Belt Road opened to motorists in the 1920's, it is likely there was relatively little roadside edging. Lava-rock guardwalls were part of the original road construction, often built as an integral part of the roadway's retaining walls. During the road's early decades, various other features were installed to improve safety and aid motorists. Historic roadside edging included additional lava rock guard walls constructed of dry-laid or concrete rubble masonry, concrete post delineators that helped motorists see the edge of the road, and concrete-post and cable guardrails. Reinforced-concrete mileposts were also set alongside the road to aid motorists. Lava rock wing walls were integral parts of original bridge design. The wing walls served to guide motorists onto the narrow one-lane bridge, and were part of the soil retention system that joined the bridge abutments.

In 2005, many of the lava-rock guardwalls remained, as did some of the concrete posts and a few concrete mileposts. In recent decades, lava rock walls as well as newer types of guardrails have been installed, including W-beam, steel guardrail and short sections of lava rock walls connected by iron pipe.



DELINEATED BY: MAUREN VOSMEK, 2005

HANA HIGHWAY
RECORDING PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

HANA VICINITY

HANA BELT ROAD (HANA HIGHWAY)
BETWEEN HAIKU AND KIPAHULU/STATE HIGHWAY 360/COUNTY HIGHWAYS 1
MAUI

HAWAII

SHEET
10 OF 13

HISTORIC AMERICAN
ENGINEERING RECORD
HI-75

IF REPRODUCED, PLEASE CREDIT THE HISTORIC AMERICAN ENGINEERING RECORD, NATIONAL PARK SERVICE, NAME OF COLLABORATOR, DATE OF DRAWING

HISTORIC AMERICAN ENGINEERING RECORD HI-75	INDEX NUMBER
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11 OF 13

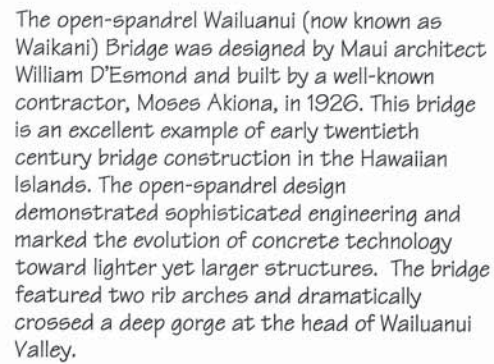
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MAUI
BETWEEN HAIKU AND KIPAHULU/STATE HIGHWAY 360/COUNTY HIGHWAY 31
HANA BLVD / ROAD HANA HIGHWAY

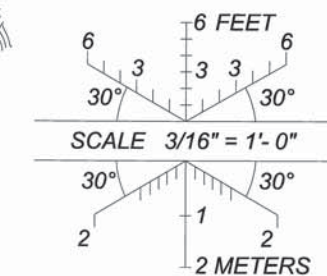
HANA VICINITY

HANA HIGHWAY

RECORDING PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR



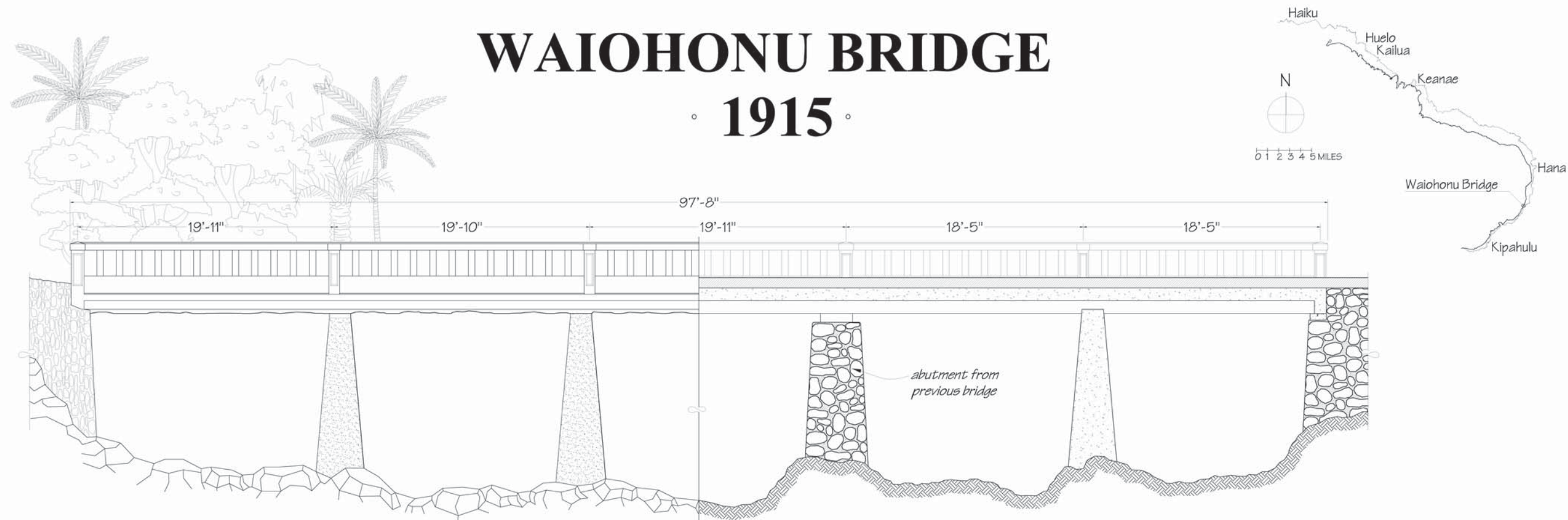
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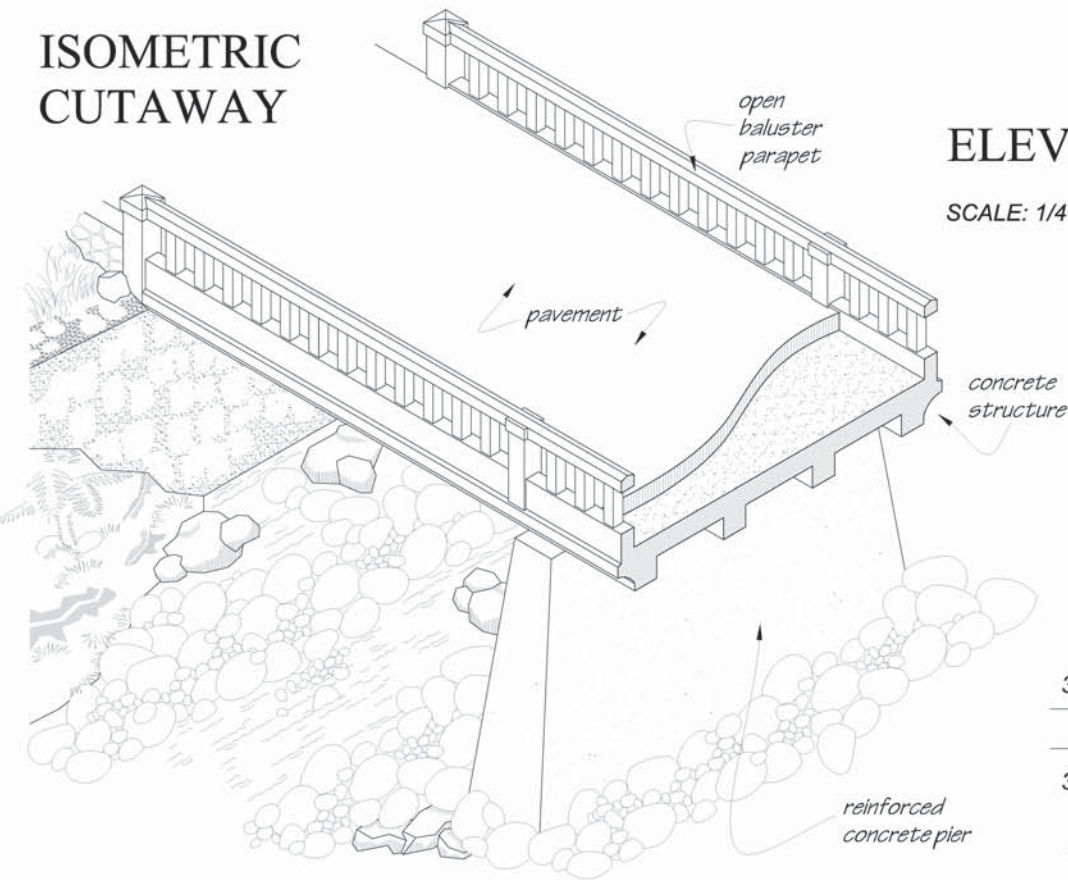
ISOMETRIC CUTAWAY

WAIOHONU BRIDGE

◦ 1915 ◦



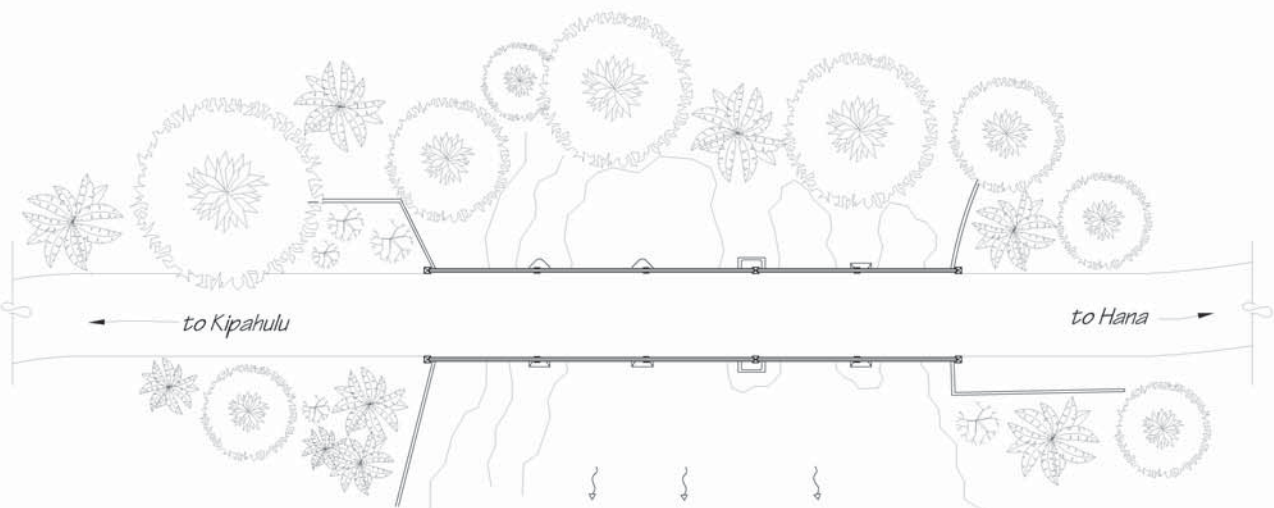
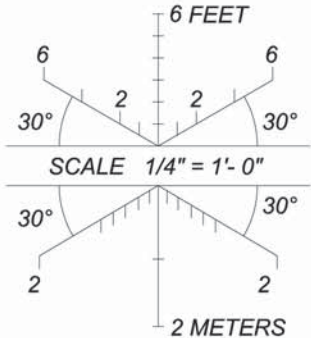
ISOMETRIC CUTAWAY



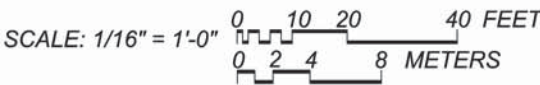
ELEVATION / SECTION



Waiohonu Bridge is unique in several respects: it is the Hana Belt Road's only five-span structure and is one of the few bridges in the historic district that is built on a tangent alignment. Its concrete rubble masonry (CRM) abutments and wingwalls demonstrate the fine craftsmanship of local laborers. The three reinforced concrete piers were probably built in 1906, when the county government replaced a two-span, wood-truss bridge with a new wood structure and concrete piers. The CRM pier, which is shorter than the other piers, was likely part of the pre-1906 bridge. To all appearances, the existing piers were utilized when Waiohonu Bridge was built in 1915.

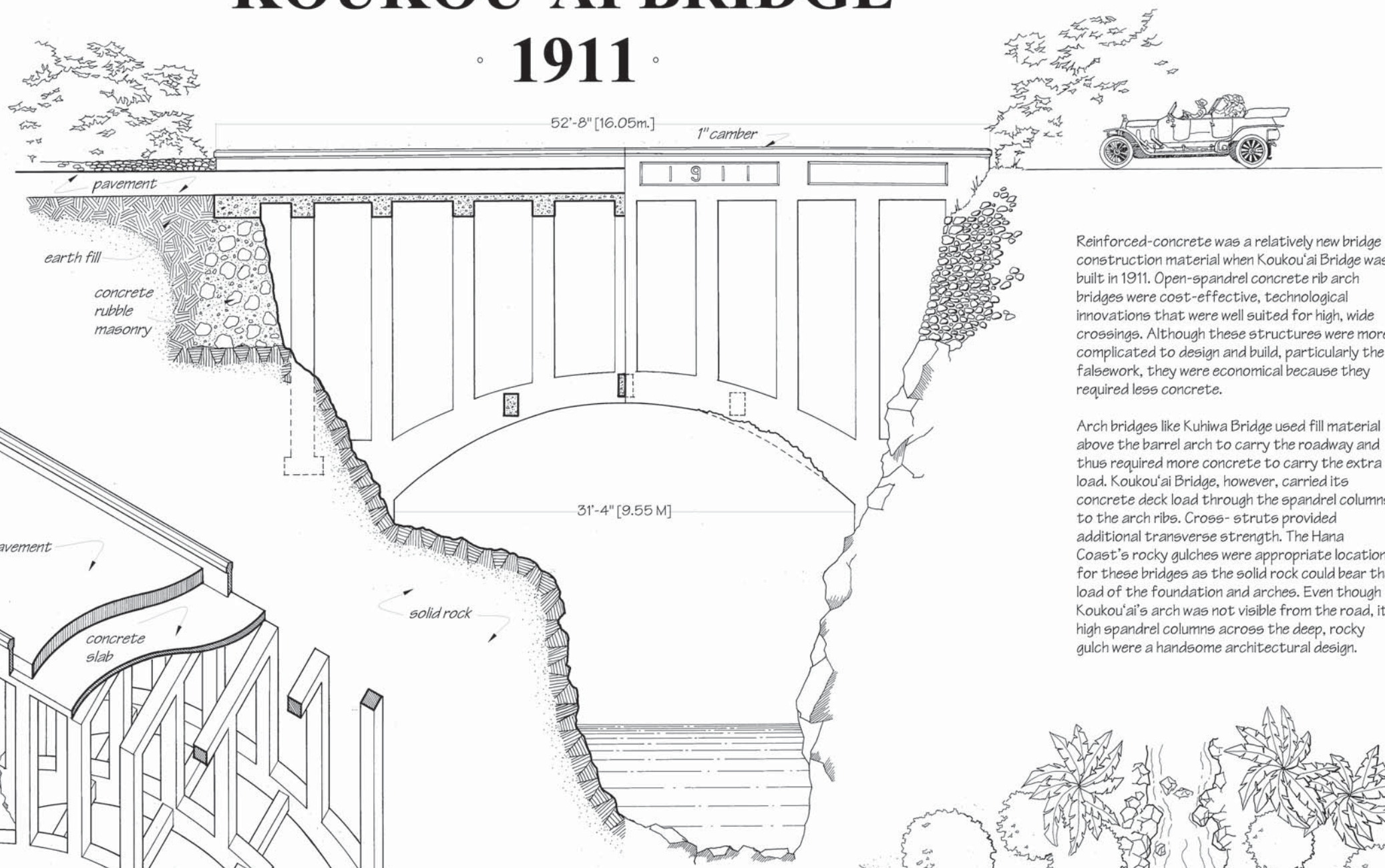


PLAN



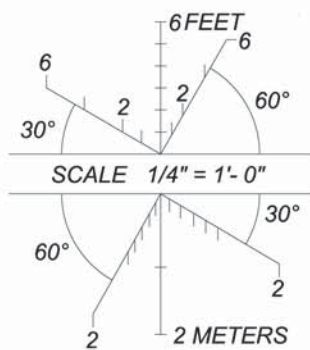
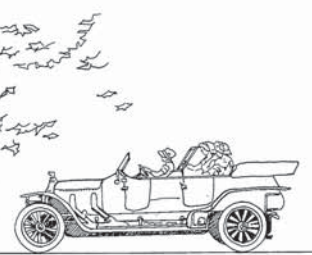
KOUKOU'AI BRIDGE

1911

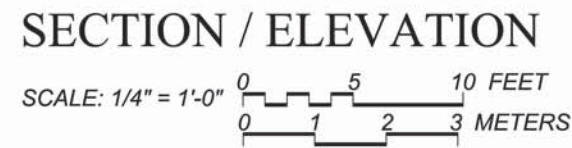


Reinforced-concrete was a relatively new bridge construction material when Koukou'ai Bridge was built in 1911. Open-spandrel concrete rib arch bridges were cost-effective, technological innovations that were well suited for high, wide crossings. Although these structures were more complicated to design and build, particularly the falsework, they were economical because they required less concrete.

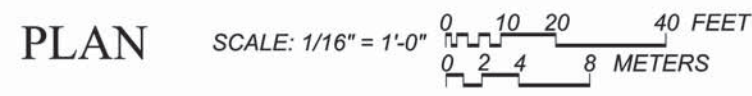
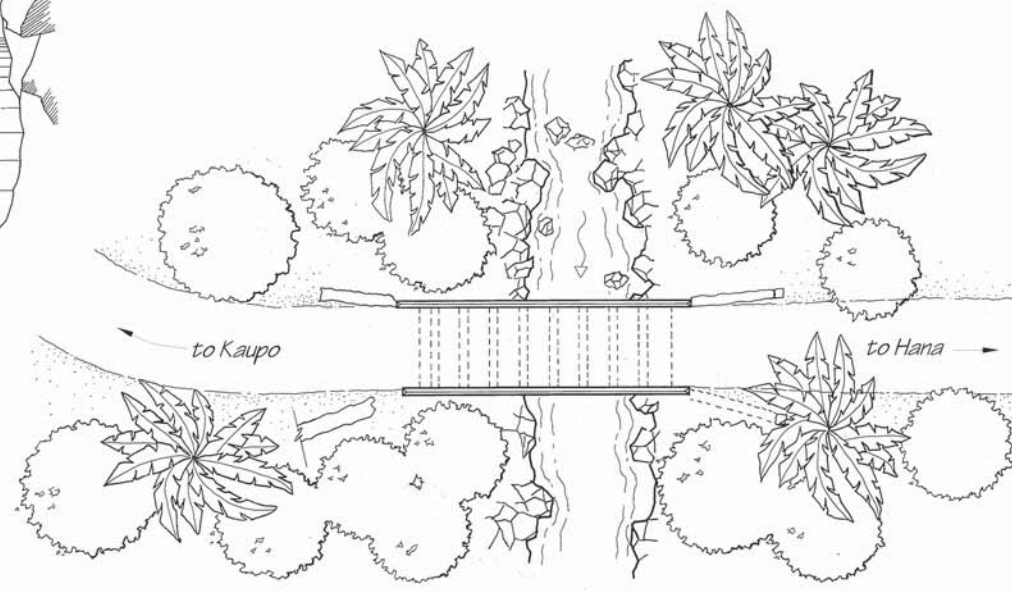
Arch bridges like Kuhlwa Bridge used fill material above the barrel arch to carry the roadway and thus required more concrete to carry the extra load. Koukou'ai Bridge, however, carried its concrete deck load through the spandrel columns to the arch ribs. Cross-struts provided additional transverse strength. The Hana Coast's rocky gulches were appropriate locations for these bridges as the solid rock could bear the load of the foundation and arches. Even though Koukou'ai's arch was not visible from the road, its high spandrel columns across the deep, rocky gulch were a handsome architectural design.



AXONOMETRIC CUTAWAY



While the structure's load-bearing weight was minimized with the open-spandrel arch rib design, in 2005 the asphalt pavement on the deck was nearly 18" thick, which not only compromised the effectiveness of the parapet, it added excessive dead weight that jeopardized the bridge's structural integrity.



APPENDIX 4

National Register Forms

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
REGISTRATION FORM

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in How to Complete the National Register of Historic Places Registration Form (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Hāna Belt Road
other names/site number Belt Road, Hāna Road, Hāna Highway, Pi'ilani Highway

2. Location

street & number Hāna Highway (State Rte. 360), Pi'ilani Highway (Rte. 31) not for publication ___
city or town Makawao District to Hāna District
vicinity Ha'ikū, Ke'anae, Nāhiku, Hāna, Kīpahulu
state Hawai'i code HI county Maui code 009 zip code ___

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1986, as amended, I hereby certify that this ___ nomination ___ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ☒ meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant ___ nationally ☒ statewide ___ locally. (___ See continuation sheet for additional comments.)


Signature of certifying official

4-20-01
Date

State or Federal agency and bureau

In my opinion, the property ___ meets ___ does not meet the National Register criteria.
(___ See continuation sheet for additional comments.)

Signature of commenting or other official

Date

State or Federal agency and bureau

4. National Park Service Certification

I, hereby certify that this property is: Signature of Keeper Date of Action

☒ entered in the National Register Avaah D. Pope 6/15/01
☒ See continuation sheet. _____

_____ determined eligible for the National Register
_____ See continuation sheet. _____

_____ determined not eligible for the National Register

_____ removed from the National Register

_____ other (explain): _____

5. Classification

Ownership of Property
(Check as many boxes as apply)

- _____ private
- ☒ public-local
- ☒ public-State
- _____ public-Federal

Category of Property
(Check only one box)

- _____ building(s)
- ☒ district
- _____ site
- _____ structure
- _____ object

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple property listing.)

N/A _____

Number of Resources within Property

Contributing Noncontributing

_____ buildings

_____ sites

73 1 structures (bridges and culverts)

_____ objects

73 1 Total

Number of contributing resources previously listed in the

National Register N/A

6. Function or Use

Historic Functions (Enter categories from instructions)

Cat: Transportation Sub: road-related

Current Functions (Enter categories from instructions)

Cat: Transportation Sub: road-related

7. Description

Architectural Classification
(Enter categories from instructions)

Other: OTHER: roadways; bridges; reinforced concrete, girder, flat slab,
masonry (basalt or lava rock)

Materials
(Enter categories from instructions)

foundation _____

roof _____

walls _____

other asphalt, concrete, masonry (lava rock)

8. Statement of Significance

Applicable National Register Criteria

(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing)

☒ A Property is associated with events that have made a significant contribution to the broad patterns of our history.

☐ B Property is associated with the lives of persons significant in our past.

☒ C Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

☐ D Property has yielded, or is likely to yield information important in prehistory or history.

Criteria Considerations

(Mark "X" in all the boxes that apply.)

Property is:

☐ A owned by a religious institution or used for religious purposes.

☐ B removed from its original location.

☐ C a birthplace or a grave.

☐ D a cemetery.

☐ E a reconstructed building, object, or structure.

☐ F a commemorative property.

☐ G less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance

(Enter categories from instructions)

Engineering _____

Social History _____

Transportation _____

Commerce _____

Period of Significance

circa 1900 to 1947

Significant Dates

circa 1900 to 1947

Significant Person

(Complete if Criterion B is marked above)

Cultural Affiliation

Architect/Builder

County engineers, including Hugh Howell, Paul Low, and A. H. Wong; builders were county employees, prison labor, and private contractors. Private contractors included Wilson and McCandless, Hugh Howell Engineering Company, and Moses Akiona, Ltd. Designers also included William D'Esmond, architect; Joseph Matson, and D. Kapohakimohewa.

9. Major Bibliographical References Bibliography (Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS)

☐ preliminary determination of individual listing (36 CFR 67) has been requested

☐ previously listed in the National Register

☐ previously determined eligible by the National Register

☐ designated a National Historic Landmark

☐ recorded by Historic American Buildings Survey

☐ recorded by Historic American Engineering Record

Primary Location of Additional Data

☐ State Historic Preservation Office

☒ Other State agency

☐ Federal agency

☐ Local government

☐ University

☐ Other

Name of repository:

State of Hawai'i Department of Transportation

10. Geographical Data Acreage of Property

UTM References

(Place additional UTM references on a continuation sheet)

Zone Easting Northing

Zone Easting Northing

1 04 787810 2314160

3 04 789510 2312640

2 04 788850 2313440

4 04 789860 2312530

☒ See continuation sheet.

Verbal Boundary Description

(Describe the boundaries of the property on a continuation sheet.)

The boundaries of the nominated district are delineated by the course of the Hāna Belt Road. The right-of-way is approximately 40' wide and is variable along the entire length of the road. The historic district begins .2 miles west of Mile Marker 3 on the Hāna Highway, State Route 360, near Huelo, and ends on the south end of Koukou'ai Bridge near Kīpahulu on Route 31.

Boundary Justification

(Explain why the boundaries were selected on a continuation sheet.)

The boundaries are coterminus with the Hāna Belt Road's historic right-of-way. The beginning and end points were selected to encompass the portion of the Hāna Belt Road that retains the greatest historic integrity and character. This section of roadway is relatively unaltered and is the most spectacular portion of Maui's historic belt road system, both in its scenery and its historic character. The boundaries include the highest concentration of stylistically consistent historic bridges in the State of Hawai'i.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 10 Geographical Data Page 2

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

UTMs continued:

	zone/easting	northing	points 1-4: Ha'ikū, Hawai'i quad
5	04/790890	2311540	
6	04/791260	2311740	
7	04/791400	2311610	
8	04/792250	2310930	
9	04/793400	2310360	
10	04/793620	2310280	points 5-17: Ke'anae, Hawai'i quad
11	04/794270	2309800	
12	04/794310	2309020	
13	04/795250	2309060	
14	04/796560	2309440	
15	04/796790	2309280	
16	04/797770	2308430	
17	04/797540	2306640	
18	04/797580	2305320	
19	04/797800	2305090	
20	04/798000	2304760	
21	04/798680	2304860	
22	04/798890	2304800	
23	04/799550	2304630	points 18-32: Nāhiku, Hawai'i quad
24	04/799760	2304420	
25	04/799920	2304330	
26	04/800000	2304410	
27	04/800520	2304260	
28	04/800880	2304190	
29	04/801930	2303950	
30	04/802190	23033830	
31	04/		
32	04/	2303830	

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 10 Geographical Data Page 3

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

UTMs continued:

	zone/easting	northing	
33	04/803810	2303440	
34	04/803910	2303270	
35	04/804000	2303160	
36	04/804170	2303130	
37	04/804290	2303000	
38	04/804900	2303020	points 33-47: Hāna, Hawai'i quad
39	04/805350	2303020	
40	04/805650	2302900	
41	04/806060	2302760	
42	04/807160	2302510	
43	04/807630	2302290	
44	04/812440		
45	04/812960	2295650	
46	04/812960	2293760	
47	04/812580	2292900	
48	04/811030	2290640	
49	04/810240	2290700	
50	04/809900	2290260	
51	04/809480	2290260	
52	04/809190	2290300	
53	04/809070	2290210	points 48-60: Kīpahulu, Hawai'i quad
54	04/808730	2289420	
55	04/808500	2289330	
56	04/808210	2289200	
57	04/808000	2289200	
58	04/807770	2288590	
59	04/807680	2288060	
60	04/805910	2286630	

11. Form Prepared By

name/title Dawn E. Duensing, historian
organization Maui County Cultural Resources Commission date 1/13/01
street & number P.O. Box 888 telephone (808)572-6583
city or town Makawao state HI zip code 96768

Additional Documentation. Submit the following items with the completed form:

Continuation Sheets

Maps

A USGS map (7.5 or 15 minute series) indicating the property's location.

A sketch map for historic districts and properties having large acreage or numerous resources.

Photographs

Representative black and white photographs of the property.

Additional items

(Check with the SHPO or FPO for any additional items)

Property Owner(Complete this item at the request of the SHPO or FPO.)

name State of Hawai'i, Department of Transportation
street & number 869 Punchbowl Street telephone (808)587-2150
city or town Honolulu state Hawai'i zip code 96813

name County of Maui, Department of Public Works & Waste Management
street & number 200 S. High Street telephone (808)270-7845
city or town Wailuku state Hawai'i zip code 96793

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 1

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description

(Describe the historic and current condition of the property on one or more continuation sheets.)

The Hāna Belt Road is coterminous with its historic right-of-way. The Hāna Highway portion of the "belt road" traverses approximately fifty-one miles along Maui's north and east coast from Kahului in central Maui to the remote East Maui community of Hāna. After Hāna, the road continues as the Pi'ilani Highway and circles back around East Maui's south side, a distance of thirty-seven miles. Together, these East Maui roads were part of Maui's "belt" road system around the entire island. The proposed historic district includes approximately forty-two miles of road from .2 miles west of Mile Marker 3 on the Hāna Highway near Huelo to Koukou'ai Bridge on Pi'ilani Highway near the Kipahulu section of Haleakalā National Park. The narrow road winds around more than 600 curves and over fifty-nine bridges. The Hāna Belt Road is famous for its one-lane bridges with sharp approaches and encompasses the highest concentration of unaltered and stylistically consistent historic bridges in Hawai'i. The Belt Road to Hāna is notable for its breathtaking scenery as it passes waterfalls, v-shaped valleys, and small villages, often hugging the precipitous sea cliffs on Maui's rugged coastline. The roadway width varies from less than 16' wide along the sea cliffs and other rugged terrain to approximately 22' wide through level topography and residential areas. Along most of the roadway, there is no shoulder or a very narrow shoulder. The road's alignment dates to its construction in the 1920s. The Belt Road is the only overland automobile route that connects East Maui communities with the rest of the island. The period of significance is circa 1900 when Mauians began calling for an improved road and a rudimentary wagon road was constructed near Nāhiku, to 1947 when the last bridge was built to service the Hāna Belt Road.

TOPOGRAPHY AND EARLY ROAD

The Hāna Belt Road traverses through some of Hawai'i's most rugged topography and rainiest climate. The island of Maui is comprised of two shield volcanoes joined by an isthmus, which constitutes east and west Maui. East Maui, where the Hāna Belt Road is located, is the immense Haleakalā, a dormant volcano more than 10,000' in elevation. In earlier times, lava flows poured into the ocean to create the jagged coastline along which the road is aligned. Centuries of stream erosion from the wet, tradewind climate on Haleakalā's windward (northeastern) slope cut a rugged terrain of great sea cliffs and v-shaped valleys. The wet climate allowed

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 2

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description (continued)

dense forests to grow over the rough terrain and helped make the Hāna District in East Maui one of Hawai'i's most isolated and inaccessible areas.

Prior to 1450 A.D., Maui was divided into two separate kingdoms, one with a court at Lahaina, the other with a court in Hāna. The East Maui coastal area was well populated in ancient times, but had little contact with the rest of Maui due to its isolated location. Traditionally, Hawaiians preferred to rely on their highly-developed navigational skills and traveled by canoe. As a result, Hāna was often politically tied to the more accessible communities across the channel on the island of Hawai'i. In the sixteenth century, Maui's King Pi'ilani conquered East Maui and pulled Hāna into his political sphere. Pi'ilani was notable for his public works projects, including the *Alaloa*, or main road, which began in West Maui.¹

The predecessor trail to the Hāna Belt Road was built by Pi'ilani's son, Kihapi'ilani, in the sixteenth century. The trail was paved with hand-fitted basalt (lava) rocks. The 1848 account of Moses Manu noted, "This road was treacherous and difficult for the stranger, but when it was paved by Kihapi'ilani this road became a fine thing." When completed, the road was 4' to 6' wide, 138 miles long, and encircled the entire island. With the completion of Kihapi'ilani's East Maui trail, known as the King's Highway, Maui became the only island in the Hawaiian chain to have a "belt" road that completely encircled it.² In 1828, missionaries noted that the trail was "paved" and extended over thirty miles. They reported that it was a great help in ascending and descending the steep mountains and cliffs in the area. The early trail's switchbacks over the mountains near Honomanū were still visible in the 1940s.³ Today, intact portions of the King's Highway remain, although most of the road has been obliterated by agriculture or paved over by modern roadways, including the Hāna Belt Road.

¹ Gail Bartholomew, *Maui Remembers: A Local History*. (Honolulu: Mutual Publishing), 1994, 2.

² Bartholomew, *Maui Remembers*, 2; Trust for Public Land and Bay Pacific Consulting, *East Maui Resource Inventory*, Prepared for the Rivers, Trails, and Conservation Assistance Program, National Park Service, U.S. Department of the Interior (Honolulu: 1998), 9.

³ E. E. Pleasant, "Maui 100 Years Ago: The Old Trail to Hāna." *The Maui News*, June 13, 1942.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 3

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description (continued)

THE HĀNA BELT ROAD

The modern history of the Hāna Belt Road began in the 1870s when fifteen miles of unpaved road was built from central Maui into East Maui's rain forest to facilitate the construction of the Hāmākua Ditch, which was completed in 1878. The ditch was an extraordinary nineteenth century engineering marvel built to ensure the economic success of sugar by bringing water from rainy East Maui to central Maui's arid plantations. In 1900, Mauians began considering the necessity of extending a good wagon road through to Hāna, which would be part of the island's "belt" (around-the-island) road system. That year, a rudimentary road was built from Ke'anae to Nāhiku to service the Nāhiku Rubber Company. Construction through this country was difficult due to the terrain and climate. The road was surfaced with cinder, but was not adequate for automobile traffic. In 1905, the Superintendent of Public Works reported that the road in East Maui traversed through very rough country and as a result, was built "as narrow as possible in order to construct, with the money available, the maximum length of road."⁴ Overland travel continued by horse and many travelers followed the trails along the irrigation ditches. Steamer remained the preferred mode of transportation for travel along the Hāna Coast.⁵

By the early 1900s, Maui leaders began planning for an improved route to Hāna. Beginning in 1908 and reaching a peak in 1911, numerous concrete bridges were built along the Hāna Coast in anticipation of road improvements.⁶ In 1914, the Maui County Board of Supervisors lobbied the Territory of Hawai'i Legislature for funding to extend the road from Kailua to Ke'anae. Territorial Governor Pinkham was adamantly opposed to the Hāna Belt Road and blocked most of its funding. Despite the governor's opposition, money was appropriated and the Wilson and McCandless firm completed a "several-mile" section of road between Ke'anae and Nāhiku in

⁴ Bartholomew, *Maui Remembers*, 161; Spencer Mason Architects, *State of Hawai'i Historic Bridge Inventory and Evaluation*, prepared for the State of Hawai'i, Department of Transportation, Highways Division. Draft. (Honolulu), 1996, IV 12.

⁵ "Raymond Adds Ginger To Loan Fund Meeting," *The Maui News*, May 23, 1914.

⁶ Spencer Mason Architects, *State of Hawai'i Historic Bridge Inventory and Evaluation*, IV 12.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 4

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description (continued)

1914. *The Maui News* reported that this "fine piece of road" was of "practically no benefit" since it ended in a forest reserve miles from any habitation. The newspaper noted that one section of road closely traversed along the mountainside a few thousand feet above sea level, with other sections following the Ko'olau Ditch. The road was praised for passing through some of the most spectacular scenery in the islands. Although money had been pledged to carry the road all the way into Ke'anae, Governor Pinkham refused to approve the appropriation and Maui was left with an inaccessible stretch of road.⁷

By 1920, the belt road from central Maui to Kailua was suitable for modern automobile traffic. Parts of the road were paved with macadam to ensure that it was passable during the rainy season. Keeping the road open was essential as it was the primary transportation route into Maui's pineapple country and muddy roads had periodically shut down pineapple operations. Maui County stretched funding as far as it could by using convict labor on the belt road projects.⁸ Territorial funding to extend and complete the coastal highway to Hāna, however, continued to be a problem and was not resolved until Wallace Farrington became governor. Major sections of the Hāna Coast remained inaccessible to automobile traffic, namely the region between Kailua and Nāhiku, the area with the most challenging topography. With Governor Farrington's strong backing, the major portion of today's Hāna Highway was constructed in two separate construction projects between 1923 and 1926. The road between Kailua and Ke'anae was built from 1923 to 1925. Immediately thereafter, a road between Wailua and Nāhiku that connected with the route into Hāna was constructed and opened to the public in 1926.

⁷ "Raymond Adds Ginger To Loan Fund Meeting," *The Maui News*, May 23, 1914; "Belt Road Or Nothing Says Board," *The Maui News*, June 20, 1914; "Let's Have The Belt Road Money," *The Maui News*, June 20, 1914; "No Ke'anae Highway Says Governor," *The Maui News*, July 18, 1914; "Road Pau on Nāhiku Part Belt Road," *The Maui News*, November 14, 1914.

⁸ "No Money For Belt Road For Two Years," *The Maui News*, May 7, 1920; "Convict Labor to Work on Belt Road," *The Maui News*, September 17, 1920.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 5

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

Narrative Description (continued)

Maui County Engineer Paul Low was credited with supervising "one of the most difficult and at the same time finest pieces of road engineering" on Maui.⁹ In January 1923, Low presented his estimates to complete the Hāna road as two projects, the first of which was the roadway extension from Kailua to Ke'anae, a distance of 11.67 miles, which would require the excavation of 273,000 cubic yards of earth. The second phase of the project extended the road from Ke'anae to Wailuaiki near Nāhiku, a distance of 5.67 miles that called for almost 30,000 cubic yards of earth to be excavated. Low used earlier survey work done by engineers of the Maui Loan Fund Commission, which had been created by the Territorial Legislature to oversee special funds for Hawai'i's belt road systems. Low credited engineers Harvey and Howell with designing the original plans. (Hugh Howell also served as Maui County engineer between 1906 and 1914.) In addition to the earlier surveys, Low and a team of county surveyors scouted the route for the Hāna Belt Road, took field notes, and prepared plans and specifications. Low's 1923 estimates included engineering costs, excavation, fill, retaining walls, culverts, bridges, macadam pavement, and tunnels to relocate some ditches. The new road was to be built on a 16'-wide bench, with a pavement width of 12'-0".¹⁰

The Kailua to Ke'anae section of the belt road took two years to build. Crews worked from both ends of the project and met in May 1925. The road opened to the public on June 11, 1925. The new section of road was described as "serpentine" as it passed through a dozen gulches and wound around "mountain sides that dip into the ocean." Although the distance between the two communities was only four miles as the crow flies, the mileage needed to complete the road around the difficult topography was nearly twelve miles. In order to build the new road, workers were lowered by rope over the steep cliffs and gulches to dig a footing, set their drills, bore holes, and set the powder and fuses that would blast the new roadbed. The most spectacular piece of the road was also considered its most impressive engineering feat. This portion of road traversed down the mountainside (west) to the bottom of Honomanū Gulch,

⁹ "Steam Shovels Meet Next Week," *The Maui News*, July 31, 1926.

¹⁰ "Itemized Costs Proposed Belt Road Presented," *The Maui News*, January 19, 1923; "Estimate Made Belt Road Cost By Way Kailua," *The Maui News*, January 13, 1923; "Magnificent Scenery Unfolds Before Eyes of Travelers On Motor Trip Over New Road Leading To Hāna," *The Maui News*, December 22, 1926.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 6

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description (continued)

where it crossed a bridge and proceeded up the other mountainside (east side of the gulch) to a peak on the Ke'anae side. Motorists had impressive views from both sides of the gulch, including a view of the road on the other side. Governor Farrington described the scene as a "gorgeous spectacle [with] the blue sea in many places hundreds of feet below you, the white surf beating against the shore line and these wonderful green hills, the many gulches and every playing light, shade and color on the sides of beautiful and majestic Haleakalā." *The Maui News* noted that the road was still rough in many places, unsurfaced, and in need of widening so that cars could pass each other at any point. The article pointed out the road opened up "marvelously beautiful scenery" that most Maui residents had never seen. As a piece of engineering, the editor claimed that there was nothing in the Territory of Hawai'i or perhaps the world quite like the new road to Ke'anae. A Los Angeles-based writer admired the landscape features, including bamboo thickets, mountain apple, and native kukui trees.¹¹

Work began immediately on the final link of the Hāna Belt Road project. In 1925, Maui's road program received a substantial boost when President Calvin Coolidge approved a bond issue for the Territory of Hawai'i that included \$150,000 to continue construction of the Hāna Belt Road. County Engineer Low reported that finishing work was being done on the newly completed section to Ke'anae, including top-dressing the road, finishing culverts, and improving bridge approaches. Stone masons were building wing walls on the bridges and retaining walls in the valleys. Crews with forty men each had started to build the last link of the road from both the Hāna and Ke'anae sides, which was a length of 3.5 miles. This section was benched at 16'-0" wide, although plans called for the road to eventually be widened to 20'-0" after it had settled. Several bridges near Wailua were also built during this phase, including the Waikani Bridge and the bridge at West Wailuanui. Construction of the last link of road was difficult as

¹¹ "First Car Runs Over Belt Road Kailua-Ke'anae," *The Maui News*, May 23, 1925; "Dream Of Thirty Years Ago About To Be Realized," *The Maui News*, June 6, 1925; "Hundreds Motor to Ke'anae: Maui Turns Out To See Opening Of Scenic Road," *The Maui News*, June 13, 1925; "Magnificent Scenery Unfolds Before Eyes of Travelers On Motor Trip Over New Road Leading To Hāna," *The Maui News*, December 22, 1926; "Maui's New Road," editorial, *The Maui News*, June 17, 1925; "Wonder And Charm Of Maui Scenery To Be Pictured And Told Hundreds Of Thousands Readers On Mainland," *The Maui News*, August 15, 1925.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 7

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description (continued)

much of the work consisted of blasting the solid rock in the area. Shovels on both sides of the project failed due to the stresses of working on solid rock cuts and the necessity of removing hundreds of tons of rock along the right-of-way. At times, the steam shovels could not do the work without considerable blasting and hand work. Heavy rains disrupted the project as well, causing floods and undermining embankments. In November 1926, a flood in the Wailuanui Valley caused a landslide over the road, washed out the scaffolding on the Waikani Bridge, and carried away 600 bags of cement to be used on the bridge.¹²

The Hāna Belt Road was opened to the public on December 18, 1926. *Honiron*, a publication of Honolulu Iron Works, described the road as "spectacularly chiseled out of abrupt cliffs and precipitous valleys." It noted that miles of the roadway were nothing more than a 16'-wide shelf cut into the mountainside, with towering masses of rock above and sheer drops measuring hundreds of feet to the ocean below. When asked how the scenery of the new section of road compared to the Kailua-Ke'anae section, Low commented that there was no comparison. He admired the section of road above the Wailua Valley that traveled along a narrow ledge for about a mile and provided a lovely panorama of *taro* patches and rice fields in the quaint village of Wailua below. *The Maui News* noted that the newly completed Hāna Belt Road was the "great road making achievement in the Islands, fraught with tremendous difficulties in engineering and construction work" and completed by "dare-devil exploits." The paper claimed the road was the most scenic driveway in the world, with vistas of lofty mountains, the Pacific Ocean, wild canyons, cataracts, waterfalls, and luxurious tropical vegetation. Signs marked "bad turn" and "go slow" were installed to mark dangerous curves and other points in the road. The average speed for driving the Hāna Belt Road was 20 m.p.h. Although Low's

¹² "Coolidge Approves Proposed \$2,590,000 Hawai'i Bond Issue," *The Maui News*, August 22, 1925; "Kailua-Kōpili'ula Road Work Making Headway, Says Low," *The Maui News*, March 13, 1926; "Workers Blast Tons Of Rock On Belt Road," *The Maui News*, May 15, 1926; "Builders Progress In Construction Of Belt Road Project," *The Maui News*, April 17, 1926; "Flood Threatens Belt Road Bridge," *The Maui News*, November 17, 1926.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 8

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description (continued)

1923 estimates to complete the road to Hāna included pavement, the road was not paved when it was opened in 1926.¹³

Approximately six miles west of Hāna, near Upper Nāhiku, the Hāna Belt Road enters a coastal plain, which permits the alignment to run in a relatively straight path. The road passes over some minor gulches via a number of culverts and several bridges. Approximately four miles south of Hāna, the coastal plain ends and the road again passes through East Maui's challenging terrain. South of Ala'ala'ula Bridge, the road traverses through a series of rugged gulches similar to those near Ke'anae. South of Waikakoi Bridge, the road is benched into the high cliffs, around steep mountains and into the deep valley of Wailua Cove, before climbing back out of the valley. This portion of road is similar to the road near Honomanū Gulch near Ke'anae. Near Kīpahulu, the Hāna Belt Road passes through the scenic 'Ohe'o Gulch and Koukou'ai Gulch, which were spanned by concrete arch bridges in 1916 and 1911 respectively. It is uncertain when the belt road between Hāna and Kīpahulu was built, although it was being used for automobile traffic by the time the belt road was completed between Kailua and Hāna in 1926.¹⁴

BRIDGES and CULVERTS

The Hāna Belt Road includes fifty-nine bridges and numerous culverts constructed between 1908 and 1947. Sixteen of these bridges are located on the Hāna Belt Road south of Hāna (Pi'ilani Highway, Route 31) and forty-three on the Hāna Belt Road between Hāna and Huelo

¹³ "Magnificent Scenery Unfolds Before Eyes of Travelers On Motor Trip Over New Road Leading To Hāna," *The Maui News*, December 22, 1926; "Honiron Tells Of Maui Road To Hāna," *The Maui News*, March 5, 1927; "Linking Up Maui," *The Maui News*, editorial, December 18, 1926; "Celebration Typical Of Maui," editorial, *The Maui News*, December 22, 1926.

¹⁴ "Magnificent Scenery Unfolds Before Eyes of Travelers On Motor Trip Over New Road Leading To Hāna," *The Maui News*, December 22, 1926; "Maui Belt Road Circled," *The Maui News*, January 15, 1927.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 9

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description (continued)

(Hāna Highway, Route 360). The narrowest bridges are approximately 12'-6" wide and the widest bridge is approximately 20'-6". More than half of the bridges are single span.

The majority of bridges in the district were constructed of reinforced cast-in-place concrete. County and territorial engineers utilized structural systems typical for the early twentieth century, including concrete arch, flat slab, girder, and simple tee-beam spans. Eighty percent of the concrete bridges were constructed between 1908 and 1929. Two unique bridges in the proposed historic district are rare surviving examples of masonry arch construction with basalt (lava rock). Many of the bridges have wingwalls, abutments, and piers constructed of concrete rubble masonry with basalt.

The majority of bridges featured two styles of parapet construction. Twenty-four bridges built between 1908 and 1915 had a solid-paneled, reinforced-concrete parapet with a peaked concrete rail cap. From 1916 to 1929, thirty-one bridges were built with a reinforced-concrete parapet of simple vertical concrete balusters and a square concrete rail cap.¹⁵ The Pu'u'haoa Bridge, built in 1910, and the Waiokamilo Bridge, built in 1921, featured a more ornate open-rail parapet. Two bridges constructed in 1947, Kawaipapa and Wailua, are unique along the corridor, with concrete post-and-beam railings. Some of the bridges have construction dates inscribed on the parapets.

Masonry Arch Bridges

Two masonry arch bridges are located on the Hāna Belt Road south of Hāna, the Hāhālawe Bridge and Wai'ele Bridge. Constructed in 1910, both bridges utilized cut basalt blocks to build the abutments and arch rings. The bridges feature solid reinforced-concrete parapets with rail caps. "A.D. 1910" is inscribed on the outer parapet of each bridge. The bridge walls and rock abutments may date to different construction periods, with the concrete parapets being from a later date. The bridges retain their historic integrity, and feature fine craftsmanship and uncommon materials.¹⁶

¹⁵ Spencer Mason Architects, *State of Hawai'i Historic Bridge Inventory and Evaluation*, VI 191.

¹⁶ Spencer Mason Architects, *State of Hawai'i Historic Bridge Inventory and Evaluation*, VI 192.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 10

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description (continued)

Concrete Arch Bridges

After 1904, concrete arch bridges were built in Hawai'i, often using standardized plans. Two types of concrete arch bridges were constructed in Hawai'i, solid and open spandrel. The solid-spandrel bridges were generally arch-deck bridges in which the traffic deck rested upon the arch. Between 1916 and 1926, several bridges of this type were built on Maui, including three bridges built along the Hāna Coast: 'Ohe'o Bridge, Hanawī Bridge, and Kūhiwa Bridge. The 'Ohe'o Bridge spans the scenic 'Ohe'o Gulch in Haleakalā National Park.

The open-spandrel concrete arch bridges demonstrated sophisticated engineering for their day and marked the evolution of concrete technology toward lighter, yet larger structures. Koukou'ai Bridge was the first open-spandrel arch bridge on Maui and is an excellent example of early twentieth century bridge construction in the Hawaiian Islands. Built in 1911, it spans a deep gorge just south of Haleakalā National Park. The other open-spandrel concrete arch bridge on the Hāna Coast is the Waikani Bridge, built in 1926 by the Akiona Contracting Company and designed by local architect William D'Esmond. The bridge dramatically crosses a deep gorge at the end of a long valley and is perhaps the most aesthetically pleasing bridge along the Hāna Belt Road.¹⁷

Concrete Deck Girder and Flat Slab Bridges

Concrete deck girder, including tee-beam spans and simple deck girder, were the most common types of bridge built along the Hāna Belt Road. Territorial and county engineers realized that these structures were both economical and strong over short spans. As a result, the government began using concrete deck bridges rather than arch or timber bridges after 1911. The majority of these bridges were built between 1911 and 1928. The 1912 Waikamoi Bridge is one of the earliest remaining examples of a concrete slab bridge in Hawai'i. Concrete slab bridges were cast on site using formwork built by local carpenters. The earlier bridges featured a solid-

¹⁷ Spencer Mason Architects, *State of Hawai'i Historic Bridge Inventory and Evaluation*, VI 192-194.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 11

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description (continued)

paneled reinforced-concrete parapet, with the later bridges utilizing simple vertical concrete balusters and a square concrete rail cap.¹⁸ Three bridges date to the 1930s and two were built in 1947. The bridges constructed in 1947 utilized a post-and-beam design that is unique in the Hāna Belt Road corridor.

Culverts

Honolulu Iron Work's publication *Honiron* reported that numerous culverts along the Hāna Belt Road were necessary due to the to the demanding topography. During the 1920s, Calco Corrugated Culverts manufactured from Armco Ingot Iron were used in road construction.¹⁹ Today, there are also culverts constructed of basalt, which are visible from the road. Many of the culverts are topped by lava rock walls on the road. Numerous culverts are not visible from the road and are covered by dense vegetation, which makes it difficult to establish an accurate count of culverts, both contributing and non contributing, along the Hāna Belt Road.

Many culverts along the Hāna Belt Road were built using concrete abutments, concrete slabs, and small concrete parapets. Example of this type of structure include: Culvert #1 between Nā'ili'ilihā'ele Bridge and 'O'opuola Bridge; Culverts #2, #3, and #4 near Ke'anae between Palauhulu Bridge and Waiokamilo Bridge; Culverts #9 and #10 located in the town of Hāna, south of Kawaipapa Bridge near the Hāna Fire Station; and Kalena Culvert north of Koukou'ai Bridge.

Four distinctive culverts (Culverts #5, #6, #7, and #8) constructed of concrete abutments, concrete slabs, and open parapets with simple vertical concrete balusters and concrete rail caps are located west of Hāna and east of Honomā'ele Bridge. These structures vary in span length from 5'-5" to 14'-7". Another distinctive culvert is located adjacent to (east of) Waiokamilo Bridge and spans the Hāna Highway at the "Y" intersection with Wailua Road. Its parapets were built to match those of the Waiokamilo Bridge. Two culverts with concrete abutments,

¹⁸ Spencer Mason Architects, *State of Hawai'i Historic Bridge Inventory and Evaluation*, VI 195-198.

¹⁹ "Honiron Tells Of Maui Road To Hāna," *The Maui News*, March 5, 1927.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 12

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description (continued)

concrete slabs, and solid parapets are Mo'omonui Culvert and Maluhiana'iwi Culvert. The construction dates are inscribed on each of these culverts.

To most observers, many of these culverts would be regarded as bridges, even though they are considered to be culverts by the State Department of Transportation. The State of Hawai'i Department of Transportation (DOT) considers a culvert to have a span of less than 10'-0" in accordance with Federal Highway Administration guidelines. Some of these structures measured longer than 10'.

VISTAS and VIEWS

There is hardly a place along the Hāna Belt Road where motorists are not rewarded with a variety of scenic views, including the ocean, mountains, sea cliffs, waterfalls, small villages, native and exotic vegetation, and traditional landscapes.

Although it is sometimes difficult to find pullouts along the narrow road, viewpoints are scattered throughout the Hāna Belt Road corridor. At most of the bridges, motorists can park on either side to view waterfalls and valleys. The most impressive waterfalls are located at the Waikani Bridge, 'Ohe'o Bridge, and Wailua Bridge. The Kīpahulu District of Haleakalā National Park includes the picturesque 'Ohe'o Gulch; its pools are a popular swimming spot. Elements of the East Maui Irrigation Company ditchworks can be seen at numerous bridges along the road, including the Kōpili'ula Bridge. Just after the Kōpili'ula Bridge, the Hāna Belt Road runs parallel to the irrigation ditch for a short distance. Scenic views are provided at Kaumahina State Wayside near Ke'anae and Wailua Valley Lookout Park above the village of Wailua. Pua'a Ka'a State Park is directly adjacent to the road near Nāhiku. Traditional cultural landscapes of taro patches are viewed in the villages of Ke'anae and Wailua. Native vegetation along the Hāna Belt Road includes hapu'u fern, ko'a, kukui, and pandanus forests. Most of the vegetation along the road, however, is exotic, with species such as bamboo and ginger impacting the landscape. On the coastal plain near the town of Hāna are large ranching areas that were formerly used for sugar cane cultivation.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 13

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description (continued)

ALTERATIONS

Maintaining the Hāna Belt Road over the years has been no easy task. Since the earliest days, highway crews have struggled to keep up with damage caused by landslides, rocks, vegetation, downed trees, and floods. A journalist driving the road in 1940 referred to it as a "paved trail following the line of the ditch through the wild jungle."²⁰ The road was not completely paved until 1962. Over the years, lava-rock retaining walls and guardwalls were constructed in various locations along the road. These walls complement the historic character of the Hāna Belt Road.

In 1969, the State of Hawai'i transferred jurisdiction over the portion of the Hāna Belt Road between Hāna and Kīpahulu, which is now known as the Pi'ilani Highway, to the County of Maui. The Hāna Belt Road between Huelo and Hāna remained under the jurisdiction of the State of Hawai'i. The manner in which the road is maintained and preserved is significantly different between the two government agencies.

Although the state's portion of the Hāna Belt Road (Hāna Highway) between Huelo and Hāna retains its historic character and integrity, there have been alterations along the roadway. The most noticeable change to the state section of the Hāna Belt Road is the addition of w-beam and thrie-beam steel guardrails. It is unknown when the first guardrails were installed along the Hāna Belt Road. Concrete posts from earlier guardrails are still present along the roadside in some areas. Another change over the years has been road widening. There are still many segments of the road that are close to the original 16' width (especially on the cliffs near Ke'anae) and too narrow for cars to pass each other without yielding. The road, however, has been widened in most areas. In a few places where there is a more level topography, as through villages and near the beginning of the road near Huelo, the pavement is up to 22'-0" wide. In several locations, the Department of Transportation has used the new layers of asphalt during

²⁰ Spencer Mason Architects, *State of Hawai'i Historic Bridge Inventory and Evaluation*, IV 14.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 14

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description (continued)

repaving projects to super-elevate curves, particularly in the area east of Wailua. On many bridges, added layers of asphalt have significantly shortened the height of the bridge parapets and asphalt often fills part of the openings between bridge railings. Other changes along the road include painting some bridges and lava rock walls white to increase nighttime visibility, installation of numerous cautionary signs ("one-lane bridge," "narrow road"), reflector signs, and reflectors in the pavement. There have been a few jersey barriers added to the road, usually in places where the roadbed is being undermined alongside a steep cliff.

In the mid 1990s, the road west of Ke'anae that traverses the steep mountainside on the east side of Honomanū Gulch was widened. Work included blasting and removing a large section of the mountain near the road's summit to relocate the damaged road (which was collapsing into the ocean) away from the cliff. A rock wall which does not match the character of the typical basalt parapets seen along the Hāna Belt Road was built between the mountain and the road to catch falling rocks. Concrete gutters were installed and wide shoulders were added. The state Department of Transportation has installed concrete gutters and new culverts in other locations along the road, especially in the area between Wailua and Nāhiku.

The bridges along the Hāna Belt Road retain their historic character. One notable exception is Kawaipapa Bridge. Constructed in 1947, the bridge was altered in 1991 when a new bridge was added to the to the west end of the original structure. The 1991 bridge expansion was modeled on the original bridge, with replications of the post-and-beam bridge walls. The consequence of the expanded bridge was that the original bridge lost its historic integrity and is a non-contributing structure.

The County of Maui section of the Hāna Belt Road, now called the Pi'ilani Highway, has been subjected to fewer changes than the state-maintained portion of the belt road. The county has widened the road in a few locations, but for the most part, the pavement is no wider than 18'-0" and often averages 15' to 16' wide. Some guardrails have been added, but not to the same extent as the state-maintained section of the Hāna Belt Road.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 15

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description (continued)

Although the Hāna Belt Road has been improved over the years, many of the bridges along the road have suffered from a lack of maintenance. Many of the bridge walls originally averaged 34" high. The walls are now shorter due to repeated layers of asphalt. In many cases, the additional asphalt is approximately 12" deep. The majority of the bridges in the Hāna corridor have weeds and vegetation growing in the concrete joints. A few bridge walls have been damaged by accidents. Many of the damaged walls were repaired to match the original design, although in a few cases, damage was not repaired neatly or was repaired with a non-matching element. An example of repaired bridge wall is the Waikani Bridge balustrades, which were severely damaged on the west end. Rather than restoring the end of the bridge wall, the repair consisted of building a rock wall in place of the balustrades. Another example of a bridge alteration that does not match the original structure is Nua'ailua Bridge. Altered in 1940, the *mauka* (mountain side) parapet was replaced with a non-matching concrete wall, most likely as a result of road widening.

The Hāna Belt Road retains its historic character and integrity. For the most part, the road is relatively unaltered. The road's alignment has not been changed since it was completed in 1926, although sections of the road on sea cliffs have collapsed into the ocean and necessitated reconstruction. The road retains its historic character and integrity in its rural location and narrow lanes. The bridges retain historic integrity with sharp and narrow approaches, original materials, and original design. Although a majority of the bridges are quite simple in appearance, several bridges are more elaborate and were designed and built by masters. The bridge designs and materials survive intact, with a few minor exceptions.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 16

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

Narrative Description

(Describe the historic and current condition of the property on one or more continuation sheets.)

Inventory of Contributing Bridges & Significant Culverts

Listed in geographical order east from Huelo:

Hōlua Bridge: constructed 1929; concrete tee-beam; one span, 48'-0"; total length 49'-0"; bridge width 16'-7"; approximate height above stream 28'-0".

Kailua Bridge: constructed 1929; concrete tee-beam; one span, 39'-0"; total length 40'-0"; bridge width 20'-6"; approximate height above stream 18'-0".

Nā'ili'ilihā'ele Bridge: constructed 1930; concrete tee-beam; three spans, 21'-6"; total length 64'-0"; bridge width 20'-3"; approximate height above stream 20'-6". Designer: County Engineer Office.

Culvert #1: concrete, one span, approximate length 9'-0".

O'opuola Bridge: constructed 1925, altered 1931; concrete tee-beam; one span, 29'-0"; total length 30'-0"; bridge width 19'-8"; approximate height above stream 18'-6". Designer: County Engineer Office.

Makanali Bridge: constructed 1928; concrete slab; one span, 18'-0"; total length 18'-0"; bridge width 16'-6". Designer/builder: Department of Public Works.

Ka'aiea Bridge: constructed 1928; concrete tee-beam; one span, 20'-0"; total length 22'-0"; bridge width 16'-6"; approximate height above stream 15'-0". Designer/Builder: Department of Public Works.

Waikamoi Bridge: constructed 1912; concrete slab; two spans, 19'-0"; total length 41'-0"; bridge width 12'-9"; approximate height above stream 17'-0". Designer/Builder: Hugh Howell, Senior Engineer.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 17

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

Narrative Description (continued)

Puohokamoa Bridge: constructed 1912; concrete tee-beam; two spans, 25'-0"; total length 56'-4"; bridge width 15'-3", approximate height above stream 13'-0".

Haipua'ena Bridge: constructed 1912; concrete slab; two spans, 16'-0"; total length 34'-6"; bridge width 12'-9"; approximate height above stream 11'-0". Designer/Builder: Hugh Howell, Senior Engineer.

Kōlea (Punala) Bridge: constructed 1911; concrete tee-beam; one span, 30'-0"; total length 34'-0"; bridge width 12'-8"; approximate height above stream 13'-0". Designer/Builder: Hugh Howell, Senior Engineer.

Honomanū Bridge: constructed 1911; concrete tee-beam; two spans, 23'-0"; total length 48'-0"; bridge width 12'-8"; approximate height above stream 15'-0". Designer/Builder: Hugh Howell, Senior Engineer.

Nua'ailua Bridge: constructed 1911/ altered 1940; concrete tee-beam; one span, 22'-0"; total length 35'-0"; bridge width 24'-0"; approximate height above stream 13'-0". Designer/Builder: Joseph Matson, Senior Engineer.

Pi'ina'au Bridge: constructed 1916; concrete tee-beam; one span, 27'-0"; total length 28'-5"; bridge width 19'-0"; approximate height above stream 19'-0".

Palauhulu Bridge: constructed 1916; concrete tee-beam; one span, 30'-0"; total length 31'-0"; bridge width 19'-10"; approximate height above stream 20'-6".

Culvert #2: concrete, one span, approximate length 10'-0".

Culvert #3: concrete, one span, approximate length 15'-0".

Culvert #4: concrete, one span, approximate length 13'-0".

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 18

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description (continued)

Waiokamilo Bridge: constructed 1921, altered 1937; concrete tee-beam; one span, 20'-0"; total length 24'-0"; bridge width 22'-1"; approximate height above stream 11'-0". Designer: D. K. Kapohakimohewa.

Waiokamilo Culvert: concrete, one span, approximate length 10'-3".

Waikani Bridge: constructed 1926; concrete arch, open spandrel; one span, 82'-6"; total length 108'-0"; bridge width 17'-7"; approximate height above stream 32'-0". Designer: William D'Esmond. Builder: Moses Akiona.

West Wailuaiki Bridge: constructed 1926, altered 1937; concrete tee-beam; three spans, 24'-6"; total length 62'-6"; bridge width 19'-7"; approximate height above stream 15'-0". Designer: A. H. Wong.

East Wailuaiki Bridge: constructed 1926; concrete tee-beam; one span, 31'-0"; total length 34'-5"; bridge width 18'-4"; approximate height above stream 16'-0". Designer/builder: A. P. Low, County Engineer.

Kōpili'ula Bridge: constructed 1926; concrete tee-beam; two spans, 34'-2"; total length 76'-7"; bridge width 14'-4"; approximate height above stream 6'-0".

Pua'aka'a (Waiohue) Bridge: constructed 1926; concrete tee-beam; one span, 19'-6"; total length 20'-2"; bridge width 22'-0"; approximate height above stream 7'-8".

Waiohue Bridge: constructed 1926, altered 1937; concrete tee-beam; two spans, 16'-7"; total length 40'-0"; bridge width 13'-2"; approximate height above stream 10'-0".

Waiohuolua Bridge: constructed 1920, altered 1970; concrete tee-beam; one span, 15'-0"; total length 19'-0"; bridge width 12'-9"; approximate height above stream 8'-0". One bridge wall was replaced by w-beam guardrail; the original bridge wall is in the stream below.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 19

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

Narrative Description (continued)

Bridge #2: constructed 1920; concrete tee-beam; one span, 16'-7"; total length 20'-0"; bridge width 12'-6"; approximate height above stream 8'-0".

Pa'akea Bridge: constructed 1920, altered 1937; concrete tee-beam; two spans, 16'-0"; total length 40'-0"; bridge width 12'-9"; approximate height above stream 8'-0".

Kapā'ula Bridge: constructed 1926; concrete tee-beam; two spans, 21'-0"; total length 49'-0"; bridge width 16'-0"; approximate height above stream 51'-0".

Hanawī Bridge: constructed 1926; concrete arch, solid spandrel; one span, 36'-0"; total length 61'-0"; bridge width 20'-4"; approximate height above stream 19'-0".

East Hanawī Bridge: constructed 1926; concrete tee-beam; one span, 18'-5"; total length 22'-10"; bridge width 15'-11"; approximate height above stream 15'-0".

East Hanawī Culvert: concrete, one span, approximate length 11'-8".

Makapipi Bridge: constructed 1926; concrete tee-beam; two spans, 22'-5"; total length 39'-10"; bridge width 16'-0"; approximate height above stream 12'-0".

Kūhiwa Bridge: constructed 1926; concrete arch, solid spandrel; one span, 36'-6"; total length 60'-0"; bridge width 16'-4"; approximate height above stream 35'-0". Builder: County Engineer's Office.

Kupukoi Bridge: constructed 1926; concrete tee-beam; one span, 21'-5"; total length 24'-7"; bridge width 16'-0"; approximate height above stream 15'-0".

Kahalaowaka Bridge: constructed 1926; concrete tee-beam; one span, 22'-4"; total length 24'-5"; bridge width 15'-0"; approximate height above stream 9'-0".

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 20

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description (continued)

Pupape-Manawaikeae Bridge: constructed 1926; concrete tee-beam; one span, 20'-8"; total length 24'-4"; bridge width 16'-2"; approximate height above stream 16'-0".

Kahawaihapapa Bridge: constructed 1922; concrete tee-beam; three spans, 17'-0"; total length 60'-0"; bridge width 16'-0"; approximate height above stream 15'-0". Builder: County Engineer's Office.

Kea'ā'iki Bridge: constructed 1921; concrete tee-beam; one span, 20'-10"; total length 22'-10"; bridge width 16'-1"; approximate height above stream 27'-0". Builder: County Engineer's Office.

West Waioni Bridge: constructed 1920; concrete tee-beam; one span, 24'-5"; total length 29'-5"; bridge width 16'-6"; approximate height above stream 15'-0".

Waioni Bridge: constructed 1920; concrete tee-beam; one span, 20'-7"; total length 24'-5"; bridge width 15'-11"; approximate height above stream 10'-0".

Lanikele Bridge: constructed 1917; concrete tee-beam; two spans, 22'-4"; total length 51'-6"; bridge width 16'-0"; approximate height above stream 13'-0".

Helele'ike'ohā Bridge: constructed 1917; concrete tee-beam; one span, 23'-7"; total length 28'-6"; bridge width 16'-1"; approximate height above stream 12'-0".

'Ula'ino Bridge: constructed 1914; concrete tee-beam; two spans, 18'-10"; total length 39'-7"; bridge width 16'-0"; approximate height above stream 12'-0".

Mokulehua Bridge: constructed 1908; concrete tee-beam; three spans, 14'-0"; total length 48'-7"; bridge width 13'-11"; approximate height above stream 21'-0".

Oilowai Bridge: constructed 1914; concrete tee-beam; one span, 20'-7"; total length 22'-10"; bridge width 16'-2"; approximate height above stream 22'-0". Builders: Wilson & McCandless.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 21

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description (continued)

Honomā'ele Bridge: constructed 1924; concrete tee-beam; two spans, 20'-4"; total length 38'-10"; bridge width 16'-1"; approximate height above stream 14'-0". Builders: County Engineer's Office.

Culvert #5: concrete, one span, approximate length 17'-6".

Culvert #6: concrete, one span, approximate length 12'-0".

Culvert #7: concrete, one span, approximate length 5'5".

Culvert #8: concrete, one span, approximate length 13'-0".

Culvert #9: concrete, one span, approximate length 14'-7".

Culvert #10: concrete, one span, approximate length 14'-0".

Mo'omonui Culvert: constructed 1911, concrete, one span approximate length 8'-3".

Haneo'o (Kaholopo) Bridge: constructed 1900, altered 1917; concrete slab; two spans, 10'-0"; total length 22'-6"; bridge width 15'-1".

Kapi'a (Kahawaiokapia) Bridge: constructed 1915, altered 1931; concrete slab; three spans, 17'-6"; total length 58'-4"; bridge width 14'-4"; approximate height above stream 17'-0". Designer/Builder: Wilson and McCandless.

Waiohonu Bridge: constructed 1915; concrete tee-beam; five spans, 18'-6"; total length 97'-6"; bridge width 15'-0"; approximate height above stream 14'-0". Designer/Builder: Wilson and McCandless.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 22

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description (continued)

Papa'ahawahawa Bridge: constructed 1913; concrete tee-beam and concrete slab; two spans, 22'-0"; total length 40'-4"; bridge width 14'-5"; approximate height above stream 9'-0".
Designer/Builder: County Engineer's Office.

Ala'ala'ula Bridge: constructed 1915; concrete slab; one span, 30'-0"; total length 54'-0"; bridge width 12'-6"; approximate height above stream 22'-0".

Waikakoi Bridge: constructed 1911; concrete slab; two spans, 14'-0"; total length 33'-6"; bridge width 15'-4"; approximate height above stream 18'-0".

Pa'ihī Bridge: constructed 1911; concrete slab; one span, 36'-6"; total length 42'-4"; bridge width 13'-9"; approximate height above stream 10'-0".

Wailua Bridge: constructed 1947; concrete tee-beam; one span, 60'-0"; total length 66'-1"; bridge width 14'-0"; approximate height above stream 17'-0".

South Wailua (Honolewa) Bridge: constructed 1911; concrete slab; two spans, 25'-0"; total length 57'-0"; bridge width 15'-2"; approximate height above stream 26'-0".

Pu'uhoao Bridge: constructed 1910; concrete tee-beam; one span, 20'-0"; total length 23'-2"; bridge width 12'-9"; approximate height above stream 13'-0".

Waiele (Paehala) Bridge: constructed 1910; masonry arch; one span, 20'-0"; total length 25'-0"; bridge width 12'-6"; approximate height above stream 7'-0".

Kakiweka (Mahalawa) Bridge: constructed 1910; concrete slab; one span, 28'-6"; total length 30'-10"; bridge width 13'-10"; approximate height above stream 16'-0".

Hāhālawe Bridge: constructed 1910; masonry arch; one span, 22'-0"; total length 25'-0"; bridge width 14'-9"; approximate height above stream 10'-0".

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 23

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

Narrative Description (continued)

Maluhiana'iwi Culvert: constructed 1910; concrete, one span, approximately 13'-9".

Pua'alu'u Bridge: constructed 1910; concrete slab; two spans, 15'-0"; total length 32'-10"; bridge width 14'-5"; approximate height above stream 10'-0".

'Ohe'o Bridge: constructed 1916; concrete arch, solid spandrel; one span, 58'-0"; total length 77'-0"; bridge width 14'-5"; approximate height above stream 44'-0".

Kalena Culvert: concrete, one span, approximate length 13'-5".

Koukou'ai (Kaukau'ai) Bridge: constructed 1911; concrete arch, open spandrel; one span, 31'-10"; total length 58'-0"; bridge width 15'-2"; approximate height above stream 34'-0".²¹

²¹ Spencer Mason Architects, *State of Hawai'i Historic Bridge Inventory and Evaluation*, prepared for the State of Hawai'i, Department of Transportation, Highways Division. Draft. (Honolulu), 1996, VI 196-198. All bridge widths and culvert span lengths were measured by Dawn Duensing as part of field work in December 2000.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 8 Page 1

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

Narrative Statement of Significance

(Explain the significance of the property on one or more continuation sheets.)

The Hāna Belt Road achieves state and local significance in the areas of engineering, transportation, commerce, and social history under criteria A and C. The construction of bridges and a road to Hāna between 1900 and 1947 was a major engineering achievement, as the County of Maui and private contractors benched a road into precipitous mountainsides and through the wilderness of East Maui. Fifty-nine of the bridges built between 1908 and 1947 remain along the route as an example of bridge engineering and construction in Hawai'i during the early twentieth century. The completion of an automobile route to Hāna in 1926 ended that community's isolation from the rest of Maui. The road opened East Maui to settlement, agricultural enterprises, and tourism. The Hāna Belt Road is the best remaining intact example of the old belt road system in Hawai'i. The Hāna Belt Road retains historic integrity in its original road alignment, narrow lanes, bridges, and spectacular setting along Maui's northeast coast.

Engineering

A 1905 Superintendent of Public Works report noted that road construction in the Hāna District was through "very rough country."²² The plan for a belt road around East Maui was popular with Maui officials and businessmen, but took decades to complete due to high costs and construction difficulties. Building the Hāna Belt Road was an expensive and difficult proposition due to the challenging topography. Miles of road were blasted out of the mountainsides and numerous bridges were required to carry the road across streams and gulches. Construction was complicated by heavy vegetation, torrential rains, and landslides.

The majority of bridges in the Hāna District were built using construction methods and materials typical in Hawai'i during the early twentieth century. Most of the Hāna District bridges (eighty percent) were constructed prior to 1930. County and territorial engineers utilized common structural systems, including concrete arch, flat slab, girder, and simple tee-beam spans. The majority of bridges along the Hāna Belt Road were simple but functional, constructed with tee-beam spans and simple deck girders. The 1912 Waikamoi Bridge is one of

²² Spencer Mason Architects, *State of Hawai'i Historic Bridge Inventory and Evaluation*, IV 12.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 8 Page 2

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

Narrative Statement of Significance (continued)

the earliest remaining examples of a concrete slab bridge in Hawai'i. Reinforced concrete was the most prevalent construction material due to the corrosive nature of the Pacific Ocean's salt air and the presence of wood-boring insects that made the use of steel and timber bridges less practical in Hawai'i than in the mainland United States. The Loan Fund Commission, established in 1911 to oversee belt road projects, decided that concrete would be used on Hawai'i's bridges rather than steel. The Commission observed that the concrete was more expensive in the beginning, but realized that the increased cost was justified due to concrete's durability as well as lower maintenance and repair costs. The use of reinforced concrete was an indication of the commitment of the Territory of Hawai'i and Maui County governments to building permanent public works improvements.²³

Five concrete arch bridges on the Hāna Belt Road remain as excellent examples of early twentieth century bridge construction in the Hawaiian Islands. These bridges used the most modern engineering technology of their day. Today, the bridges make a significant statement regarding Maui's civic pride during the early twentieth century. The open-spandrel concrete arch bridges demonstrated sophisticated engineering and marked the evolution of concrete technology toward lighter yet larger structures. These bridges were constructed for their strength and permanence, although only a few remain in Hawai'i. Koukou'ai Bridge near Kīpahulu was the first open-spandrel arch bridge on Maui and one of the earliest to be built in Hawai'i. The 'Ohe'o Bridge, a solid spandrel concrete arch, spans the scenic 'Ohe'o Gulch in Haleakalā National Park and was declared eligible for the National Register of Historic Places in 1977 as part of the Kīpahulu Historic District (50-17-299). The open-spandrel Waikani Bridge was designed by Maui architect William D'Esmond and built by a well-known contractor, Moses Akiona.²⁴ D'Esmond designed Maui's County Office Building, built in 1927;

²³ Spencer Mason Architects, *State of Hawai'i Historic Bridge Inventory and Evaluation*, VI 191, 195; V 10-12.

²⁴ Spencer Mason Architects, *State of Hawai'i Historic Bridge Inventory and Evaluation*, VI 192-194.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 8 Page 3

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

Narrative Statement of Significance (continued)

Pā'ia School, 1926; St. Anthony's School, 1925; and numerous residences on Maui.²⁵

Two unique bridges on the Hāna Belt Road are rare surviving examples of masonry arch construction with basalt, Hāhālawe Bridge and Wai'eke Bridge. Fewer than ten masonry arch bridges remain in the state of Hawai'i. Constructed in 1910, both bridges utilized cut basalt blocks for the abutments and arch rings. Basalt arch construction was common in Hawai'i prior to 1898. The bridge walls and rock abutments may date to different construction periods, with the concrete parapets being from a later date. The bridges retain their historic integrity, with each featuring fine craftsmanship and uncommon materials.²⁶

The bridges along the Hāna Belt Road present a visual record and timeline of bridge construction technology and innovation on Maui and in Hawai'i. Many bridges are unique due to the use of vernacular materials (basalt). In addition to the masonry arch bridges, a number of bridges used basalt for the construction of abutments, piers and wingwalls. The majority of bridges, however, were built with the latest in construction technology, reinforced concrete. The bridges were built during a period when formal engineering expertise in bridge building was first introduced in Hawai'i and are good examples of the Territory of Hawai'i's progressive highway system. Each county in the territory had a County Engineer's Office, within which was a bridge design office. Many of the bridges on the Belt Road were designed by the County Engineer's Office and the engineers proved themselves to be not only technologically skilled, but also sensitive to aesthetics. In many cases, the bridges also demonstrate the work of skilled builders. The masonry arch and concrete arch bridges show a high degree of detailing and workmanship. Together, the bridges played an integral role in the development of belt roads on

²⁵ *The Maui News*, December 4, 1926, section 8; "Drawings and Floor Plans of Proposed St. Anthony School Building," *The Maui News*, March 28, 1925; Dawn E. Duensing, *Historic Architectural Survey of Wailuku, Maui, Hawai'i*, prepared for the County of Maui Department of Planning, 1993, 20.

²⁶ Spencer Mason Architects, *State of Hawai'i Historic Bridge Inventory and Evaluation*, VI 192.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 8 Page 4

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

Narrative Statement of Significance (continued)

Maui as well as on other Hawaiian Islands. Today, the Hāna Belt Road bridges remain as the highest concentration of unaltered and stylistically consistent historic bridges in Hawai'i.²⁷

Talented local engineers were responsible for the design and construction of the Hāna Belt Road. A substantial portion of the road and bridge design as well as the majority of engineering work was completed by County Engineer's Office. Hugh Howell, who was appointed Maui County engineer in 1906 and again in 1914, had served as an engineer with the Loan Fund Commission and participated in the early survey work for the Hāna Belt Road. He also designed several bridges on the Hāna Belt Road while serving as a county engineer. The Hugh Howell Engineering Company worked on Hāna Belt Road contracts once construction began. Paul Low was Maui County Engineer from 1918 until 1928 and was responsible for supervising the two major phases of Hāna Belt Road construction between 1923 and 1926. He and his county crews used Howell's earlier survey work as the basis for their road design and built the most spectacular sections of road between Kailua and Nahikū. During his tenure as county engineer, Low also supervised a number of Maui's other public works projects, including the County Office Building in 1924. A. H. Wong, who designed the West Wailuaiki Bridge, was appointed county engineer in 1928 to replace Low. After his service with the county, he worked on the construction of Haleakalā Highway and became an engineering supervisor with the Works Progress Administration project building Maui Airport.²⁸

Notable local contractors built portions of the Hāna Belt Road and several bridges. The Honolulu firm Wilson and McCandless built the 1914 section of road near Nahikū and Oilowai Bridge. Another important local builder, Moses Akiona, was born in Ke'anae and established his contracting firm, Moses Akiona, Ltd., in 1920. In addition to Waikani bridge, Akiona's firm worked on other Maui projects, including Malulani Hospital, Kula Sanitarium, and the Lahaina

²⁷ Spencer Mason Architects, *State of Hawai'i Historic Bridge Inventory and Evaluation*, IV 7-9.

²⁸ Howell noted in *The Maui News*, January 10, 1914; January 9, 1915; and February 4, 1916. Low noted in *The Maui News*, February 15, 1918; October 3, 1928; in Duensing, *Historic Architectural Survey*, 35. Wong noted in *The Maui News*, October 17, 1928.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 8 Page 5

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

Narrative Statement of Significance (continued)

Courthouse. His business eventually grew to become one of the largest contracting firms in the territory. In the 1960s, Akiona and his sons built a section of the H-1 freeway on O'ahu.²⁹

Transportation & Commerce

Belt road projects are a significant element in the transportation history of Maui. This road-building program was concurrent with the strategy of all the major Hawaiian Islands to develop belt road systems. By 1900, Mauians were concentrating on the Hāna section of the belt road, calling for a good wagon road to connect central Maui and Hāna. "What the Central Pacific was to California, and what the Panama Canal would be to the Islands," *The Maui News* emphasized in 1903, was "relatively what a good road all the way from Pā'ia to Hāna would mean to Maui." A road to Hāna was believed necessary for the economic development of East Maui and its success in sugar, minor industries, and small-scale farming.³⁰ Prior to the completion of a road from central Maui to Hāna, travel to East Maui villages was by steamship or an unpaved wagon and horse trail. The route along the Hāna Coast was often impassable due to heavy rain. Various sections of the coastal road were built by 1914, but the lack of a continuous road to Hāna was considered a nuisance. One Maui legislator complained that Maui was "the only island on which you cannot traverse by road around it."³¹

The improved transportation provided by the Hāna Belt Road was considered essential for Maui's commercial development. *Maui News* editorials noted that East Maui had plenty of fertile land and emphasized that a road to Hāna would open the area to settlement. Mauians predicted that a road through East Maui to Hāna would make homestead lands available and would also facilitate trade between East Maui and the rest of the island. Benefits to be obtained from improved transportation to Hāna included increased tax revenues, population, and

²⁹ Spencer Mason Architects, *State of Hawai'i Historic Bridge Inventory and Evaluation*, VI 191, V 14.

³⁰ *The Maui News*, editorial, April 25, 1903.

³¹ "Roads First Need View of Fassoth," *The Maui News*, February 11, 1921.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 8 Page 6

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

Narrative Statement of Significance (continued)

production. Roads connecting the various parts of the island, including Hāna, were viewed as essential to Maui as arteries were to the human body. Some Mauians believed that the Hāna Belt Road project was the most needed road in the territory and noted that Maui was ten years behind the other islands in its belt road construction.³²

The opening of the Hāna Belt Road in 1926 was a major transportation milestone for Maui. *The Maui News* labeled it "the greatest road making achievement in the Island, one fraught with tremendous difficulties in engineering and construction work." The new road eliminated Hāna's reliance on the weekly steamer for its transportation and communication needs to the outside world. With the new road, the trip to Hāna could now be made overland on one's own timetable rather than by the schedule of a steamer or horse trip. Instead of a round-trip journey of a week, the trip was shortened to 3.5 hours each way.³³

Another significant commercial aspect of the Hāna Belt Road was tourism. By the 1920s, Maui's businessmen and civic leaders recognized the importance of scenic roads and considered them to be commercial enterprises, without which Maui could not develop its tourism industry. As early as 1912, the Hāna Belt Road, as well as a proposed route to the summit of Haleakalā, were planned as the centerpieces of Maui's road-building projects. Mauians realized that building a road to Hāna would open up some of the finest scenery in the Hawaiian Islands and put Maui "on the tourist map." One civic group claimed that a magnificent scenic highway could be one of Maui's greatest assets. Local businessmen argued that tourism would not thrive on Maui unless the island had good roads to accommodate its visitors. One Mauian claimed that the mere mention of the term "horseback ride" scared tourists from visiting Maui. A businessman pointed out that tourists expected to travel comfortably by automobile and were not always willing to climb into the saddle to go sightseeing. Mauians realized that more tourists visited

³² *The Maui News*, editorials, June 28, 1902; November 15, 1902; December 27, 1902; March 7, 1903; July 4, 1903; "Advocates Belt Road: Maui is Ten Years Behind in Road Matters," *The Maui News*, November 6, 1909.

³³ "Linking Up Maui," *The Maui News*, editorial, December 18, 1926; "Maui Takes Day Off for Road Opening," *The Maui News*, December 22, 1926.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 8 Page 7

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

Narrative Statement of Significance (continued)

the Big Island of Hawai'i because that island's attractions, especially Kilauea Volcano, were accessible by automobile, while Maui's attractions remained almost inaccessible. The Hāna Belt Road was a significant piece of a road-building program that aimed to make Maui's scenic attractions easily available. Maui's plans to develop a tourist industry received a tremendous boost with the completion of the Hāna Belt Road in 1926 and the Haleakalā Highway in 1935.³⁴ These two roads were Maui's crowning achievements in transportation public works projects during the twentieth century. Both highways were important commercial enterprises and remain the island's most popular scenic drives today. The Hāna Belt Road has become an attraction in itself, with tourists driving the route to experience the narrow road and its historic bridges, not just the scenery. Motorists appreciate this unique route that is relatively unchanged from the 1920s and provides an opportunity to visit a rural area that is uniquely Hawaiian.

Social History

The immediate impact of opening the Hāna Belt Road was to end East Maui's centuries of isolation from the rest of Maui. Prior to the belt road's construction, many on Maui maintained that Hāna might as well be on another island.³⁵ Indeed, in ancient times, Hāna was more connected to communities on the island of Hawai'i that were more easily accessible by canoe. Until the Hāna Belt Road was completed, many Mauians had never seen the 'other side' of Maui, whether they lived in West Maui or East Maui.

The completion of the Hāna Belt Road is a testament to civic pride on Maui during the early twentieth century. The County Act in 1905 authorized the establishment of local governments

³⁴ "No Ke'anae Highway Says Governor," *The Maui News*, July 18, 1914; "The Key to Progress," *The Maui News*, May 16, 1914; "Road to Ke'anae Now Maui's Best Bet To Draw Tourist Travel," *The Maui News*, October 7, 1925; "Connect Maui Up," *The Maui News*, February 11, 1921; Duensing, Dawn E., *Haleakalā Highway, HAER No. HI-52*. [Washington D.C.], National Park Service, Historic American Engineering Record, 1999.

³⁵ "New Comer Doesn't Like Our Road Policy," *The Maui News*, August 14, 1915; "Connect Maui Up," *The Maui News*, February 11, 1921.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 8 Page 8

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

Narrative Statement of Significance (continued)

on Hawai'i's four major islands. On Maui, numerous public works projects during the next thirty years demonstrated residents' keen sense of civic awareness. Substantial public buildings were constructed in the county seat of Wailuku, including the Wailuku Courthouse (built in 1907), County Office Building (1924), Wailuku Library (1928), and Territorial Building (1931). In the Lahaina District, the courthouse was renovated and the Pali Highway was improved in 1925. Prominent schools were built, including the Wailuku Public School in 1905 and Maui High School in 1921, both designed by well-known architect C. W. Dickey. Many of the structures built during this intense period of civil works projects were designed by prominent architects, including Dickey, H. L. Kerr, and William D'Esmond.³⁶

The Hāna Belt Road was part of this great, early twentieth century public works movement. First suggested in 1895, the Maui Board of Supervisors sought funding for the road as early as 1900. Although numerous bridges were constructed on the Hāna Belt Road starting in 1908, little money was available for road construction or improvement. Mauians lobbied Hawai'i's governors and legislators for decades before receiving funding to build the dream of an automobile road to Hāna. A 1923 estimate of \$692,000 to complete the road was a substantial undertaking for an island with limited resources and a population of approximately 38,000, most of whom were agricultural laborers. Maui's leaders found ways to finance the Hāna Belt Road through the sale of territorial bonds and the savings gained from the use of public employees and prison labor rather than private contractors. In early 1923, the county government demonstrated its determination to go ahead with the project by purchasing a steam shovel and drill and assigning a gang of twenty men to begin work on the new road, even though the territorial legislature had not yet approved the sale of bonds for the project. The county established a prison camp in Kailua to house the fifty convicts expected to work on the road. Within months, leaders purchased another steam shovel and drill so that work could proceed from both ends of the road. Funding eventually was secured from the territorial and federal governments.³⁷

³⁶ Duensing, *Historic Architectural Survey*, 5-12, 19-20.

³⁷ "Belt Road Plans Further Advanced," *The Maui News*, February 10, 1923; "Belt Road Funds Knotty Problem Chamber Finds," *The Maui News*, March 9, 1923; "Belt Road Work Will Be

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 8 Page 9

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

Narrative Statement of Significance (continued)

A number of bridges on the Hāna Belt Road were significant civic statements for Maui. Altogether, the concrete bridges along the road demonstrated the county's commitment to permanent and modern improvements. Several bridges were visually prominent both in style and location, and also demonstrated fine workmanship. Bridges such as Waikani, Koukou'ai, and 'Ohe'o indicated both the technical and aesthetic sophistication of the community in which they were built. Many of the bridges are examples of exceptional work by important local builders, including Johnny Wilson of Honolulu (in partnership with McCandless) and Moses Akiona. Waikani Bridge is one of the most aesthetically pleasing bridges along the road and was a collaboration of Akiona and D'Esmond. Many other bridges were not quite so grand, but also made pleasing visual statements, including Hanawī Bridge, Kūhiwa Bridge, Waiokamilo Bridge, and Pu'uhaoa Bridge.

The extent of economic development predicted by *Maui News* writers never happened, although many homes and small farms were built along the Hāna Belt Road corridor over the years as land became available and accessible. Census statistics indicate that the Hāna District was home to 3,100 residents in 1920 before the road opened. In 1930, population in the district declined to 2,436. Agriculture remained the dominant activity, with the communities of Ke'anae and Wailua noted for their production of *taro* and rice. Despite the improvements in transportation and the possibilities for more development, the Hāna District's population dwindled to 1,495 by 1950.³⁸

The lack of road improvements over the past seventy years has not only preserved the historic character of the Hāna Belt Road, but has also helped to maintain the historic rural character of the Hāna District itself. The absence of an easily-traveled, high-speed traffic artery has served to impede substantial development, which has subsequently allowed Hāna and other communities in East Maui to remain rural. There are no fast food chains, chain stores, strip malls or

Started By Maui County," *The Maui News*, March 10, 1923; "Belt Road Project Is To Go Forward At Once," *The Maui News*, May 26, 1923, Robert C. Schmitt, *Historical Statistics of Hawai'i*, Honolulu: The University Press of Hawai'i, 1977, 13.

³⁸ Robert C. Schmitt, *Historical Statistics of Hawai'i*, 13-14.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 8 Page 10

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

Narrative Statement of Significance (continued)

sprawling subdivisions along the Hāna Belt Road. Travelers along the Hāna Coast are served by the occasional roadside stand and must drive all the way to Hāna for conveniences such as groceries, gas, and restaurants. With a sizable population of residents of Hawaiian ancestry, Hāna is often cited as Maui's "most Hawaiian community." The Hāna community has worked together to "Keep Hāna Hawaiian," as a bumper sticker urges, and preserve its rural lifestyle and values. In the 1990s, residents rallied against the approval of major developments such as a golf course and an adjacent residential community. Many Hāna residents believe that the narrow, winding, and slow Hāna Belt Road is a means to "Keep Hāna Hawaiian."

Today, a trip along the Hāna Belt Road allows a motorist to see much of what would have been viewed in 1926 when the road opened: a spectacular thoroughfare chiseled out of cliffs, passing through huge gullies and past waterfalls, while always presenting stunning views of the Pacific Ocean and East Maui's natural features. Ke'anae still practices traditional ways, with *taro* being farmed and a Hawaiian lifestyle. A three-room rural school is still in operation in Ke'anae. The section of road above the Wailua Valley, which was admired by Engineer Paul Low, still travels along a narrow ledge for a mile, providing a panoramic view of *taro* patches in the quaint village of Wailua below. Along the way motorists view the historic irrigation ditches, weirs, and intakes still used for Maui's sugar industry. The journey to Hāna provides an opportunity to experience a rural way of life that is uniquely Hawaiian and also a way of life that is becoming more rare in the Hawaiian Islands.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 9 Page 1

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

Major Bibliographical References

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Duensing, Dawn E. *Haleakalā Highway, HAER No. HI-52*. [Washington D.C.]: National Park Service, Historic American Engineering Record, 1999.

_____. *Historic Architectural Survey of Wailuku, Maui, Hawai'i*. [Wailuku, Hawai'i]: County of Maui, Department of Planning, 1993.

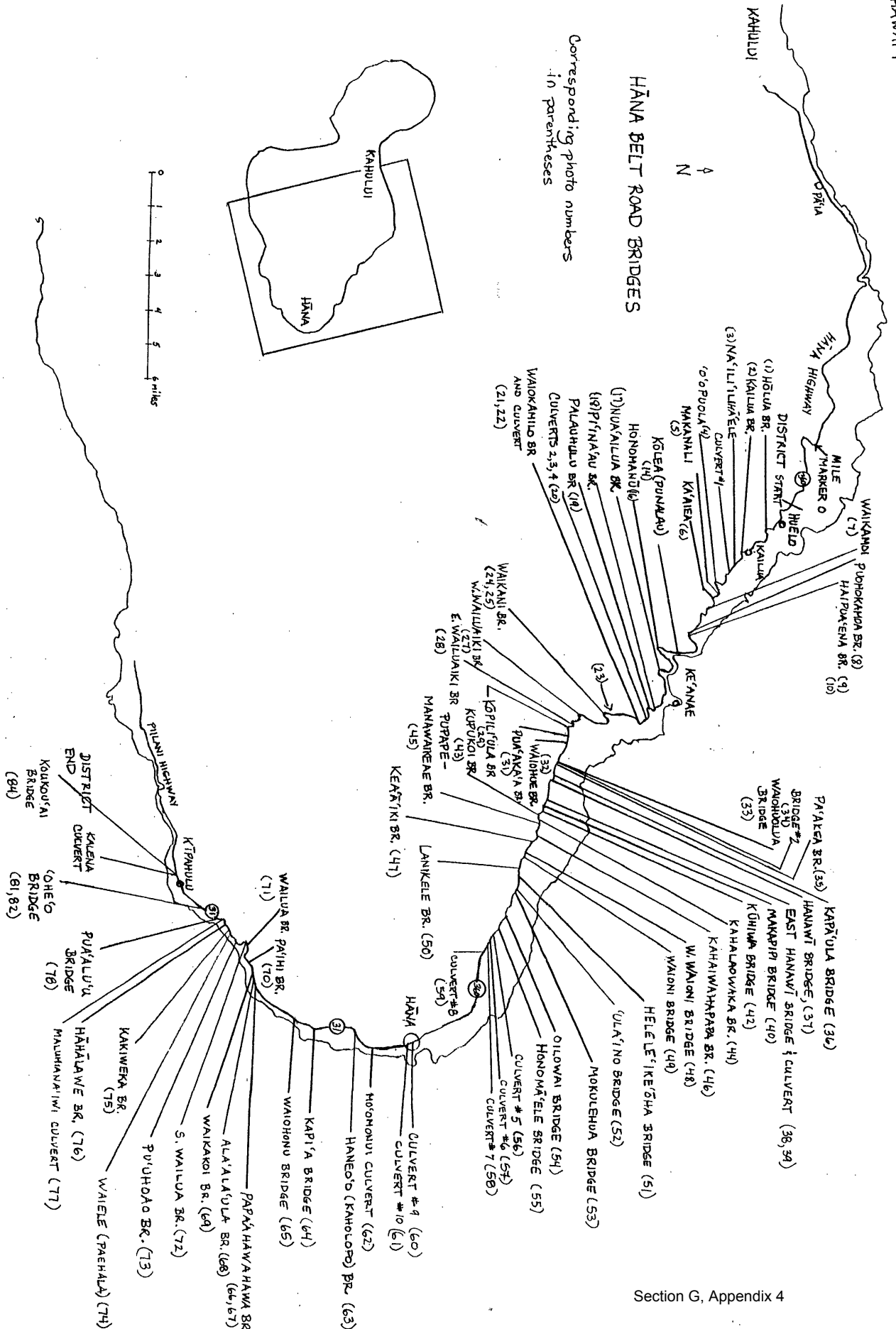
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Robert C. Schmitt. *Historical Statistics of Hawai'i*. Honolulu: The University Press of Hawai'i, 1977.

Spencer Mason Architects. *State of Hawai'i Historic Bridge Inventory and Evaluation*. Draft. [Honolulu]: State of Hawai'i, Department of Transportation, Highways Division, 1996.

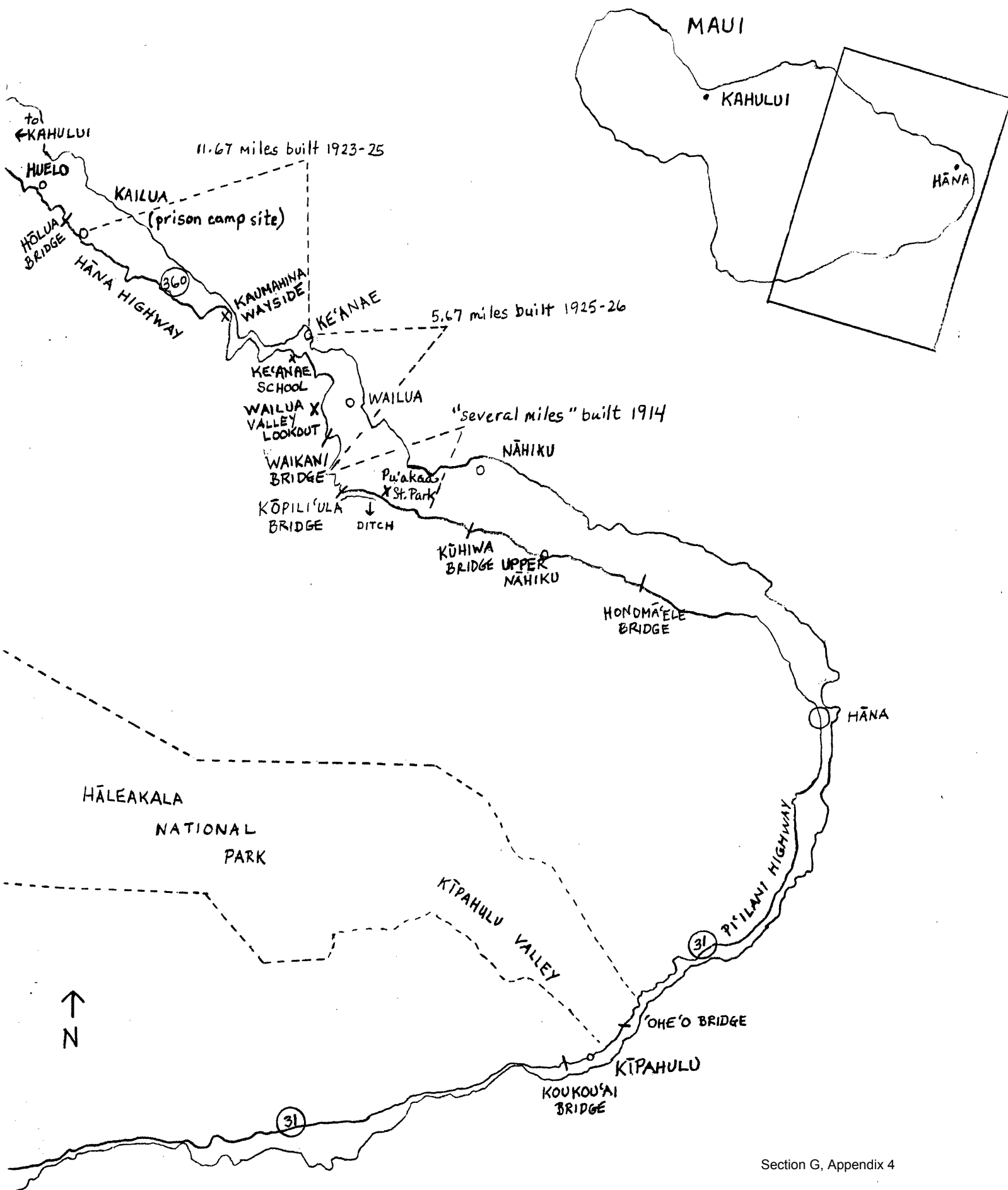
Trust for Public Land and Bay Pacific Consulting. *East Maui Resource Inventory*. [Honolulu]: U.S. Department of the Interior, National Park Service, Rivers, Trails, and Conservation Assistance Program, 1998.

The Maui News, 1900-1950.



Hāna Belt Road

Maui County, Hawai'i



United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

Section number _____ Page _____

SUPPLEMENTARY LISTING RECORD

NRIS Reference Number: 01000615

Date Listed: 06/15/01

Property Name: Hana Belt Road

County: Maui

State: HI

Multiple Name: N/A

This property is listed in the National Register of Historic Places in accordance with the attached nomination documentation subject to the following exceptions, exclusions, or amendments, notwithstanding the National Park Service certification included in the nomination documentation.

(for) Sarah D. Pope
Signature of the Keeper

6/15/01
Date of Action

=====

Amended Items in Nomination:

The following amendments are hereby made to the documentation and confirmed with the HI SHPO:

Section 5. Classification

The road itself, not just the bridges and culverts, should be counted as a contributing structure. Therefore, the total number of contributing structures is changed to 74. The one (1) non-contributing structure remains the same.

Section 10. Geographical Data

The acreage of the property was not provided. The correct acreage of the district is 153 acres.

DISTRIBUTION: National Register property file; Nominating Authority

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section Additional Documentation: Photographs Page 1

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

All photographs, with the exception of photograph #84 (Koukou'ai Bridge), were taken by Dawn E. Duensing. Dawn E. Duensing has all negatives except for that for #84, which is located at the State of Hawai'i Department of Transportation.

1. Hāna Belt Road
2. Maui County, Hawai'i
3. Dawn E. Duensing
4. November 19, 2000
5. Dawn E. Duensing
6. Hōlua Bridge, view looking east
7. Photograph #1

4. November 19, 2000
6. Kailua Bridge, view looking east
7. Photograph #2

4. November 19, 2000
6. Nā'ili'ilihā'ele Bridge, view looking west
7. Photograph #3

4. November 19, 2000
6. 'O'opuola Bridge, view looking west
7. Photograph #4

4. November 19, 2000
6. Makanali Bridge, view looking west
7. Photograph #5

4. November 19, 2000
6. Ka'aiea Bridge, view looking west, with ditchworks in the background
7. Photograph #6

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section Additional Documentation: Photographs Page 2

Name of property Hāna Belt Road
County and State Maui County, Hawai'i

4. November 19, 2000
6. Waikamoi Bridge, view looking east
7. Photograph #7

4. November 19, 2000
6. Puohokamoa Bridge, view looking *makai* (towards the ocean)
7. Photograph #8

4. November 19, 2000
6. Haipua'ena Bridge, view looking *mauka* (toward the mountain or inland)
7. Photograph #9

4. November 19, 2000
6. Haipua'ena Bridge, view looking east
7. Photograph #10

4. November 19, 2000
6. View from road looking east, just east of Kaumahina State Wayside
7. Photograph #11

4. December 2, 2000
6. Aerial view of road on west side of Honomanū Valley.
7. Photograph #12

4. November 26, 2000
6. West side of Honomanū Valley portion of road as viewed from the road on Honomanū Valley's east side
7. Photograph #13

4. December 2, 2000
6. Kōlea (Punala) Bridge, looking *mauka*
7. Photograph #14

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section Additional Documentation: Photographs Page 3

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

4. November 26, 2000
6. Hāna Belt Road through Honomanū Gulch, between Kōlea Bridge and Honomanū Bridge, looking east
7. Photograph #15

4. November 26, 2000
6. Honomanū Bridge, looking *mauka*
7. Photograph #16

4. November 26, 2000
6. Nua'ailua Bridge, looking east
7. Photograph #17

4. November 26, 2000
6. Pi'ina'au Bridge, looking west
7. Photograph #18

4. November 26, 2000
6. Palauhulu Bridge, looking *mauka*
7. Photograph #19

4. November 26, 2000
6. Culverts #2 & #3, looking west, culvert #4 is of similar construction.
7. Photograph #20

4. November 26, 2000
6. Waiokamilo Bridge, looking west
7. Photograph #21

4. December 2, 2000
6. Waiokamilo Bridge, *makai* wall. Waiokamilo Culvert, adjacent to bridge, has identical walls.
7. Photograph #22

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section Additional Documentation: Photographs Page 4

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

4. November 26, 2000
6. View of road on cliff's edge above Wailua Village, after Wailua Valley lookout, looking west
7. Photograph #23

4. December 3, 2000
6. Waikani Bridge, looking *mauka* from west side of bridge
7. Photograph #24

4. November 26, 2000
6. Road view of Waikani Bridge, looking west
7. Photograph #25

4. December 3, 2000
6. View from road on east side of Wailuanui Valley, east of Waikani Bridge; overlooking Wailua Village, with Hāna Belt Road above Wailua visible on left
7. Photograph #26

4. November 26, 2000
6. West Wailuaiki Bridge, looking *mauka* from east side of bridge
7. Photograph #27

4. November 26, 2000
6. East Wailuaiki Bridge, looking east
7. Photograph #28

4. November 26, 2000
6. Kōpili'ula Bridge, looking east
7. Photograph #29

4. November 26, 2000
6. Ditch running alongside Hāna Belt Road after Kōpili'ula Bridge
7. Photograph #30

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section Additional Documentation: Photographs Page 5

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

4. November 26, 2000
6. Pua'aka'a (Waiohue) Bridge, looking *mauka*
7. Photograph #31

4. November 26, 2000
6. Waiohue Bridge, looking east / *makai*
7. Photograph #32

4. November 26, 2000
6. Waiohuolua Bridge, looking east
7. Photograph #33

4. November 26, 2000
6. Bridge #2, looking east, Pa'akea Bridge is in background
7. Photograph #34

4. January 27, 2001
6. Pa'akea Bridge, with Bridge #2 in background, looking west
7. Photograph #35

4. December 2, 2000
6. Kapā'ula Bridge, looking west
7. Photograph #36

4. December 2, 2000
6. Hanawī Bridge, from west side of bridge looking *mauka*
7. Photograph #37

4. December 2, 2000
6. East Hanawī Bridge, looking east
7. Photograph #38

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section Additional Documentation: Photographs Page 6

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

4. December 2, 2000
6. East Hanawī Culvert, looking east / *mauka*
7. Photograph #39

4. December 2, 2000
6. Makapipi Bridge, looking *mauka*
7. Photograph #40

4. December 2, 2000
6. View of Hāna Belt Road east of Makapipi Bridge, looking east
7. Photograph #41

4. December 2, 2000
6. Kūhiwa Bridge, looking east
7. Photograph #42

4. December 2, 2000
6. Kupukoi Bridge, looking east
7. Photograph #43

4. December 2, 2000
6. Kahalaowaka Bridge, view looking *mauka*
7. Photograph #44

4. December 2, 2000
6. Pupape-Manawaikeae Bridge, view looking east
7. Photograph #45

4. December 2, 2000
6. Kahawaihapapa Bridge, looking east
7. Photograph #46

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section Additional Documentation: Photographs Page 7

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

4. December 2, 2000
6. Kea'ā'iki Bridge, looking east
7. Photograph #47

4. December 2, 2000
6. West Waioni Bridge, looking east
7. Photograph #48

4. December 2, 2000
6. Waioni Bridge, looking east
7. Photograph #49

4. December 2, 2000
6. Lanikele Bridge, looking west
7. Photograph #50

4. December 2, 2000
6. Helele'ike'ōhā Bridge, looking east
7. Photograph #51

4. December 2, 2000
6. 'Ula'ino Bridge, looking west
7. Photograph #52

4. December 3, 2000
6. Mokulehua Bridge, looking east
7. Photograph #53

4. December 3, 2000
6. Oilowai Bridge, looking east
7. Photograph #54

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section Additional Documentation: Photographs Page 8

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

4. December 3, 2000
6. Honomā'ele Bridge, looking west
7. Photograph #55

4. December 3, 2000
6. Culvert #5, looking west
7. Photograph #56

4. December 3, 2000
6. Culvert #6, looking *makai*
7. Photograph #57

4. December 3, 2000
6. Culvert #7, looking *makai*
7. Photograph #58

4. December 3, 2000
6. Culvert #8, looking west
7. Photograph #59

4. December 3, 2000
6. Culvert #9, looking *mauka*
7. Photograph #60

4. December 3, 2000
6. Culvert #10, looking west
7. Photograph #61

4. January 27, 2001
6. Mo'omonui Culvert, looking *mauka*
7. Photograph #62

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section Additional Documentation: Photographs Page 9

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

4. December 3, 2000
6. Haneo'o (Kaholopo) Bridge, looking *mauka*
7. Photograph #63

4. December 3, 2000
6. Kapi'a (Kahawaiokapia) Bridge, looking north
7. Photograph #64

4. December 3, 2000
6. Waiohonu Bridge, looking south
7. Photograph #65

4. December 3, 2000
6. Papa'ahawahawa Bridge, looking *mauka*
7. Photograph #66

4. December 3, 2000
6. Papa'ahawahawa Bridge, road view looking north
7. Photograph #67

4. December 3, 2000
6. Ala'ala'ula Bridge, looking *mauka*
7. Photograph #68

4. December 3, 2000
6. Waikakoi Bridge, looking north
7. Photograph #69

4. December 3, 2000
6. Pa'ihī Bridge, looking *mauka*
7. Photograph #70

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section Additional Documentation: Photographs Page 10

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

4. December 3, 2000
6. Wailua Bridge, looking north
7. Photograph #71

4. December 3, 2000
6. South Wailua (Honolewa) Bridge, looking *mauka*
7. Photograph #72

4. December 3, 2000
6. Pu'uhoao Bridge, looking north
7. Photograph #73

4. December 3, 2000
6. Waiele (Paehala) Bridge, looking north
7. Photograph #74

4. December 3, 2000
6. Kakiweka Bridge, looking *mauka*
7. Photograph #75

4. December 3, 2000
6. Hāhālawe Bridge, looking *mauka*
7. Photograph #76

4. December 3, 2000
6. Maluhiana'iwi Culvert, looking *mauka*
7. Photograph #77

4. December 3, 2000
6. Pua'alu'u Bridge, looking *mauka*
7. Photograph #78

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section Additional Documentation: Photographs Page 11

Name of property Hāna Belt Road

County and State Maui County, Hawai'i

4. December 3, 2000
6. Roadscape south of Pua'alu'u Bridge, looking north
7. Photograph #79

4. December 3, 2000
6. Roadscape north of 'Ohe'o Bridge, looking north
7. Photograph #80

4. December 3, 2000
6. 'Ohe'o Bridge, looking *makai*
7. Photograph #81

4. December 3, 2000
6. 'Ohe'o Bridge, looking *mauka*
7. Photograph #82

4. December 3, 2000
6. Roadscape south of 'Ohe'o Bridge in Haleakalā National Park, looking north
7. Photograph #83

3. August Riccio, Hawai'i Heritage Center
4. 1990
5. State of Hawai'i Department of Transportation
6. Koukou'ai (Kaukau'ai) Bridge, looking *mauka*
7. Photograph #84

APPENDIX 5

Proposed Crash-Tested Railing Options

PREFACE


The following pages provide information on the bridge approach walls, railings, and parapets this report recommends as replacements for existing components. Website links are provided in red clouded boxes for reference. The information is provided in the following order:

- Approach Wall: Stone Masonry Guardwall
- Concrete Open Vertical Type: Texas C411
- Concrete Solid Type (1 of 2): Vertical Concrete Wall
- Concrete Solid Type (2 of 2): Vertical Concrete Barrier Rail
- Crash-Tested Interior Rail: Wyoming 740 Bridge Railing

APPENDIX 5


APPROACH WALL

Stone Masonry Guardwall

 Eastern Federal Lands Highway Division

 [About EFLHD](#)

 [Projects](#)

 [Procurement](#)

 [Design Resources](#)

 [Technology Developer](#)

[Home](#) > [Technology Development](#) > **Stone Masonry Guardwall** >


 [EFLHD Home](#)


 [Technology Development](#)

 [Steel-Backed Timber Guardrail](#)

 [Stone Masonry Guardwall](#)

 [Precast Concrete Guardwall](#)

 The edge of a forest along the horizon

 A highway stretching off into the distance

Stone Masonry Guardwall

This railing is often specified for use along roads under the jurisdiction of the National Park Service.

Stone Masonry Guardwall Menu

- [CADD Drawings \(Metric\)](#)
- [Photographs of installed barrier](#)
Best when viewed using 1024 X 768 True Color
- [Standard Specifications \(FP-96\)](#)
- [Special contract requirements \(Special Provisions\)](#)
- [Design and Construction Notes](#)
- [Excerpt from the AASHTO Roadside Design Guide, 1996](#)
- [Bid Prices for the barrier](#)



[Related Links](#)

[Acronym List](#)

[Privacy Policy](#)

[Site Map](#)

[Home](#) | [About EFLHD](#) | [Projects](#) | [Procurement](#) | [Design Resources](#) | [Contact Information](#)

[Planning and Public Involvement](#) | [Technology Development](#)

[United States Department of Transportation](#) | [Federal Highway Administration](#) | [Federal Lands Highway](#)

[Eastern Federal Lands Highway Division](#) | [Central Federal Lands Highway Division](#) | [Western Federal Lands Highway Division](#)

Please send your questions or comments to eflhd.webmaster@fhwa.dot.gov

<http://www.efl.fhwa.dot.gov/techdev/stone/stone-main.htm>











Memorandum

<http://www.efl.fhwa.dot.gov/files/technology/abs/StoneMasonry/acceptance-letter/b64d.pdf>

Subject: INFORMATION: National Cooperative Highway Research Program
(NCHRP) Report 350 Aesthetic Barriers and Bridge Rails

Date: April 9, 2003

From: Michael S. Griffith /**Original Signed by Harry W. Taylor for**/
Acting Director, Office of Safety Design
Office of Safety

In Reply Refer To:
HSA-10/B64-D

To: Safety Field
Federal Land Highway Division Engineers

Some aesthetic roadside/median barriers and bridge railings developed in conjunction with Federal Lands Highways and the National Park Service have been successfully tested under NCHRP Report 350 guidelines in recent years, but have not been formally acknowledged as being acceptable for use on the National Highway System (NHS). Other aesthetic barriers have been informally accepted for use on the NHS based on the crash performance of similar, but more critical designs. Information on several of these barriers was appropriately included in the 2002 edition of the American Association of State Highway and Transportation Officials' Roadside Design Guide.

Please be advised that the following roadside barriers/bridge rails are considered to have met NCHRP Report 350 evaluation criteria at the test levels indicated:

- Steel-Backed Timber Guardrail w/ 4-inch offset block – TL-3
- Steel-Backed Timber Guardrail w/out offset block – TL-2
- Rough Stone Masonry Guardwall – TL-3
- Smooth Stone Masonry Guardwall – TL-3
- Pre-cast Concrete Guardwall – TL-3
- George Washington Memorial Parkway Bridge Rail – TL-3
- Natchez Trace Bridge Rail – TL-3
- Glacier Removable Bridge Rail – TL-1

Any of the above barrier designs, when built symmetrically, are also acceptable for use as median barriers at the indicated test levels. The preferred termination for these barriers is to anchor the ends in a natural backslope wherever practical, holding the top of the barrier to a constant height above the roadway shoulder and using a flare rate for a rigid barrier appropriate for the design speed of the adjacent roadway. The area between the traffic lanes and the barrier



should be essentially flat (i.e., 10:1), but a steeper side slope is acceptable if the barrier height is adjusted accordingly. A sloped termination or an earth mound at the barrier end is not crashworthy and should be used only when it can be constructed at or beyond the minimum clear zone established for a specific project.

The George Washington Memorial Parkway and the Natchez Trace bridge rails were originally tested under guidelines that preceded NCHRP Report 350 and were assigned equivalent NCHRP Report 350 TL-2 designations. Both of these designs have now been tested under NCHRP Report 350 guidelines and have been reclassified as TL-3 designs. Additionally, two variations of a special “removable” bridge rail design, developed for use in Glacier National Park, were tested to NCHRP Report 350 TL-1.

Details and specifications for the designs listed above can be found or will soon be posted at <http://efl.fhwa.dot.gov/techdev> under Aesthetic Barriers. Additional information can be obtained from Mr. Dan Van Gilder with FHWA’s Eastern Federal Lands Division at (703) 404-6361 or via e-mail at dan.vangilder@fhwa.dot.gov.

FHWA:HSA-10:D.Powers:tb:x61320:4/8/03

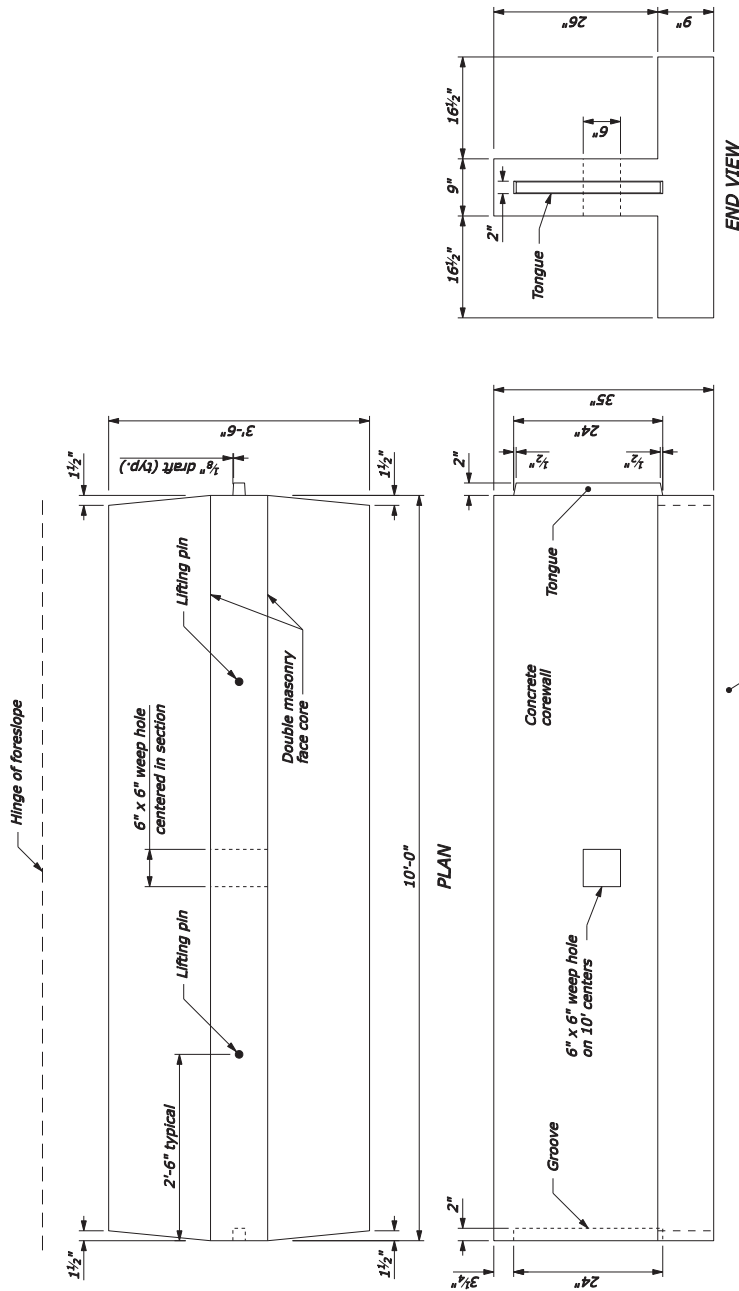
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cc: HSA-10 (Reader, HSA-1; Chron File, HSA-10;
D. Powers, HSA-10)

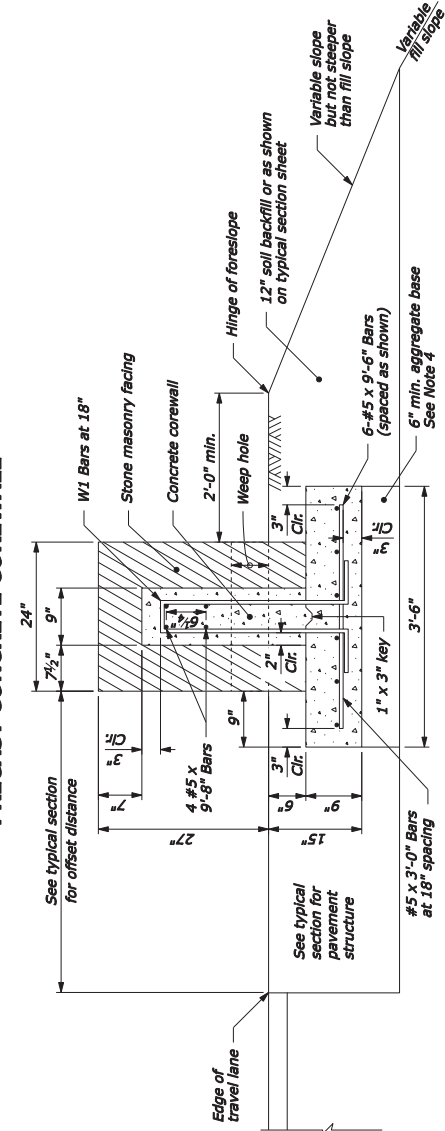
STATE	PROJECT	SHEET NUMBER

NOTE:

1. Form construction joints in the corewall at 30-foot intervals or, at the option of the Contractor, the corewall may be constructed of precast concrete units.
2. On curves with radius less than 150 feet, the corewall is to be cast-in-place.
3. The depth of base may be less than 6" as directed by the CO, when the foundation is on either rock fill or solid rock.
4. Set galvanized metal slots with anchors for the stone work or other approved type of metal anchors in the concrete. Equivalent attachment systems are allowed with the approval of the CO.



PRECAST CONCRETE COREWALL



<http://www.efl.fhwa.dot.gov/files/technology/abs/StoneMasonry/standard-drawings/st62002.pdf>

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	U.S. CUSTOMARY STANDARD
STONE MASONRY GUARDRAIL (DOUBLE FACE)	
STANDARD APPROVED FOR USE 3/1990 REVISED: 4/1994 6/2005	STANDARD 620-2

NO SCALE

APPENDIX 5

CONCRETE OPEN VERTICAL TYPE

Texas C411

<http://guides.roadsafellc.com/bridgeRailGuide/index.php?action=view&railing=93>



Online Guide To Bridge Railings

Navigation

[Bridge Rail Home](#)

[Browse Railings](#)

[Search Railings](#)

[Manufacturers/Contacts](#)

[About](#)

[Links](#)

Other Guides

[Bridge Rail Systems](#)

[Transition Systems](#)

[Sign Support Systems](#)

[Luminaire Support Systems](#)

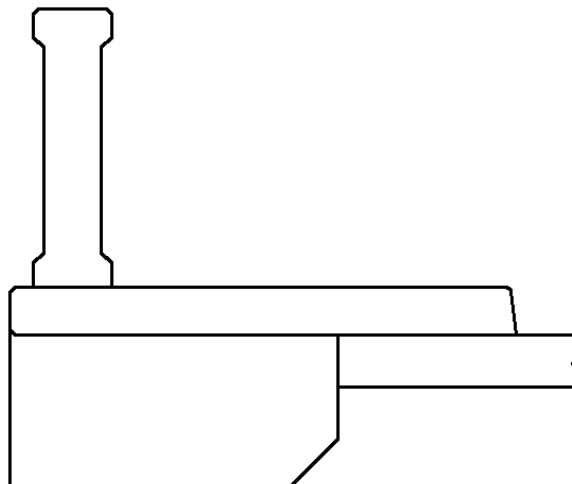
[Hardware Systems](#)

[Components](#)

TX C411 (SBC43b)

Review Status:	In Review
Test Specification:	Unknown
*Test Level:	2
Material:	Cast-in-Place Concrete
Mounting Type:	Parapet
Weight Per Foot:	Unknown
Deck Type:	Conventional
Perm/Temp:	Permanent
Aesthetic:	No
See-Through:	Yes
Retrofit:	No
Combo	No
Traffic/Pedestrian:	
Contact:	(Click for details)
Last Updated:	May 4, 2008
FHWA Eligibility	No letter on FHWA site. Check below in
Letters:	Other Documents

** Crash test compliance shown on the system pages does not imply satisfactory performance other than what is specifically shown on the page.*



Drawings

Other Documents

Images

Compatible Transitions

- [tx_c411_plan.tif](#)
- [tx_c411p2.pdf](#)
- [Thumbnail Gallery](#)
- [None](#)
- [tx_c411plan.tif](#)
- [tx_c411p1.pdf](#)

Existing Comments

Click [here](#) to post a new comment.

Posted by [Christine Conron](#) on June 2, 2008

These materials are ready for review. If you have comments please p
comment feature on this page. If you have attachments (i.e., marked
please email them to me (click on my name in this comment and an e
appear).

*The details in this guide only address the crash performance of the
bridge railing itself. Users should analyze deck and overhang
details for their particular bridge loadings.*

Section 4

Vertical Concrete Parapet

Type C411

Height:
42"

Cost per linear foot:
\$62

Test level:
TL-2

Utilized in:
Texas

Contact:
Mark Blosscock
Texas DOT Bridge Division
125 E. 11th Street
Austin, TX 78701 -2483
(512) 416-2178

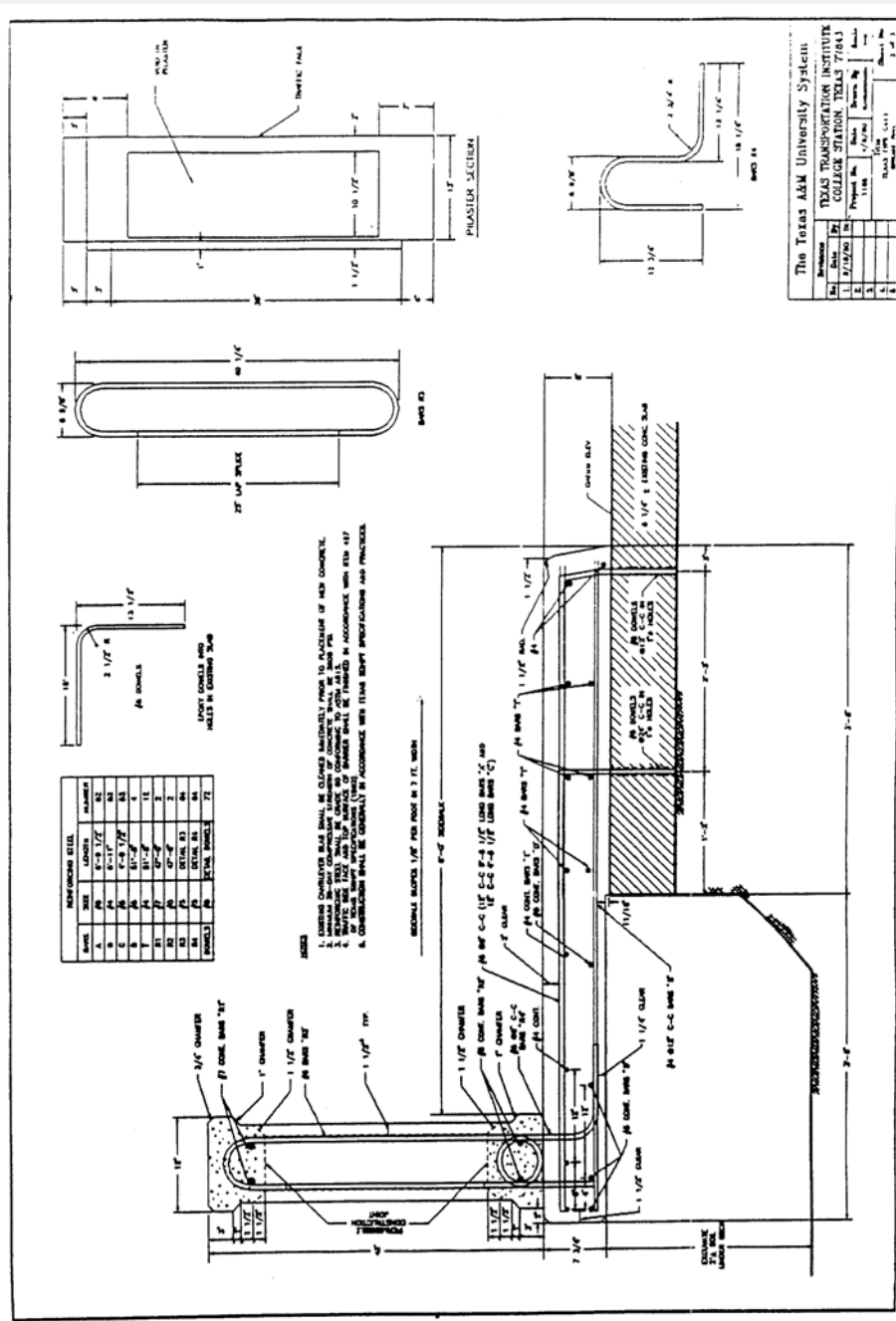


http://guides.roadsafellc.com/Documents/SBC43b/OtherDocs/tx_c411p1.pdf

page 1 of 2

4.X

Type C411



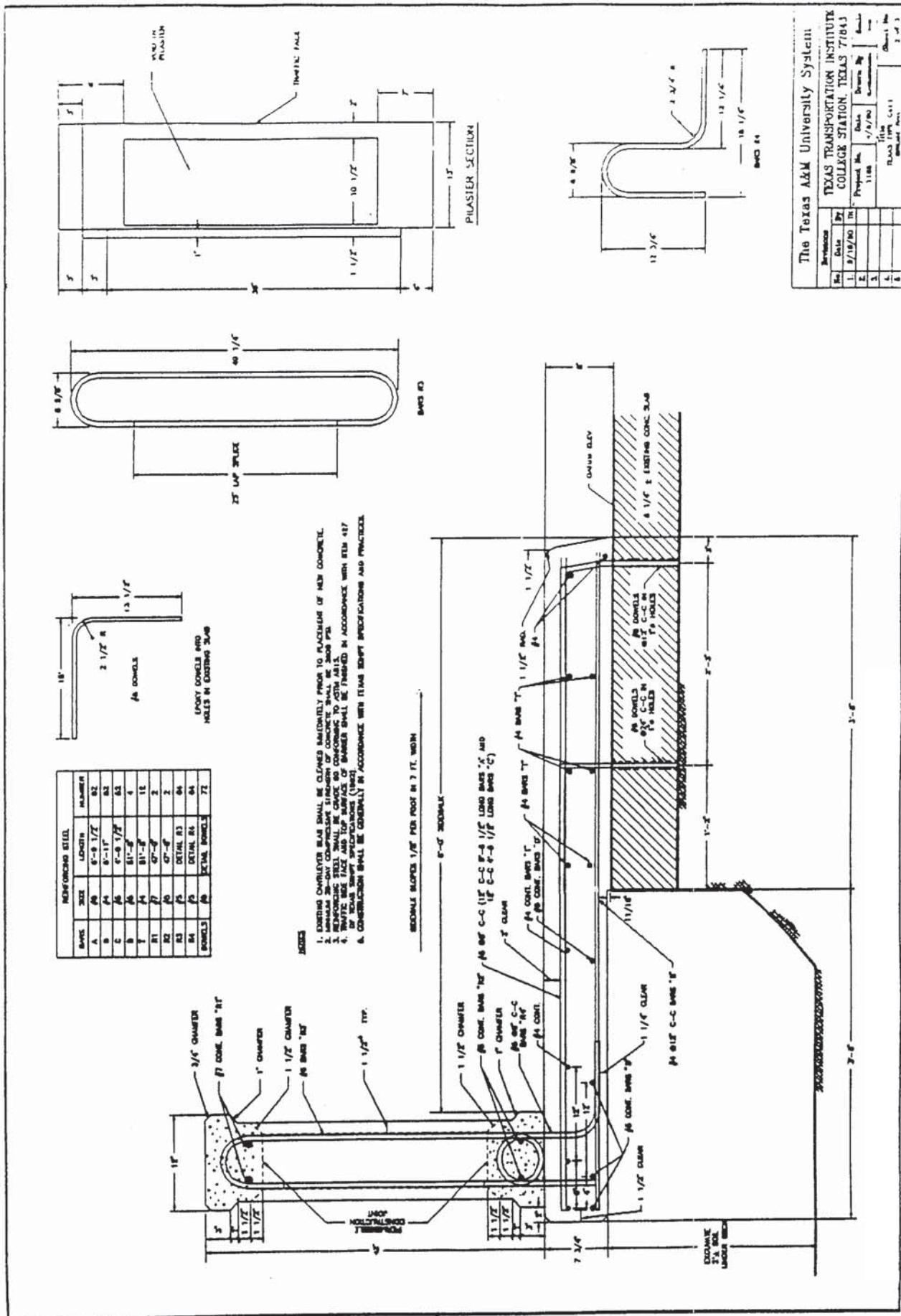


Figure B7.48. Texas C411, 42" Aesthetic Concrete Baluster Rail (58,66).

APPENDIX 5

CONCRETE SOLID TYPE (1 OF 2)

Vertical Concrete Wall



http://guides.roadsafellc.com/bridgeRailGuide/index.php?
action=view&railing=23

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Navigation

[Bridge Rail Home](#)

[Browse Railings](#)

[Search Railings](#)

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[Links](#)

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[Bridge Rail Systems](#)

[Transition Systems](#)

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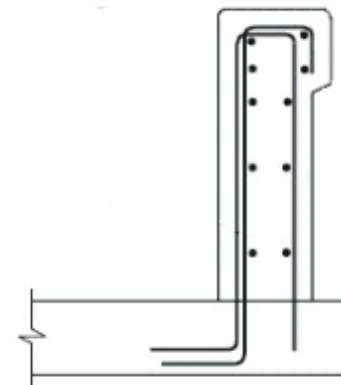
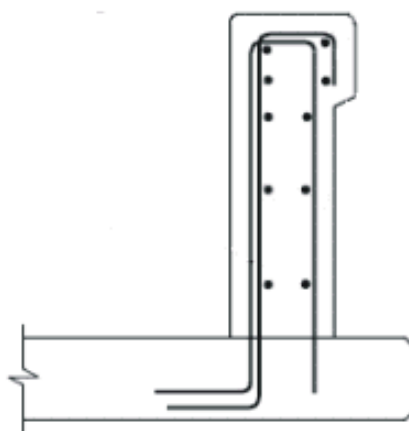
[Hardware Systems](#)

[Components](#)

TL-3 Vertical Concrete Wall (SBC01a-c)

Review Status:	In Review
Test Specification:	AASHTO Guide Spec for Bridge Railing
*Test Level:	3
Material:	Cast-in-Place Concrete (C)
Mounting Type:	Deck
Weight Per Foot:	1 lb(s).
Deck Type:	Conventional
Perm/Temp:	Permanent
Aesthetic:	No
See-Through:	No
Retrofit:	No
Combo	No
Traffic/Pedestrian:	
Contact:	Roger Bligh, Ph.D. (Click for details)
Last Updated:	June 16, 2015
FHWA Eligibility	No letter on FHWA site. Check below in
Letters:	Other Documents

** Crash test compliance shown on the system pages does not imply satisfactory performance other than what is specifically shown on the page.*



Drawings

- [sbc01a.dwg](#)
- [sbc01a.dgn](#)
- [sbc01b.dgn](#)
- [1993GSBH.pdf](#)
- [sbc01b.dwg](#)
- [sbc01a.pdf](#)

Other Documents

No files found.

Images

- [Thumbnail Gallery](#)

Compatible Transitions

- None

Existing Comments

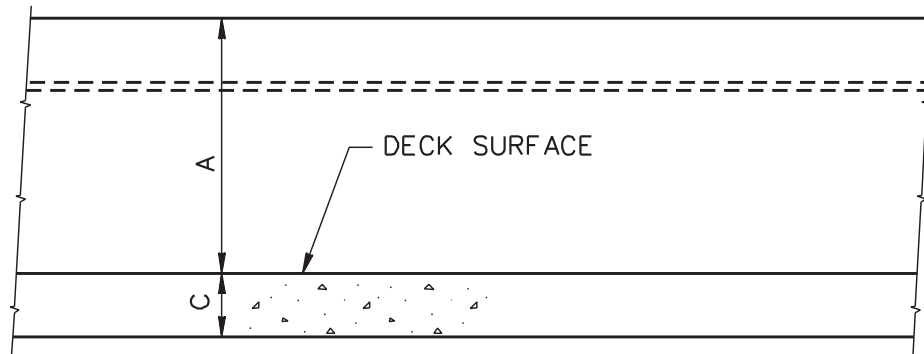
Click [here](#) to post a new comment. If you are experiencing problems posting a new comment, please contact the [webmaster](#).

Posted by [Christine Conron](#) on June 2, 2008

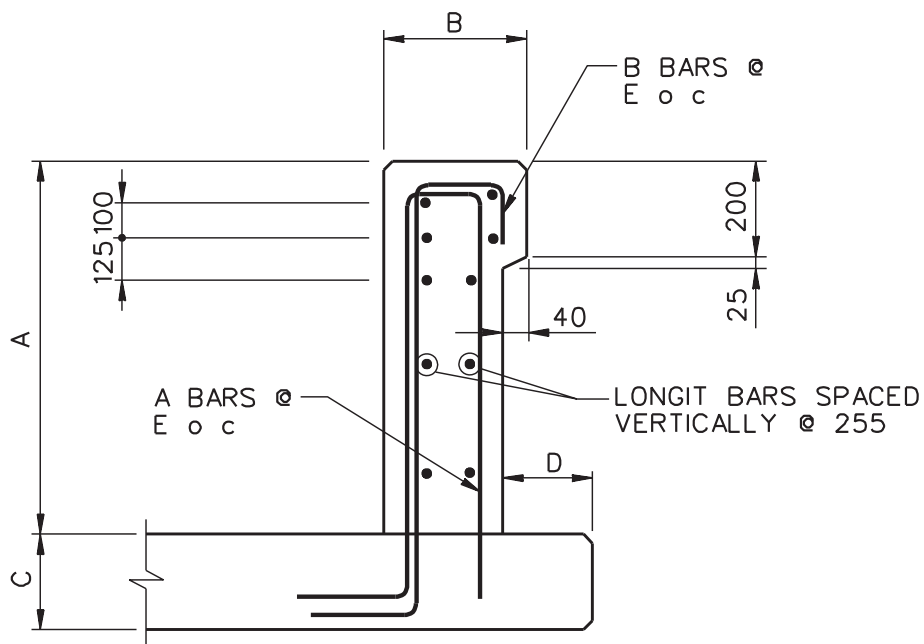
These materials are ready for review. If you have comments please post a comment feature on this page. If you have attachments (i.e., marked as attachments) please email them to me (click on my name in this comment and an email will appear).

The details in this guide only address the crash performance of the bridge railing itself. Users should analyze deck and overhang details for their particular bridge loadings.

- NOTE:**
1. USE 40 COVER THROUGHOUT.
 2. A AND B BARS SHOULD ALTERNATE.



ELEVATION



SECTION

SYSTEM	A	B	C MIN	D	E	LONGIT BAR SIZE	NO. LONGIT BAR
SBC01a	710	220	200	65	200	10	4
SBC01b	810	255	200	75	200	15	8
SBC01c	1070	305	255	200	300	25	10

1994

VERTICAL - WALL BRIDGE RAILING

<http://guides.roadsafellc.com/Documents/SBC01a-c/Drawings/1993GSBH.pdf>

SBC01a-c

SHEET NO.

REF. NO.

1 of 4

INTENDED USE

The vertical wall bridge railing can be used as an AASHTO Performance Level 1 (SBC01a), 2 (SBC01b), or 3 (SBC01c) bridge railing with the appropriate modifications. The 685 mm high version (SBC01a) is similar to the Texas T201 and California Type 26 bridge railings which have not been crash tested although their reinforcement details are similar to other 685-mm high tested bridge railings. SBC01b and SBC01c have been crash tested and satisfy AASHTO Performance Level 2 and 3 respectively. The Performance Level 2 and 3 versions are listed in the 1990 FHWA memorandum on crash-tested bridge rails as systems 17 and 22 respectively.

This drawing and specification address only the bridge railing and not the design or detailing of the bridge deck. Only reinforcement directly related to the bridge rail is shown. Bridge decks should be designed to develop the full strength of the bridge railing.

COMPONENTS

Concrete shall develop a minimum 28-day strength of not less than 28 MPa. The concrete shall use a cement conforming to AASHTO M85 (ASTM C150) Type I or II. Reinforcing steel shall be Grade 400 MPa and shall conform to either of the following:

- (a) Epoxy-coated deformed bars as specified in AASHTO M284M (ASTM D3963M).
- (b) AASHTO M31M (ASTM A615M) deformed and plain billet steel reinforcing bars for use with calcium nitrite corrosion inhibitor (30% calcium nitrite solution).

VERTICAL-WALL BRIDGE RAILING

SBC01a-c

SHEET NO.

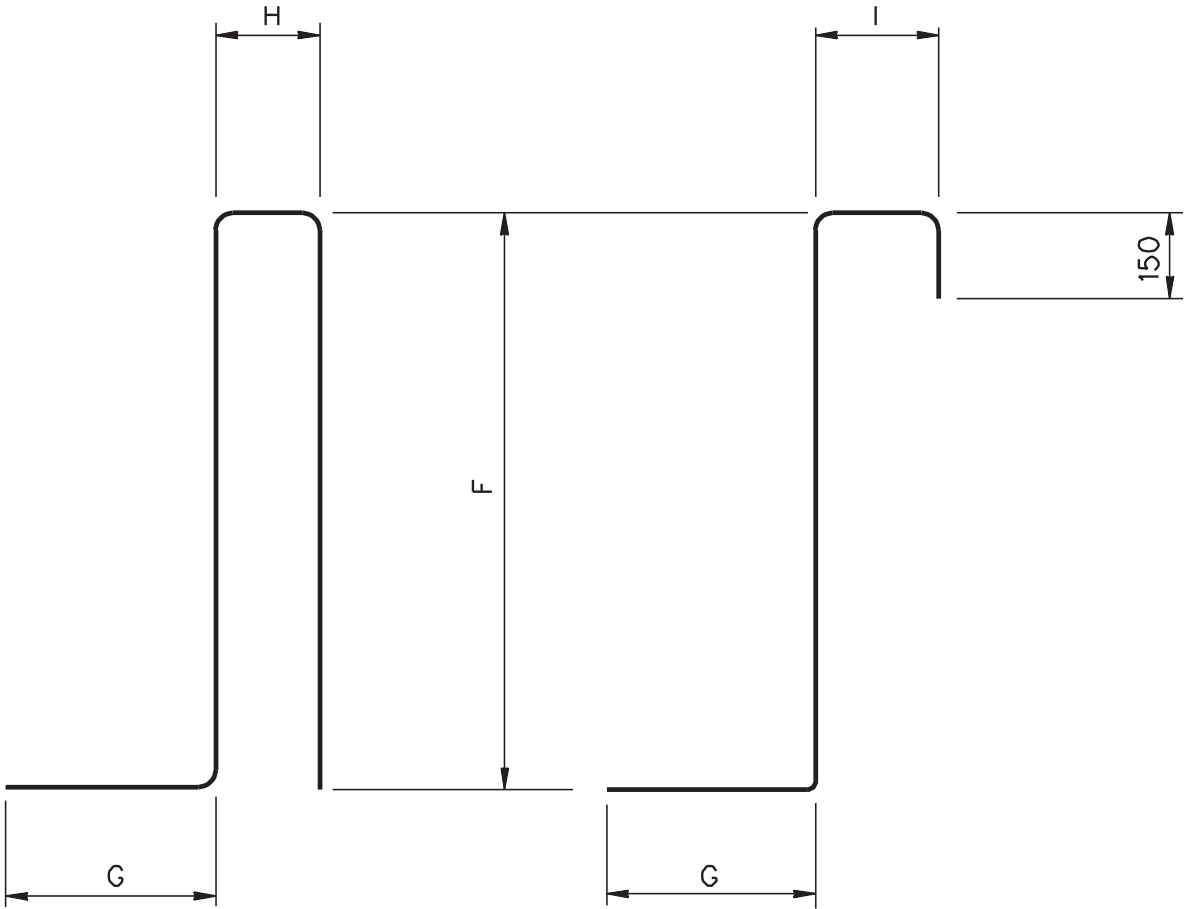
2 of 4

DATE

03-05-06



SYSTEM	F	G	H	I
BC01a	600	255	100	140
BC01b	955	255	130	180
BC01c	1220	370	180	230



BAR A (15)

BAR B (15)

1994

VERTICAL-WALL BRIDGE RAILING

SBC01a-c

SHEET NO.	REF. NO.
3 of 4	

REFERENCES

T. O. Willet, *Crash Tested Bridge Rails*, Memorandum to Regional FHWA Administrators, Federal Highway Administration, Washington, D.C., August 13, 1990.

C.E. Buth, T.J. Hirsch, and W. L. Menges, "*Testing of New Bridge Rail and Transition Designs*", FHWA Report No. FHWA-RD-93-058, Federal Highway Administration, Washington, D.C., May 1993.

C.E. Buth, T.J. Hirsch, and C.F. McDevitt, *Performance Level Two Bridge Railings*, Transportation Research Record, Transportation Research Board, Washington, D.C., 1990.

VERTICAL-WALL BRIDGE RAILING

SBC01a-c

SHEET NO.

4 of 4

DATE

03-05-06



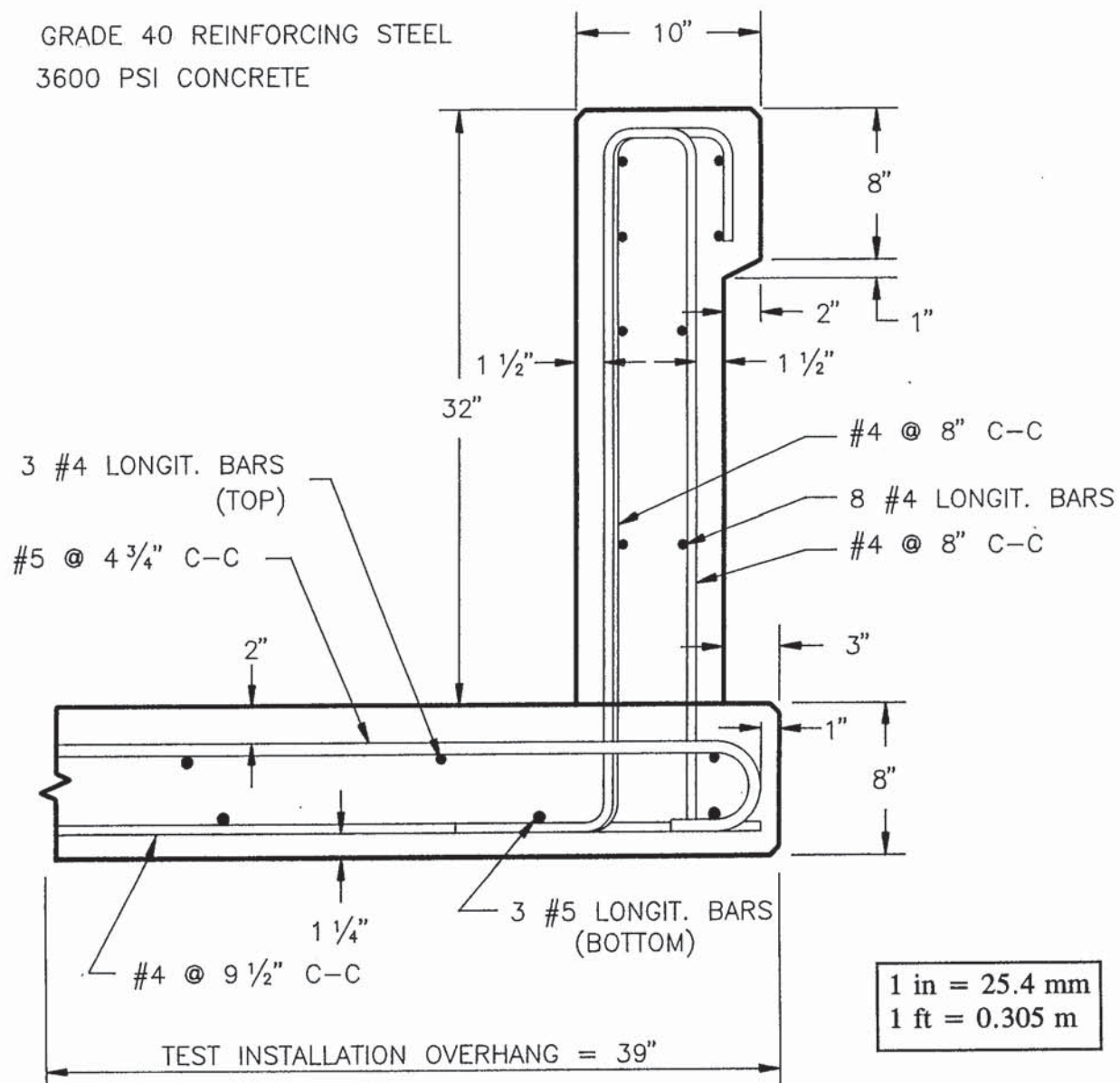


Figure B7.46. 32-in (813-mm) Vertical Concrete Parapet (8,62,63,48,15).

http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/barriers/bridgerailings/docs/appendixb7d.pdf

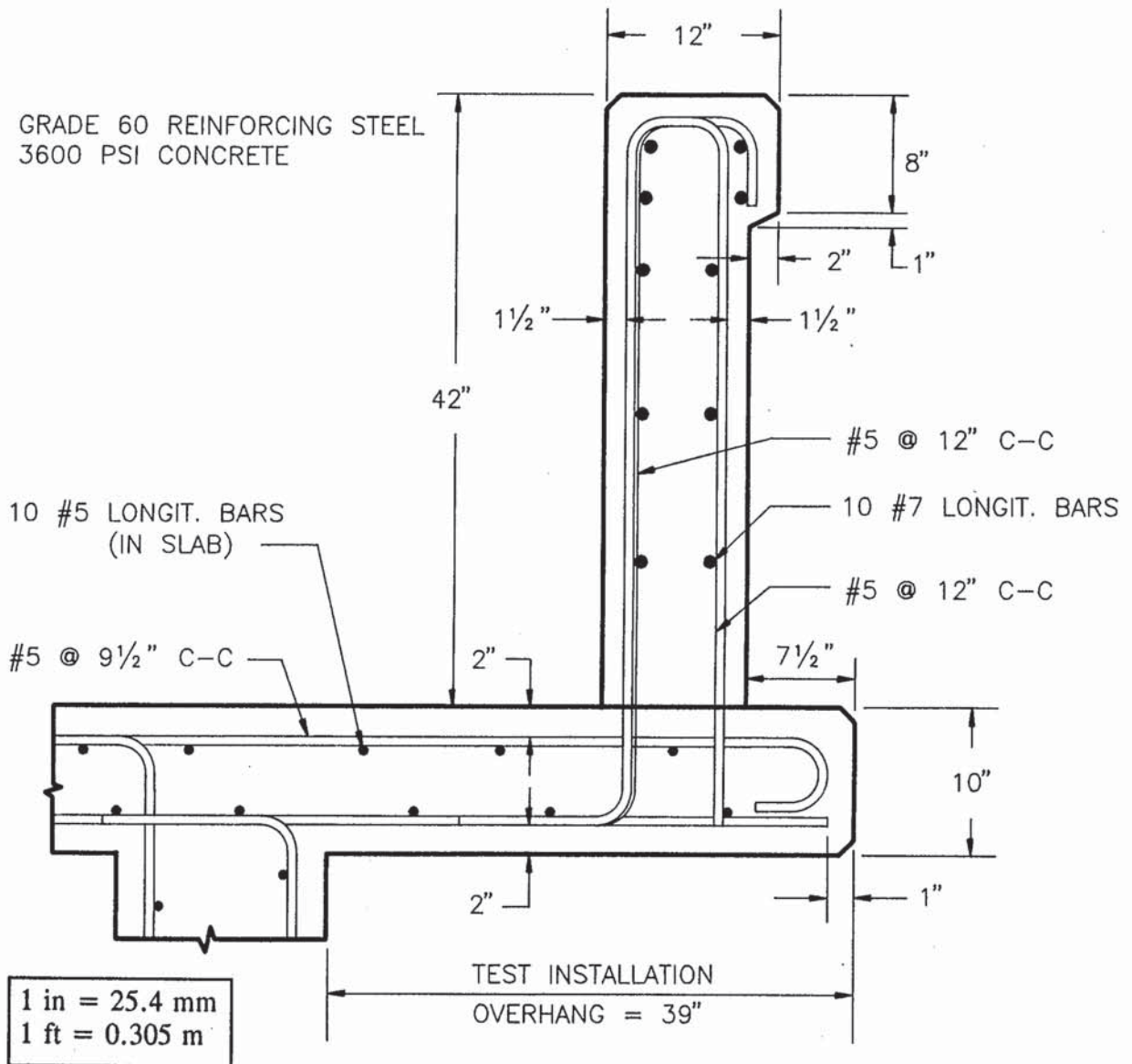


Figure B7.47. 42-in (1.07-m) Vertical Concrete Parapet (8,64,65,15).

http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/barriers/bridgerailings/docs/appendixb7d.pdf

APPENDIX 5

CONCRETE SOLID TYPE (2 OF 2)

Vertical Concrete Barrier Rail

<http://guides.roadsafellc.com/bridgeRailGuide/index.php?action=view&railing=125>

**NOT
REVIEWED**

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Navigation

[Bridge Rail Home](#)

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[About](#)

[Links](#)

Other Guides

[Bridge Rail Systems](#)

[Transition Systems](#)

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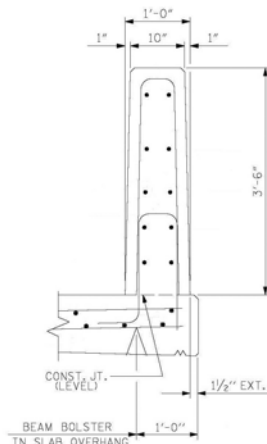
[Hardware Systems](#)

[Components](#)

TL4 NC Vertical Wall (SBC55d)

Review Status:	Not Reviewed
Test Specification:	AASHTO Guide Spec for Bridge Railing
*Test Level:	4
Material:	Cast-in-Place Concrete
Mounting Type:	Deck
Weight Per Foot:	482 lb(s).
Deck Type:	Conventional
Perm/Temp:	Permanent
Aesthetic:	No
See-Through:	No
Retrofit:	No
Combo	No
Traffic/Pedestrian:	
Contact:	Greg Perfetti (Click for details)
Last Updated:	October 19, 2012
FHWA Eligibility Letters:	Letter b-234

** Crash test compliance shown on the system pages does not imply satisfactory performance other than what is specifically shown on the page.*



Drawings	Other Documents	Images	Compatible Transitions
<ul style="list-style-type: none"> • NCDOT42 vertical wall drawings.pdf 	<ul style="list-style-type: none"> • FHWA Approval Letter.pdf 	<ul style="list-style-type: none"> • Thumbnail Gallery 	<ul style="list-style-type: none"> • None

Existing Comments

Click [here](#) to post a new comment.

Posted by [Kurt Brauner](#) on October 1, 2012

I suggest changing the subtitle for this system to "NC Vertical Wall - T (SBC55d)". When searching the various systems, there is nothing in distinguish it from the Test Level 3 version of the same name. Also, the FHWA acceptance letter is broken. Searching the FHWA site shows it posted. I will forward a copy of the letter to the Bridge Rail Guide Webmaster. I will also include the supporting documents area. Finally, a cross section sketch photograph will also be forwarded to the webmaster.

Posted by [Kurt Brauner](#) on October 19, 2012

I have reviewed this system and have no further comments

The details in this guide only address the crash performance of the bridge railing itself. Users should analyze deck and overhang details for their particular bridge loadings.



U.S. Department
of Transportation
**Federal Highway
Administration**

<http://guides.roadsafellc.com/Documents/SBC55d/OtherDocs/FHWA%20Approval%20Letter.pdf>

1200 New Jersey Ave., SE
Washington, D.C. 20590

February 24, 2012

In Reply Refer To:
HSST/B-234

Mr. Earl Dubin
Structural Engineer
North Carolina Division
Federal Highway Administration
310 New Bern Avenue, Suite 410
Raleigh, NC 27601-1418

Dear Mr. Dubin:

This letter is in response to your request for the Federal Highway Administration (FHWA) to review a roadside safety system for eligibility for reimbursement under the Federal-aid highway program.

Name of system: North Carolina TL3 and TL4 Vertical Wall Bridge Rail
Type of system: NCHRP Report 350 Bridge Barrier
Test Level: TL3 and TL4
Testing conducted by: 'n/a'
Task Force 13 Designator: SBC55d-e
Date of request: December 1, 2011
Date initially acknowledged: December 1, 2011
Date of completed package: December 1, 2011

Decision:

The following device is eligible, with details provided below and in the drawings which are enclosed as an integral part of this letter:

- North Carolina 32-inch TL3 Vertical Wall Bridge Rail, and
42-inch TL4 Vertical Wall Bridge Rail

Based on a review of the engineering analysis as submitted by the North Carolina Department of Transportation (NCDOT) Bridge Engineer certifying the device described herein meets the crashworthiness criteria of the National Cooperative Highway Research Program (NCHRP) Report 350, the device is eligible for reimbursement under the Federal-aid highway program. Eligibility for reimbursement under the Federal-aid highway program does not establish approval or endorsement by the FHWA for any particular purpose or use.

The FHWA, the Department of Transportation, and the United States Government do not endorse products or services and the issuance of a reimbursement eligibility letter is not an endorsement of any product or service.

Requirements

The NC DOT has requested the proposed North Carolina TL3 and TL4 Vertical Wall Bridge Rail be granted eligibility for reimbursement under the Federal-aid highway program based upon comparison to the existing successfully crash tested as per NCHRP Report 350 vertical wall barrier as per FHWA memo entitled Crash Testing of Bridge Railings dated May 30, 1997 [http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/barriers/bridgerailings/docs/bridge.pdf]. In addition, the NCDOT submitted an engineering analysis to prove the concrete barrier section is equal to or greater than the existing crash tested barrier. The North Carolina TL3 and TL4 Vertical Wall Bridge Rail details and the as submitted engineering analysis are included with this correspondence as enclosures.

Findings

The NCDOT has requested the changes as described herein as non-significant, effect is positive or inconsequential. For modifications that do not affect the structure of the hardware, FHWA accepts an engineering analysis as a basis for continued eligibility. The NCDOT therefore submitted computations that demonstrate the as described changes to have no adverse affect on the crash test performance of the hardware. Therefore, the as described system is eligible for reimbursement and may be installed under the range of conditions tested.

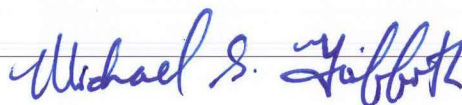
Please note the following standard provisions that apply to FHWA eligibility letters:

- This letter provides a AASHTO/ARTBA/AGC Task Force 13 designator that should be used for the purpose of the creation of a new and/or the update of existing Task Force 13 drawing for posting on the on-line 'Guide to Standardized Highway Barrier Hardware' currently referenced in AASHTO Roadside Design Guide.
- This finding of eligibility is limited to the crashworthiness characteristics of the systems and does not cover their structural features, nor conformity with the Manual on Uniform Traffic Control Devices.
- Any changes that may influence the crashworthiness of the system will require a new reimbursement eligibility letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals safety problems, or that the system is significantly different from the version that was crash tested, we reserve the right to modify or revoke this letter.
- You will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You will be expected to certify to potential users that the hardware furnished has the same chemistry, mechanical properties, and geometry as that submitted for review, and that it will meet the crashworthiness requirements of the NCHRP Report 350.
- To prevent misunderstanding by others, this letter of eligibility is designated as number B-234 and shall not be reproduced except in full. This letter and the test documentation upon which it is based are public information. All such letters and documentation may be reviewed at our office upon request.
- This letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented system for which the applicant is not the patent holder.

The finding of eligibility is limited to the crashworthiness characteristics of the candidate system, and the FHWA is neither prepared nor required to become involved in issues concerning patent law. Patent issues, if any, are to be resolved by the applicant.

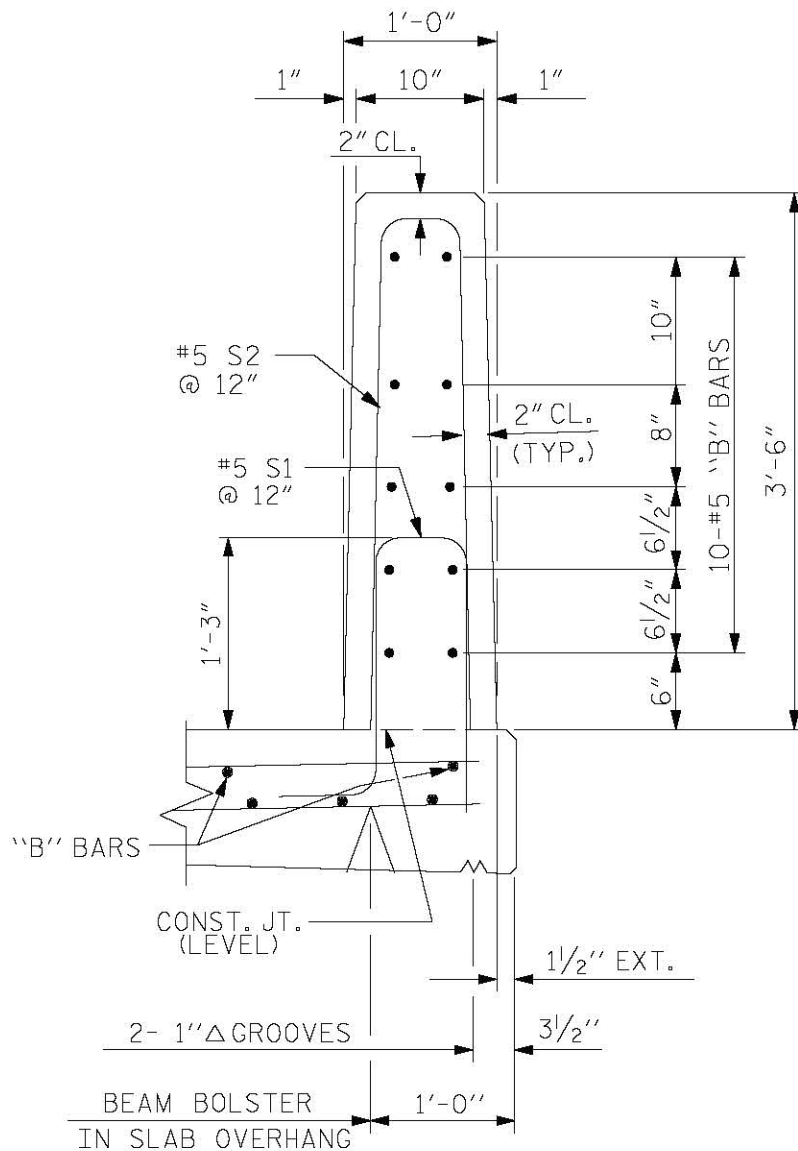
- The North Carolina TL3 and TL4 Vertical Wall Bridge Rail are considered generic bridge railings.

Sincerely yours,

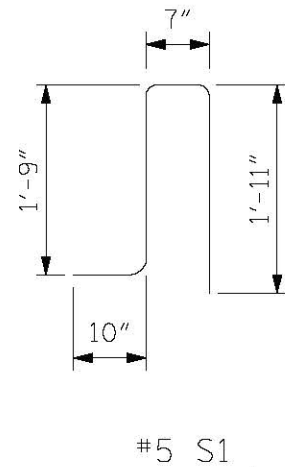
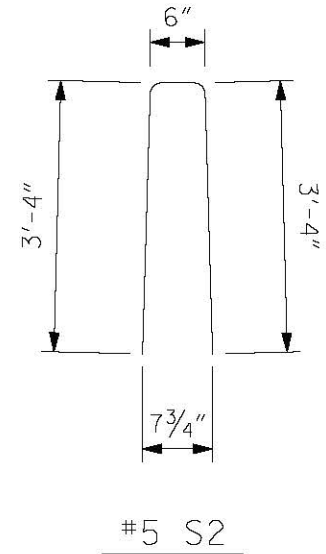


Michael S. Griffith
Director, Office of Safety Technologies
Office of Safety

Enclosures



SECTION THRU RAIL



42" VERTICAL CONCRETE BARRIER RAIL

<http://guides.roadsafellc.com/Documents/SBC55d/Drawings/NCDOT42%20vertical%20wall%20drawings.pdf>

APPENDIX 5

CRASH-TESTED INTERIOR RAIL

Wyoming 740 Bridge Railing

IN REVIEW

<http://guides.roadsafellc.com/bridgeRailGuide/index.php?action=view&railing=66>

Online Guide To Bridge Railings

Navigation

[Bridge Rail Home](#)

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Other Guides

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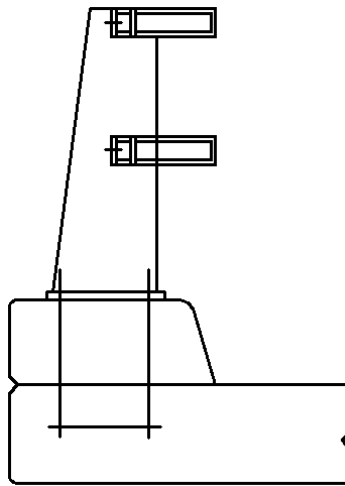
[Hardware Systems](#)

[Components](#)

WY Two Tube (SBB36c)

Review Status:	In Review
Test Specification:	Unknown
*Test Level:	3
Material:	Steel Tube
Mounting Type:	Curb/Sidewalk
Weight Per Foot:	Unknown
Deck Type:	Conventional
Perm/Temp:	Permanent
Aesthetic:	No
See-Through:	Yes
Retrofit:	No
Combo	No
Traffic/Pedestrian:	
Contact:	Roger Bligh, Ph.D. (Click for details)
Last Updated:	May 6, 2010
FHWA Eligibility	No letter on FHWA site. Check below in
Letters:	Other Documents

** Crash test compliance shown on the system pages does not imply satisfactory performance other than what is specifically shown on the page.*



Drawings

- [StndDetail1.pdf](#)
- [wy_2tube6curbplan2.tif](#)
- [wy_2tube6curbplan1.tif](#)
- [StndDetail2](#)

Other Documents

- [wy_2tube6curbp3.pdf](#)
- [wy_2tube6curbp1.pdf](#)
- [TL-3_Tech_Report.pdf](#)
- [wy_2tube6curbp2.pdf](#)

Images

- [Thumbnail Gallery](#)

Existing Comments

Click [here](#) to post a new comment.

Posted by **Christine Conron** on June 2, 2008

These materials are ready for review. If you have comments please p
comment feature on this page. If you have attachments (i.e., marked
please email them to me (click on my name in this comment and an e
appear).

*The details in this guide only address the crash performance of the
bridge railing itself. Users should analyze deck and overhang
details for their particular bridge loadings.*

Section 3

Steel Tube Bridge Rail Attached to Curb

2-Tube, Curb-Mounted

Height:
29"

Cost per linear foot:
\$53

Test level:
TL-3

Utilized in:
Wyoming

Contact:
Lee Potter, P.E.
Federal Highway Admin,
Wyoming Division
1916 Evans Ave
Cheyenne, WY 82001
(307) 772-2004 ext 46

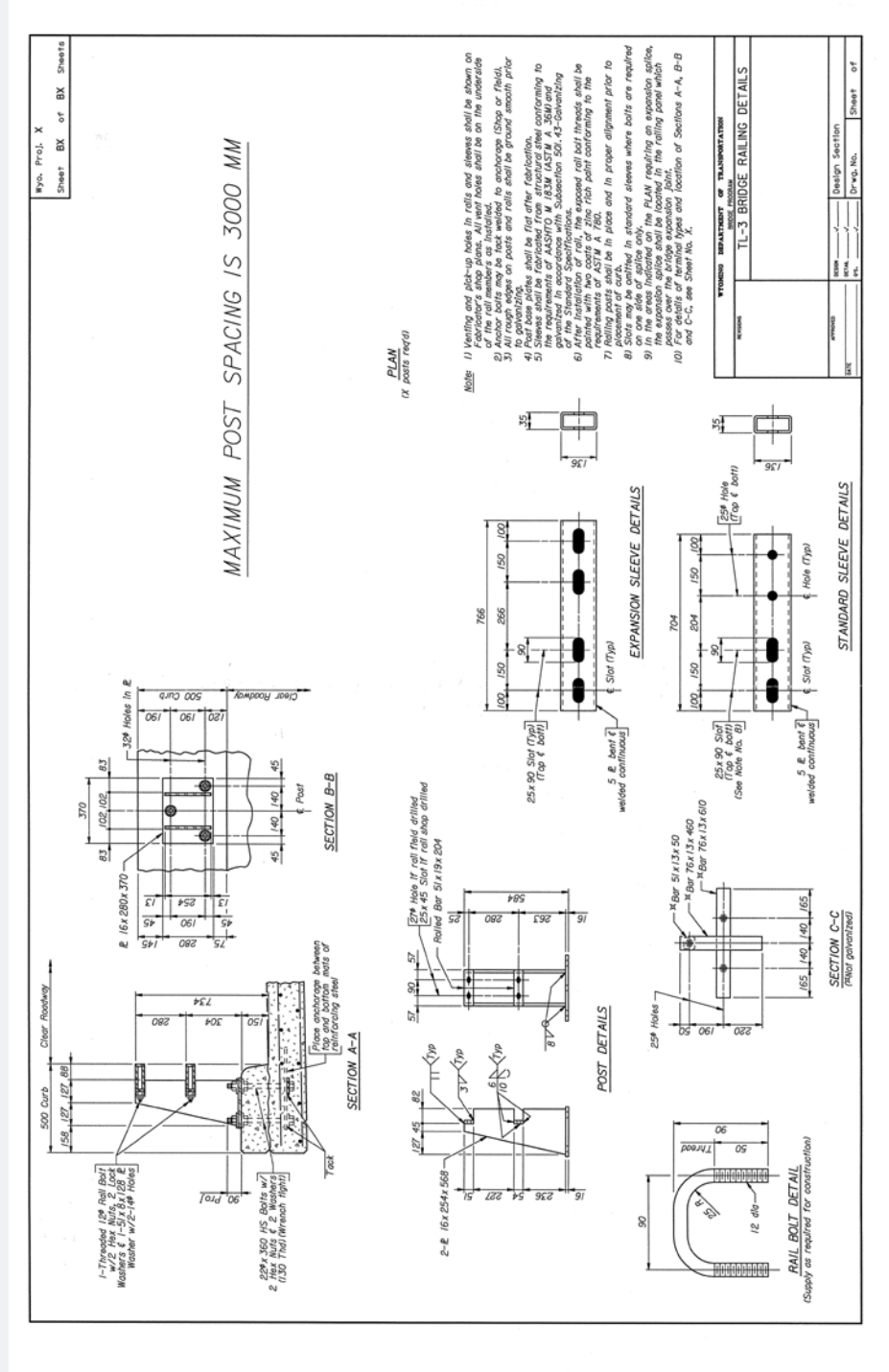


http://guides.road safellc.com/Documents/SBB36c/OtherDocs/wy_2tube6curbp1.pdf

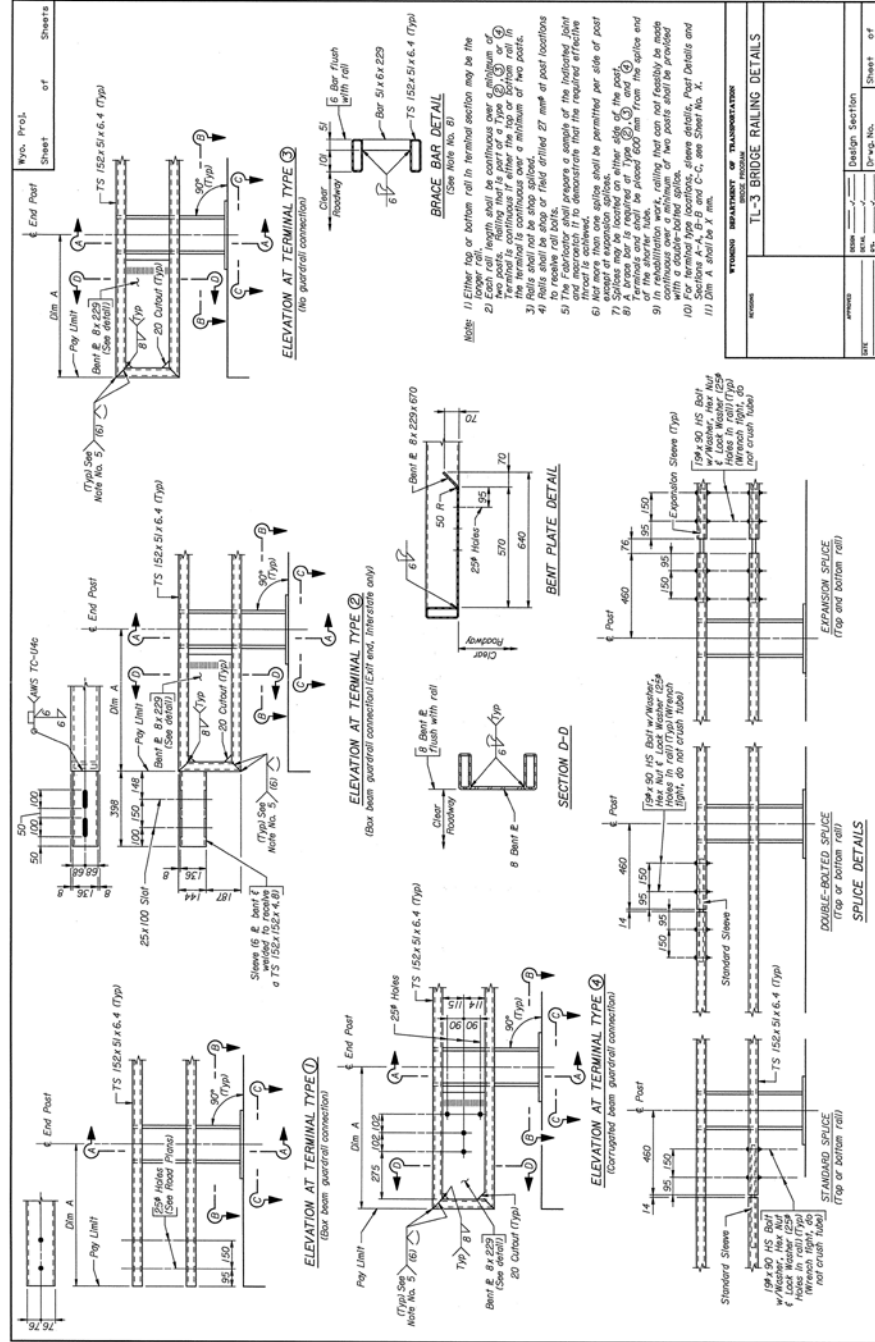
page 1 of 3

3.X

2-Tube, Curb-Mounted



2-Tube, Curb-Mounted



PLAN
(X posts req'd)

WYOMING DEPARTMENT OF TRANSPORTATION
GRANT PROGRAM

BRIDGE PROGRAM
BRIDGE RAILING DETAILS

RAILSTD.DGN
TL-3 , English

Design Section X

Drwg. No. X	Sh
-------------	----

x.dgn



POST ASSEMBLY DETAIL

(Shown near & Post)
Bridge Slab shown, Approach Slab similar



(See Section A-A for anchor bolt hole spacing)

EXPANSION SLEEVE DETAILS



NAILE DOEL DETAIL
(Supply as req'd for construction)

STANDARD SLEEVE DETAILS

APPENDIX 6

Programmatic Section 4(f)
Determination & Approval Form
for Historic Bridges

HAWAII DIVISION
FEDERAL HIGHWAY ADMINISTRATION
PROGRAMMATIC SECTION 4(f) DETERMINATION AND APPROVAL
UNDER THE
NATIONWIDE PROGRAMMATIC SECTION 4(f) EVALUATION
AND APPROVAL FOR FHWA PROJECTS THAT NECESSITATE
THE USE OF **HISTORIC BRIDGES**
(JULY 5, 1983)

PROJECT NUMBER: _____

BRIDGE NAME: _____ BRIDGE ID: _____

ROUTE: _____ MILEPOST: _____ COUNTY: _____

Instructions: Consult the Nationwide Section 4(f) Evaluation as it relates to the following items. Complete all items. Any response in a shaded box requires additional information prior to approval. This Section 4(f) determination will be attached to the applicable EA, FONSI, or Categorical Exclusion.

Eligibility Criteria	Yes	No
1. Will the bridge be replaced or rehabilitated with Federal Funds?		
2. Will the project require the "use" ¹ of a historic structure which is on, or eligible for listing on, the National Register of Historic Places?		
3. Has the bridge been determined to be a National Historic Landmark?		
4. Is the environmental documentation an Environmental Impact Statement?		

Alternatives Considered	Yes	No
5. Have all of the following alternatives, to avoid any use of the historic bridge been evaluated? ²		
A. Has the "Do Nothing" alternative been studied and been determined, for reasons of maintenance and safety, not to be feasible and prudent?		
B. Has the "Build on New Location Without Using the Old Bridge Alternate" been studied and been determined, for reasons of terrain, and/or adverse social, economic or environmental effects, and/or engineering and economy, and/or preservation of the old bridge, not to be feasible and prudent?		
C. Has rehabilitation of the existing bridge without affecting the historic integrity of the bridge been studied and has it been determined, for reasons of structural deficiency and/or geometrics, that rehabilitation		

is not feasible and prudent?		
------------------------------	--	--

Measures to Minimize Harm When an item does not apply indicate with N/A	Yes	No
6. Has the project included all possible planning to minimize harm, including the following:		
A. For bridges that are adversely affected ; have the FHWA, SHPO, and ACHP reached agreement [Memorandum of Agreement (MOA)] through the Section 106 process, and this MOA includes Stipulations which amount to Measures to Minimize Harm, and those measures will be incorporated in the project?		
B. For bridges that are to be rehabilitated to the point that the historic integrity is affected or that are to be moved or demolished have fully adequate records been made of the bridge in accordance with the Historic American Engineering Record (HAER) or other suitable means developed through the Section 106 consultation?		
C. For bridges that are to be replaced ; has the existing bridge been made available for an alternate use, provided a responsible party agrees to maintain and preserve the bridge? ³ (If the project is a rehabilitation project, write N/A for this question.)		
D. For bridges that are to be rehabilitated and there is an “ Adverse Effect ” ⁴ on the historic integrity of the bridge, is the historic integrity preserved to the greatest extent possible, and consistent with unavoidable transportation needs, safety, and load requirements? (If the project is a replacement project, write N/A for this question.)		

Notes
<p>¹ Definition of Use: The action will impair the historic integrity of the bridge either by rehabilitation or demolition. Where the definition of impair is to diminish the qualities that made it eligible for the National Register of Historic Places. (Federal Register, Vol 48. No. 163, dated Monday, August 22, 1983)</p> <p>² Consult the Nationwide Programmatic Section 4(f) Evaluation for the generic (not prudent and feasible) reasons that might be addressed. (Federal Register, Vol 48. No. 163, dated Monday, August 22, 1983) The evaluation of alternatives for the subject project, however, must quantify those reasons as applicable and be supported by the circumstances of the project.</p> <p>³ This criterion will require the advertisement and marketing of the bridge in accordance with FHWA requirements. Marketing will be addressed in programmatic Section 4(f) Evaluation and by appropriate provisions in the Memorandum of Agreement entered into between the State or local agency, FHWA, the SHPO, and the ACHP. Refer to Mr. Leathers’ July 22, 1987, memorandum on the applicable requirements for preservation and marketing. Copies of the advertisement and results of marketing efforts must be furnished to FHWA prior to replacement of the historic bridge.</p>

⁴ When it has been determined by FHWA in consultation with the SHPO and ACHP that the rehabilitation work will result in “No Effect” or “No Adverse Effect” on the historic integrity of the structure, the provisions of Section 4(f) Evaluation do not apply.

DETERMINATION AND APPROVAL:

Based on the environmental documentation and analysis, the results of public and agency consultation and coordination, the FHWA has determined that :

The project meets the applicability criteria set forth in the Nationwide Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges dated July 5, 1983;

All of the alternatives set forth in the Findings section of the above Nationwide Section 4(f) Evaluation have been fully evaluated. Based on the Findings, it is determined there is no feasible and prudent alternatives to the use of the Historic Bridge; and

The project complies with the Measures to Minimize Harm Section of the Nationwide Section 4(f) Evaluation; and agreement between FHWA, SHPO and ACHP has been reached.

Accordingly, the FHWA approves the proposed use of the historic bridge for construction under the above Nationwide Section 4(f) Evaluation issued on July 5, 1983.

Date Approved

Federal Highway Administration

APPENDIX 7

1st Cycle of Community
Meetings – Project
Initiation Stage
(May to August 2014)

APPENDIX 7

ATTACHMENTS & INDEXES

Project Initiation Stage
(May to August 2014)

P R E F A C E

Throughout the project initiation stage meeting process, fact sheet handouts and a PowerPoint were used as visual aids. During the first two meetings, a draft May 2014 fact sheet referred to as Exhibit “1” was used. From the third meeting and thereafter, the Exhibit “1” fact sheet was slightly refined to a finalized June 2014 version. To eliminate redundancy of enclosing each handout repeatedly in the meeting summaries, the matrix below summarizes which exhibit(s) were used for each meeting. A “List of Indexes” on the following page indicates which reference handouts were provided to meeting attendees.

Index 1. (Exhibit “1”) Draft May 2014 Fact Sheet

Index 2. (Exhibit “1”) Final June 2014 Fact Sheet

Index 3. (Exhibit “1”) (Revised) Final June 2014 Fact Sheet

Index 4. (Exhibit “2”) Site Photos

Index 5. PowerPoint Slide Presentation

Appendix Attachment	Meeting Date	Stakeholder Name	Index 1	Index 2	Index 3	Index 4	Index 5
7a	May 22, 2014	Department of Planning	X			X	
7b	June 3, 2014	Department of Public Works	X				
7c	June 4, 2014	Councilmember Robert Carroll		X		X	
7d	June 5, 2014	Mayor Alan Arakawa		X		X	
7e	July 3, 2014	Maui County Cultural Resources Commission					X
7f	June 6, 2014	Aha Moku Advisory Committee Representative		X		X	
7g	June 19, 2014	Hana Cultural Center and Museum					X
7h	June 19, 2014	Hana Community Association					X
7i	June 21, 2014	Kaupo Community Association					X
7j	June 29, 2014	Nahiku Community Association					X
7k	August 16, 2014	Kipahulu Community Association					X
7l	July 22, 2014	Kaui Kanakaole			X		
7m	July 24, 2014	State Historic Preservation Division — Maui Office					
7n	August 4, 2014	Hawaii Historic Foundation and SHPD — Architecture Branch					
7o	August 25, 2014	Hana Lani Senior Citizens					X

**HANA HIGHWAY, ROUTE 360 BRIDGE PRESERVATION PLAN
WITHIN THE HANA HIGHWAY HISTORIC DISTRICT
STAKEHOLDER LIST**

**MEETING TRACKING MATRIX
First Cycle of Meetings and Consultations (May to August 2014)**

Meeting No.	Meeting Coordinator	Stakeholder	Regular Meeting Dates	Category	Required Participant(s)	Action Status	Action Outcomes/Results
1	NOEI/FAI	State Department of Transportation, Maui District (Highways)		Agency	NOEI, FAI	NOEI/FAI met with HWY-DB, -M on April 21, 2014.	Kick-off to discuss expected scope, design criteria, upcoming project activities, etc.
2	MHI (Mike)	County Department of Planning - (Michelle McLean, Deputy; Clayton Yoshida, Current Division Head; Annalise Kehler, Staff Planner)		Agency	MHI	Meeting held on 5/22/14 at 2:00 p.m. at County Planning Dept. office.	Awareness and understanding of the project's objectives. See attached Attachment "A" , 5/22/14 meeting summary.
3	MHI (Mike)	County Department of Public Works (David Goode, Director; Rowena Dagdag-Andaya, Deputy Director; Cary Yamashita, Engineering Division Chief)		Agency	MHI	Meeting held on 6/3/14, 3:30pm at Director's Office Conference Room.	Awareness and understanding of the project's objectives. See attached Attachment "B" , 6/3/14 meeting summary.
4	MHI (Gwen)	Councilmember Robert Carroll (Hana Council office contact: Dawn Lono - Phone: 248-7513)		Elected Official	MHI	Meeting held on 6/4/14 at 9:30 a.m.	Awareness and understanding of the project's objectives to be prepared for hearing constituent concerns. See attached Attachment "C" , 6/4/14 meeting summary.
5	MHI (Gwen)	Mayor Alan Arakawa Bill Medeiros, Executive Assistant – East Maui, Lanai		Elected Official	MHI	Meeting held on 6/5/14 at 9:00 a.m. in the Mayor's Office.	Awareness and understanding of the project's objectives to be prepared for hearing constituent concerns. See attached Attachment "D" , 6/5/14 meeting summary.

Meeting No.	Meeting Coordinator	Stakeholder	Regular Meeting Dates	Category	Required Participant(s)	Action Status	Action Outcomes/Results
6	MHI (Mike)	Maui County Cultural Resources Commission (CRC)	1 st Thursday of each month	Agency	NOEL, FAI, MHI, CSH, HDOT	Meeting held on 7/3/14 at County Planning Department Conference Room.	Awareness and understanding of the project's objectives. See attached Attachment "E" , 7/3/14 meeting summary.
7	MHI (Mike)	Maui County Hana Advisory Committee (HAC)	2 nd Thursday of each month	Agency	NOEL, FAI, MHI, CSH, HDOT	Consulted with Ward Mardfin (member) directly.	Awareness and understanding of the project's objectives.
8	MHI (Gwen)	Senator Kalani English		Elected Official	FAI, MHI	Not able to coordinate a meeting date before CRC or HAC meetings (emailed PowerPoint Presentation on 6/25/14).	Awareness and understanding of the project's objectives to be prepared for hearing constituent concerns.
9	MHI (Gwen)	Representative Mele Carroll		Elected Official	FAI, MHI	Not able to coordinate a meeting date before CRC or HAC meetings (emailed PowerPoint Presentation on 6/25/14).	Awareness and understanding of the project's objectives to be prepared for hearing constituent concerns.
Aha Moku Advisory Committee* Representatives							
10	MHI (Mike)	Kyle Nakanelua, Maui Po'-Moku O Kahekili Aha Moku Advisory Committee – Maui Representative		Hawaiian Cultural Organization	MHI	Meeting held on 6/6/14 at 9:30 a.m. Agreed to meet with MHI and relate project information to individual moku representatives.	Communicate project, objectives and solicit input on the project's and means and methods. See attached Attachment "F" , 6/6/14 meeting summary.
11	MHI (Mike)	Jocelynn Costa Maui Po'o-Moku O Kahekili; Hamakualoa moku		Hawaiian Cultural Organization	MHI	E-mailed to Kyle Nakanelua who is acting on behalf of Moku representative, PDFs of Fact Sheet and Preservation Challenges photographic examples with CD copies of same.	Communicate project objectives and solicit input on the project's means and methods.
12	MHI (Mike)	Kimo Ka'a'a Maui Po'o-Moku O Kahekili Koolau moku		Hawaiian Cultural Organization	MHI	E-mailed to Kyle Nakanelua who is acting on behalf of Moku representative, PDFs of Fact Sheet and Preservation Challenges photographic examples with CD copies of same.	Communicate project objectives and solicit input on the project's means and methods.
13	MHI (Mike)	Shane Senenci Maui Po'o-Moku O Kahekili Hana moku		Hawaiian Cultural Organization	MHI	E-mailed to Kyle Nakanelua who is acting on behalf of Moku representative, PDFs of Fact Sheet and Preservation Challenges photographic examples with CD copies of same.	Communicate project objectives and solicit input on the project's means and methods.

Meeting No.	Meeting Coordinator	Stakeholder	Regular Meeting Dates	Category	Required Participant(s)	Action Status	Action Outcomes/Results
14	MHI (Mike)	Leona Bak Nomura Maui Po'o-Moku O Kahekili Hamakuapoko moku		Hawaiian Cultural Organization	MHI	E-mailed to Kyle Nakanelua who is acting on behalf of Moku representative, PDFs of Fact Sheet and Preservation Challenges photographic examples with CD copies of same.	Communicate project objectives and solicit input on the project's means and methods.
Community Associations and Community Groups							
15	MHI (Mike)	Hana Cultural Center and Museum – Board of Directors (contact: Harolen Kaiwi)	3 rd Thursday of each month	Organization	FAL, MHI, HDOT	Meeting held on 6/19/14 at 10:00 a.m. at the Hana District Courthouse, 4974 Uakea Road	Communicate project objectives, solicit input on the project's means and methods, and establish resource connections See Attachment "G" , 6/19/14 meeting summary.
16	MHI (Mike)	Hana Community Association (contact: Dawn Lono)	<ul style="list-style-type: none"> Every Monday at 5:00 p.m. 	Community Association	FAL, MHI, HDOT	Meeting held on 6/19/14 at Helene Hall at 5:00 p.m., on same day as Museum Board of Directors meeting scheduled at 10:00 a.m.	Communicate project objectives and solicit input on the project's means and methods. See attached Attachment "H" , 6/19/14 meeting summary.
17	MHI (Mike)	Kaupo Community Association Alohalani Smith, President (contact: Jonathan Starr)	Sat - 6/21/14 at 10:00 a.m.	Community Association	FAL, MHI, HDOT	Meeting held on 6/21/14 at 10:00 a.m. at Old Kaupo School.	Communicate project objectives and solicit input on project's mean and methods. See Attachment "I" , 6/21/14 meeting summary.
18	MHI (Mike)	Nahiku Community Association 540 Lower Nahiku Road (Kamalu Kahookele, President – NCAMAUJ@gmail.com)	Last Sunday (at 1:00 p.m.) of each month	Community Association	FAL, MHI, HDOT	Meeting held on 6/29/14 (Sunday) at 1:00 p.m. Place: 540 L. Nahiku Road (Kamalu's residence).	Communicate project objectives and solicit input on the project's means and methods. See Attachment "J" , 6/29/14 meeting summary.
19	MHI (Mike)	Keanae-Wailua-Nahiku No formal association but advised by Nalani Kaaahamo to consult with Ed Wendt. Na Moku Aupuni Ko'olau Hui District.			MHI	Keanae community was invited to Nahiku Community Association (NCA) meeting on 6/29/14, but only NCA members were present.	Communicate project objectives and solicit input on the project's means and methods.

Meeting No.	Meeting Coordinator	Stakeholder	Regular Meeting Dates	Category	Required Participant(s)	Action Status	Action Outcomes/Results
20	MHI (Mike)	Per Ed Wendt (Ko'olau Ahupua'a member), MHI can use meetings with Moku reps to outreach into these communities. Haiku Community Association to capture communities Haiku to Huelo at fringe of historic limits Board: Jennifer Livingston, President Mike Gagne; Gregg Blue, Vice President; Charlotte King, Secretary; Tim Wolfe, Treasurer; Daniel Grantham; Netra Halperin; Lucienne De Nale	1 st Wednesday of each month	Community Association	FAL, MHI, HDOT	Meeting targeted for July. 5/12/14 e-mailed Haiku Community@gmail.com, meeting request to website address. Phone number listed on website does not connect. 5/20/14 sent follow up email – No response to date. 5/28/14 forwarded email meeting request to the new contact information noted on new website. 6/4/14 left voicemail for Mike Gagne. 6/10/14 Mike Gagne called back and let MHI know Jennifer Livingston is the new president. He will pass request to schedule on agenda availability. 6/19/14 Left voicemail for Jennifer Livingston. 7/2/14 Letter request sent, since no return calls or email responses received.	Communicate project objectives and solicit input on the project's means and methods.
21	MHI (Mike)	Kipahulu Community Association (Theodore Firestone, President)		Community Association	FAL, MHI	Meeting held on 8/16/14 (12:00 p.m.) at Kipahulu Community Center.	Communicate project objectives and solicit input on the project's means and methods. See Attachment "K" , 8/16/14 meeting summary.
Other							
22	MHI (Charlene)	Kaui Kanakaole, English Teacher, Researcher and Report Writer on Water Sources in Hana District		Individual	MHI	Meeting held on 7/22/14 at Kanakaole residence.	Consultation on stream and bridge names. See Attachment "L" , 7/22/14 meeting summary.

Meeting No.	Meeting Coordinator	Stakeholder	Regular Meeting Dates	Category	Required Participant(s)	Action Status	Action Outcomes/Results
23	NOEI / FAI	SHPD – Maui Office (Morgan Davis, Archaeologist) Phone: 243-4641 Morgan.E.Davis@hawaii.gov		State Gov't	CSH, MHI, HDOT	Meeting held on 7/24/14 (2:00 p.m.) at Maui District office via video conference.	Communicate project objectives and solicit input on projects mean and methods. See Attachment “M” , 7/24/14 meeting summary.
24	NOEI/FAI/CSH	Janet L. Six, PhD, Archaeologist			CSH, MHI, HDOT	J. Six is a volunteer with the Hana Cultural Center and Museum and attended the 6/19/14 presentation.	Communicate project objectives and solicit input on projects mean and methods.
25	NOEI/FAI/MHI	Garrett Hew, East Maui Irrigation Manager Phone: 874-6950 ghew@hcsugar.com		Private Water Landowner		7/9/14 Telephone call. Email contact established. Sent PowerPoint presentation. A presentation or meeting is not required, since it's only him involved for EMI	Communicate project objectives for awareness of which structures are adjacent to EMI facilities.
26	NOEI/FAI	Hawaii Historic Foundation and SHPD-Architecture Branch		Organization		Meeting held on August 4, 2014 in Kapolei, Oahu	Discuss project objectives, preservation strategies and design philosophies. See Attachment “N” , 8/4/14 meeting summary.
27	MHI (Mike)	Hana Lani Senior Citizens (Annie Gilbert, President)	4 th Monday of each month	Organization	FAI, MHI, HDOT	Meeting held on 8/25/14 at Old Hana School Cafeteria.	Communicate project objectives and solicit input. Make connections with kupunas that have historical and cultural information relative to preservation plan. See Attachment “O” for 8/25/14 meeting summary.
* Aha Moku Advisory Committee - Maui 'Po'o-Moku O Kahekili: Oversees Hawaiian system of natural resource management of 'ahupua'a's (traditional land and ocean tenure system).							

APPENDIX 7

ATTACHMENT 7a

MAY 22, 2014

Department of Planning
Meeting Summary



MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

June 4, 2014

MEETING MEMORANDUM

Date of Meeting: May 22, 2014 (2:00 p.m.)

Place: Department of Planning

Participants: Michelle McLean, Deputy Director (*County of Maui, Department of Planning*)
Clayton Yoshida, Current Division Head (*County of Maui, Department of Planning*)
Analise Kehler, CRC Staff Planner (*County of Maui, Department of Planning*)
Charlene Shibuya, Senior Associate (*Munekiyō & Hiraga, Inc.*)

Subject: Hana Highway Historic District, State Department of Transportation Bridge Preservation - Introduce project objectives and request being placed on the July meeting agendas for Cultural Resources Commission and Hana Advisory Committee

MEETING SUMMARY

C. Shibuya introduced project by handing out a draft fact sheet (attached) outlining the team consultants, project purpose, meeting purpose, tentative project schedule/activities to occur from now to September 2015, location map, and bridge/culvert lists. Pointed out map showing the State Department of Transportation (DOT) portion of the Hana Highway Historic district and the County's portion mentioning that a Bridge Preservation Plan was already developed by Wilson Okamoto &

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APPENDIX "A"

Associates back in 2001 of which a copy is on the Planning Department's website. Flipped through the **Appendix "A"** portion of the fact sheet to show 50 bridge structures and 12 culverts to be evaluated and listed by milepost and year built.

C. Shibuya explained how the community outreaches will be conducted in 3-cycles of meetings to First introduce project; Second to present preliminary findings/recommendations; and Third to present a Final Report which addresses any comments, concerns, or issues brought up in all previous meetings and other solicitations of input during the earlier stages. Outreach will cover the Hana and Nahiku community associations, Hana Cultural Center & Museum Board, advisory boards, and various Moku representatives to cover the Keanae communities which do not have a community association. Elected officials will be briefed before the broader community group meetings so they are informed in case constituents ask questions. C. Shibuya then requested to get on the July agendas of both the Cultural Resources Commission (CRC) and Hana Advisory Committee (HAC).

C. Yoshida mentioned that Ward Mardfin (HAC member) will be at University of Hawaii - Manoa from May 23 till after Aug 15 (Statehood Day). Due to his absence, Ward asked to not schedule any committee meetings until he returns. C. Shibuya noted that the consultant team intended to consult with Ward directly since he is a knowledgeable resource on Hana bridges. And if a HAC meeting could be scheduled despite his absence. C. Yoshida said that would be a possibility.

M. Munekiyo mentioned that Jane Six, Archaeologist got appointed to CRC about 6-months ago and lives in Hana, and she advised that our archaeologist Tanya Lee-Grieg keep in contact with her on the project.

M. Munekiyo, C. Yoshida, and A. Kehler will see how the agenda develops for July and will let us know. For the HAC, they would want other items on the agenda since it takes a lot of County resources to travel to Hana to run a meeting there. When the project meeting material gets finalized and approved by State DOT, C. Shibuya will send it to the Planning Department.



Charlene Shibuya
Senior Associate

CS:yp
Attachments

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APPENDIX 7

ATTACHMENT 7b

JUNE 3, 2014

Department of Public Works
Meeting Summary



MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

October 1, 2014

MEETING MEMORANDUM

Date of Meeting: June 3, 2014 (3:30 p.m.)

Place of Meeting: Department of Public Works

Participants: David Goode, Director (*Department of Public Works*)
Rowena Dagdag-Andaya, Deputy Director (*Department of Public Works*)
Cary Yamashita, Engineering Division Chief (*Department of Public Works*)
Charlene Shibuya, Senior Associate (*Munekiyo & Hiraga, Inc.*)

Subject: Hana Highway Historic District, State Department of Transportation (DOT) Bridge Preservation Plan

PURPOSE:

Introduce project team, objectives, schedule, and outreach strategy to familiarize the County on State DOT's project which will be similar to the effort on the County's Bridge Preservation Plan prepared in 2001 by Wilson Okamoto.

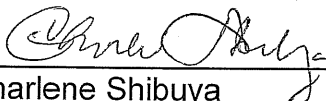
MEETING SUMMARY:

1. C. Shibuya introduced project by handing out the draft May 2014 fact sheet (**Exhibit "1"**) outlining the team consultants, project purpose, outreach program, tentative project schedule/ activities to occur from now to September 2015, 'Ahupuaa map overlay, and bridge/culvert lists. She continued with a preview of photos (**Exhibit "2"**) from the PowerPoint to illustrate some examples of preservation challenges to be presented at the public meetings.

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2. She explained how the community outreach effort will be conducted in 3-cycles of meetings to: (1) introduce project; (2) to present preliminary findings/recommendations; and (3) to present a Final Report which addresses any comments, concerns, or issues brought up in all previous meetings.
3. The outreach program will cover the Hana and Nahiku community associations, Hana Cultural Center & Museum Board, and various Moku representatives which will also help with informing the Keanae community which does not have a community association. This strategy will allow multiple opportunities for public input.
4. C. Shibuya explained that elected officials are being briefed before the broader community group meetings so they are informed in case constituents ask questions.
5. C. Shibuya reported that Munekiyo & Hiraga, Inc. (MHI) met with the County Planning Department to request being on the July agendas of both the Cultural Resources Commission (CRC) and Hana Advisory Committee (HAC). Separately, Ward Mardfin who is a HAC member, but at UH Manoa for a few months, is being consulted for his expertise on Hana bridges and streams.
6. MHI is attempting to contact the Haiku Community Association with no success to date. Their community touches the Huelo side of the Historic District.
7. The Hana Community Association meeting is scheduled this month on June 19th at 5:00 p.m. at the Helene Hall with the presentation to the Hana Cultural Center & Museum board members on that same day at 10:00 a.m. Nahiku Community Association's presentation is scheduled on June 29, 2014.
8. Understanding that all of the bridges and culverts to be evaluated are within the State DOT's jurisdiction, DPW did not have any particular concerns. D. Goode expressed a thought that the State could come up with a more costly recommendation that the community likes and requests it be implemented on the County's bridges. No particular example were given.
9. Now that some of the bridges in the County's jurisdiction have been replaced, C. Shibuya asked that if the County thinks of any 'lessons learned' in the implementation of the County's Bridge Preservation Plan, to please let us know.



Charlene Shibuya
Senior Associate

CS:yp
Attachments

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APPENDIX 7

ATTACHMENT 7c

JUNE 4, 2014

Councilmember Robert Carroll
Meeting Summary



MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

October 1, 2014

MEETING MEMORANDUM

Date of Meeting: June 4, 2014 2:00 p.m.

Place of Meeting: Councilmember Robert Carroll

Participants: Councilmember Robert (Bob) Carroll
Charlene Shibuya, Senior Associate (*Munekiyo & Hiraga, Inc.*)
Gwen Ohashi Hiraga, Senior Vice President (*Munekiyo & Hiraga, Inc.*)

Subject: Hana Highway Historic District, State Department of Transportation (DOT) Bridge Preservation Plan

PURPOSE:

Introduce project team, objectives, schedule, and outreach strategy to familiarize the Councilmember on the project prior to holding broader community meeting presentations.

MEETING SUMMARY:

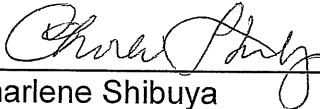
1. C. Shibuya handed out June 2014 Fact Sheet (**Exhibit "1"**) and explained the team consultants, project purpose, outreach program, project schedule/ activities to occur from now to September 2015, 'Ahupuaa map overlay, and bridge/ culvert lists. She pointed out the map showing the State DOT portion of the Hana Highway Historic District and the County's portion, mentioning that a Bridge Preservation Plan was already developed by Wilson Okamoto & Associates in 2001. She presented photos from the PowerPoint (**Exhibit "2"**) to illustrate some examples of preservation challenges to be presented at the public

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meetings.

2. C. Shibuya continued to explain how the community outreach effort will be conducted in 3-cycles of meetings to: (1) introduce project; (2) to present preliminary findings/recommendations; and (3) to present a Final Report which addresses any comments, concerns, or issues brought up in all previous meetings.
3. The outreach will cover the Hana and Nahiku community associations, Hana Cultural Center & Museum Board, and various Moku representatives which will also help with informing the Keanae communities which do not have a community association. This strategy will allow multiple opportunities for attendance.
4. C. Shibuya explained that elected officials are being briefed before the broader community group meetings so they are informed in case constituents ask questions.
5. C. Shibuya reported that Munekiyo & Hiraga, Inc. (MHI) met with the County Planning Department to request being on the July agendas of both the Cultural Resources Commission (CRC) and Hana Advisory Committee (HAC). Separately, Ward Mardfin who is a HAC member, but at UH Manoa for a few months, is being consulted for his expertise on Hana bridges and streams. MHI is attempting to contact Haiku Community Association with no success. Their community touches the Huelo side of the Historic District.
6. G. Hiraga suggested inquiring with Councilmember Mike White's office who handles the Haiku District, for a contact.
7. Dawn Lono has assisted with scheduling the Hana Community Association meeting on June 19th at 5:00 p.m. at the Helene Hall. The project team's presentation to the Hana Cultural Center & Museum board members will be that same day at 10:00 a.m. in the morning.
8. Councilmember Carroll noted that he has a council meeting on that day and will not be able to drive back to Hana in time for this 5:00 p.m. meeting and requests that our presenters announce his regrets being unable to attend.
9. Councilmember Carroll brought up the following points:
 - a. The Keanae community is sensitive about bridge names.
 - b. During review of the photos, particularly on pointing out how the modern looking metal guardrail ties in to the Waikani Bridge end, he mentioned receiving a negative comment about that condition.
 - c. He suggests the Kaupo Community Association also be included in the outreach even if they are beyond the project limits. Jonathan Starr is a responsive contact for that group.

- d. Kailua is the cut-off between Haiku and Hana Districts but that community will typically associate themselves with the Haiku community.
- e. Honomanu Stream Bridge is misspelled.
- f. Waikani Bridge is not named after the stream but after the name of the falls



Charlene Shibuya
Senior Associate

CS:yp
Attachments

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APPENDIX 7

ATTACHMENT 7d

JUNE 5, 2014

Mayor Alan Arakawa
Meeting Summary



MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

October 1, 2014

MEETING MEMORANDUM

Date of Meeting: June 5, 2014 (3:30 p.m.)

Place of Meeting: Mayor Alan Arakawa's Office

Participants: Mayor Alan Arakawa (*County of Maui*)
Bill Medeiros, Executive Assistant – East Maui, Lanai (*County of Maui*)
Charlene Shibuya, Senior Associate (*Munekiyo & Hiraga, Inc.*)
Gwen Ohashi Hiraga, Senior Vice President (*Munekiyo & Hiraga, Inc.*)

Subject: Hana Highway Historic District, State Department of Transportation (DOT) Bridge Preservation Plan

PURPOSE:

Introduce project team, objectives, schedule, and outreach strategy

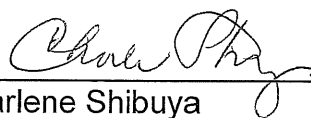
MEETING SUMMARY:

1. C. Shibuya introduced project by handing out the June 2014 Fact Sheet (**Exhibit "1"**) and presented the team consultants, project purpose, meeting purpose, project schedule/activities to occur from now to September 2015, 'Ahupuaa map overlay, and bridge/culvert lists. The plan will be similar to the effort on the County's Bridge Preservation Plan prepared in 2001 by Wilson Okamoto. C. Shibuya presented photos from the PowerPoint (**Exhibit "2"**) to illustrate some examples of preservation challenges to be presented at the public meetings.

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2. C. Shibuya explained how the community outreach will be conducted in 3-cycles of meetings to: (1) introduce project; (2) to present preliminary findings/recommendations; and (3) to present a Final Report which addresses any comments, concerns, or issues brought up in all previous meetings.
3. The outreach will cover the Hana and Nahiku community associations, Hana Cultural Center & Museum Board, and various Moku representatives which will also help with informing the Keanae communities which do not have a community association. This strategy will allow multiple opportunities for attendance.
4. C. Shibuya explained that elected officials are being briefed before the broader community group meetings so they are informed in case constituents ask questions.
5. C. Shibuya reported that MHI met with the County Planning Department to request being on the July agendas of both the Cultural Resources Commission (CRC) and Hana Advisory Committee (HAC).
6. Munekiyo & Hiraga, Inc. (MHI) is attempting to contact Haiku Community Association with no success to date. Their community touches the Huelo side of the Historic District.
7. The Hana Community Association meeting is scheduled this month on June 19, 2014 at 5:00 p.m. at the Helene Hall with the presentation to the Hana Cultural Center & Museum board members on that same day at 10:00 a.m. Nahiku Community Association's presentation is scheduled on June 29, 2014. C. Shibuya added that Councilmember Carroll advised to include the Kaupo Community Association which the Mayor agreed was a good idea being that they could get affected by road closure detours.
8. B. Medeiros asked whether DOT intends to use metal bridges for detours. C. Shibuya explained that evaluations are in progress and proposed recommendations are not developed yet. The Mayor expects some total road closures may be necessary. C. Shibuya explained that on previous DOT projects, there were times when work space only allowed for a single lane of traffic which had to be alternated 24/7. And at other times, total road closures in the night were needed with proper advance notice to the community.


Charlene Shibuya
Senior Associate

CS:yp

Attachments

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APPENDIX 7

ATTACHMENT 7e

JULY 3, 2014

Maui County Cultural
Resources Commission
Meeting Summary
and Minutes



MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

October 1, 2014

MEETING MEMORANDUM

Date of Meeting: July 3, 2014 (10:30 a.m.)

Meeting Place: Maui Planning Commission Conference Room

Participants: Paul Santo (*State Department of Transportation*)
Ferdinand Cajigal (*State Department of Transportation*)
Tonia Moy (*Fung Associates, Inc.*)
Alison Chiu, (*Fung Associates, Inc.*)
Michael T. Munekiyo, (*Munekiyo & Hiraga, Inc.*)

Cultural Resources Commission Members

Warren Osako, Chair
Gaylord Kubota
Janet Six
Arlene Ricalde-Garcia
Bridget Mowat
Francis Skowronski

Subject: Hana Highway Historic District, State Department of Transportation
Bridge Preservation Plan

PURPOSE:

The purpose of the meeting was to introduce the Cultural Resources Commission to the Preservation Plan project for the Hana Highway Historic District and to solicit their initial comments on the plan's objectives and contents.

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DISCUSSION ITEMS:

1. M. Munekiyo provided a PowerPoint overview of the project, explaining the objectives of the project, its schedule and the role of community involvement in the process.
2. T. Moy continued the presentation, providing illustrative examples of preservation issues which will be addressed as part of the project.
3. Commissioner Mowat noted her support for the project team's efforts in meeting with community stakeholders.
4. Commissioner Six noted that she attended the project team's Hana Cultural Center & Museum Board presentation. She supported the objective of the Preservation Plan to ensure that public input is incorporated as part of the plan.
5. Chair Osako asked if the limits of the Hawaii Register and National Register for the Hana Highway Historic District are identical. T. Moy responded that they are the same.
6. Commissioner Ricalde-Garcia asked what prompted this project. P. Santo explained that Senator Kalani English recognized the need to comprehensively consider the public safety and historic preservation requirements for bridges within the Historic District. He therefore sought funding to implement the project. P. Santo noted that the implementation phase of the work, which is separate from the Preservation Plan, will be a lengthy process.
7. Commissioner Ricalde-Garcia asked how traffic issues will be addressed. T. Moy explained that there have been suggestions provided as to how to better manage traffic flow along the highway. For example, suggestions have been made to have car rental companies provide educational information to customers, informing them of roadway etiquette when driving along Hana Highway.
8. Commissioner Ricalde-Garcia noted that traffic congestion and its effect to emergency vehicles should be considered.
9. Commissioner Kubota noted his support for the team's community outreach process.

10. In closing the question and answer portion of the meeting, T. Moy reiterated that the project team will return to the CRC to provide information on its findings and recommendations.



Michael T. Munekiyo, AICP
President

MTM:tn

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**CULTURAL RESOURCES COMMISSION
REGULAR MEETING
JULY 3, 2014**

*** All documents, including written testimony, that was submitted for or at this meeting are filed in the minutes file and are available for public viewing at the Maui County Department of Planning, One Main Plaza, 2200 Main Street, Suite 315, Wailuku, Maui, Hawai'i. ***

A. CALL TO ORDER

The regular meeting of the Cultural Resources Commission (Commission) was called to order by Chairperson Warren Osako, at approximately 10:33 a.m., Thursday, July 3, 2014, in the Planning Department Conference Room, first floor, Kalana Pakui Building, 250 South High Street, Wailuku, Island of Maui.

A quorum of the Commission was present (see Record of Attendance).

Chair Warren Osako: Okay, the July 3, 2014 meeting of the Maui County Cultural Resources Commission is now called to order.

B. PUBLIC TESTIMONY

C. APPROVAL OF MINUTES OF THE APRIL 3, 2014 MEETING

Chair Osako: At this time, if there's anybody in the audience that needs to leave before we're done, you may testify now. Please be aware that if you testified before, then you won't be able to do so when the item comes up. At this time, is there anybody that would like to give their testimony beforehand? Okay, if not, we'll proceed.

Item C is approval of the April 3 meeting. Is there any discussion or comment, Commissioners?

Dr. Janet Six: I move that we approve the minutes of the meeting on April 3. That was a lot to say.

Ms. Bridget Mowat: And I'll second.

Chair Osako: It has been moved and seconded that we approve the minutes of the April 3 meeting.

There being no discussion, the motion was put to a vote.

It has been moved by Commissioner Six, seconded by Commissioner Mowat, then unanimously

VOTED: to approve the minutes of the April 3, 2014 meeting

Chair Osako: And I think that in the case that there are a lot of businesses, small businesses in a building, and the building's not that big, if everybody is granted the 20 square feet, would you see a building?

Dr. Six: So right now, as it's written, Warren, is it just per building, or is it per business? We don't know?

Chair Osako: That's a gray area.

Dr. Six: Yeah. Exactly. So maybe we need to look at size of business, numbers of tenants per building, what the building was historically used for, you know.

Chair Osako: Okay, any other discussion, Commissioners? Okay, then we'll move on. Next item is the Director's Report.

Chair Osako read the following agenda item into the record:

E. DIRECTOR'S REPORT

Introduction to the State Department of Transportation's "Preservation Plan for Bridges within the Hāna Highway Historic District" project by the offices of Munekiyo & Hiraga, Inc. and Fung Associates, Inc.

Mr. Mike Munekiyo: Good morning, Mr. Chairman and Members of the Commission. My name is Mike Munekiyo. We are a sub-consultant on a project for the State Department of Transportation relating to the preservation -- development of a preservation plan for the Hana Highway Historic District, and what we'd like to do is just introduce the notion of what the plan is about, receive any preliminary comments that the Commissioners may have, and also to let you know that this is a phased program so to the extent that we can come back to the Commission to present our findings and final report, we certainly would like to do that, so we'd like to consider this as an introductory meeting and we will be back before the Commission through the course of time, and I'll get into that in a minute.

This morning we do have representatives of the State Department of Transportation; Mr. Paul Santo, he's with the bridge section of DOT; we also have our Maui Highways District Engineer, Mr. Ferdinand Cajigal; so those DOT representatives are here. We also have our architectural preservation specialists, Tonia Moy and Allison Chiu. Tonia will be providing a portion of the presentation in a minutes. And, of course, our project archaeologist is Tanya Greig, and she is with Cultural Surveys Hawaii. She's here this morning as well. So we do have our resources available. And just to let you know that we are in our initial data gathering phase and as part of that program, we are seeking input

from not only the Commission here today, but we've gone out to the community, we've met, to date, with the Hana Community Association, the Hana Cultural Center and Museum Board, we've met with the Nahiku Community Association, Kaupo Community Association, and we plan to continue our outreach engagement with the kupuna in Hana as well as the Kipahulu Community Association as well, so to the extent that we can broaden our network of communication with the folks who are familiar with the district that that's really our goal.

And just before I get started though, the Hana Highway Historic District is, as many of you know, on the Hawaii Register of Historic Places, it's also on the National Register of Historic Places, and whenever work is done within the historic district, therefore, there are certain requirements that the state is obligated to address in terms of receiving public input ensuring that designs and rehabilitation, repair and reconstruction plans are vetted properly through the community, and this is a way, this process of developing a preservation plan is to allow the state to comprehensively look at the historic district and come up with the preservation guidelines which can be applied to each of the bridges in the district, and I'll go through these in a minute, so this whole process is really a part of developing a master planning framework for the long-term preservation of bridges in the historic district.

So let me just go through -- so a little bit about the team structure. Again, this is a project of the State Department of Transportation. The prime consultant is Nagamine Okawa, they are a structural engineering firm, and under Nagamine Okawa, there are a number of disciplines that are participating in the study. As I mentioned, we have architectural preservation specialists, and Tonia will be giving a brief presentation in a minute. We also have traffic and civil engineers, Austin Tsutsumi & Associates, and they look at any traffic or civil design implications that are relevant to the preservation plan development process. We have an electrical engineer on board; similarly, if there are electrical design issues that need to be considered that that's where their role comes in. Again, I'm Mike Munekiyo, and we are the planning and outreach consultants, and we do have, as I mentioned earlier, Cultural Surveys as our archaeological and cultural consultant.

What I'll do during the remainder of slides is to set the context for the preservation plan project is all about, and then have Tonia talk a little bit about the preservation issues that we'd like to address as part of this process.

So the preservation plan is really to develop a plan for approximately 50 bridge structures and 12 box culverts found within the Hana Highway Historic District, and the process we're in is to gather public input early in the planning process and take a very comprehensive approach to developing the preservation plan. And again, this whole notion of going out to the community, coming before the CRC today is part of that process.

What we'd like to do today is introduce the Commission to the project, and its objectives, explain how the project will be conducted, and to the extent that, at this point in the

process, that the Commission may have comments, we'd certainly be happy to receive those comments.

The project is developed or will be undertaken in three phases. We are in the initial phase right now, the data gathering, we've conducted site visits, we're in the midst of conducting detailed studies of each of the bridges, and we're in the process, of course, of gathering community input. Later on this year, from October through early January, we'll be actually preparing a preservation design, concepts, and drawings for each of the bridges, and, at that point, we'll continue with our community input process as well so, hopefully, we'll work with the department to come back to the Commission to present those concepts early next year. And finally, from February through July, we'll be preparing our final report and recommendations, and again, continue with the outreach process, and again, we'll work, at that time, with the department to schedule this matter back before the Commission. So, you know, we will be back before the Commission, hopefully, two additional times, and anytime throughout the process, of course, any comments that the Commissioners may have, we'd be happy to receive.

So a little bit about the Hana Highway Historic District. Under bullet point one, the historic district extends from milepost 2.8, shortly before Ho`alua Bridge near Huelo to Kalepa Gulch just past Kipahulu. The last bridge in the historic district is the Koukou`ai Bridge, again that's in the Kipahulu area. The historic district is basically the roadway corridor, approximately 40 feet wide, but it is limited to the highway right-of-way, so it's a very unusual designation. As I mentioned, it is listed on the Hawaii Register of Historic Places and the National Register of Historic Places. In a minute, I'll show you a map which defines the state's jurisdiction of the historic district versus the county's jurisdiction. What we're engaged in is a process of developing a preservation plan for the state bridges, which runs roughly from Ho`alua Stream Bridge to Kawaipapa Bridge in Hana.

So this is a graphic which illustrates the extent of the historic district, and again from roughly Huelo to Kipahulu. The state's jurisdiction is in here, again from Ho`alua to Kawaipapa. And then the balance of the historic district is under county jurisdiction through Kipahulu. You may recall that the county also prepared their own preservation plan I think in the early 2000s, so that portion of the preservation planning work has been undertaken by the county, so the state is now proceeding with their portion.

This illustrates the locations of approximately -- or of 43 bridges which are a part of the study. Now, in addition to the 43 bridges, there are 7 additional structures which are referred to as "hillside structures," and these are structures which were developed to address road-widening or road erosion issues, and those are found throughout the historic district. So in total, there are 50 structures that we'll be examining, and in addition to the 50 structures, we'll also be looking at 12 box -- or 12 culverts, which are -- may not

necessarily named but certainly still within the historic district and certainly worthy of consideration as part of the preservation plan.

So just a bit about the specific project objectives. Number one, study the affected bridges and structures to document each bridge's historic character, and when I talk about bridge, I'm referring to culverts and hillside structures as well; to evaluate each bridge with respect to conditions and public safety considerations, and we'll see some illustrations of some of these issues in a minute; number three, develop a community and agency consultation process to ensure that input is received regarding the bridge evaluation and preservation process; and finally, to prepare recommendations for historic preservation for each bridge considering historic qualities, public safety, funding options, and community and agency input.

I won't go through these individually but what we've done is we've compiled a list of all of the bridges that are affected under this scope of work, and if we may, we'd like to leave a copy of that list with staff, but, primarily, we're providing this information though some individuals may be familiar with specific bridge locations, specific conditions, specific stories which may be associated with a bridge and I think that kind of knowledge and input as a result brings value to our study, so this is more to give you an idea of where the bridges area. And as you note, you can see that some of these bridges are well over a hundred years old.

So, at this point, I may, Mr. Chair, ask Tonia Moy, who's a architectural preservation specialist to talk a little bit about the issues that we'd like to discuss.

Ms. Tonia Moy: Well, first of all, thank you very much for having us and for taking the time to listen to this big project that we're about to undertake, and, you know, as Mike said, we've been already going to several communities, and talking with them, and hearing what they had to say, so it's really -- it's always really fun and interesting to get the -- their input, so, hopefully, we'll have another good input meeting.

But, anyway, just to go over some of the issues for us, from the architectural preservation point of view, because Hana Highway is a historic district and you folks really, after seeing all that Lahaina sign thing, I know you guys really know all what's entailed and when something is a historic district, and what you folks have to review. And, actually, this Commission has probably reviewed every single bridge project on that highway. And so this is -- this whole project is a way to help smooth the process over in the future years so that when a bridge comes up, the designers will kind of already know what the issues are, where they have to go, what they have to see, what they have to do so that it won't be every time there's a big, you know, issue for every single bridge. So that's the whole purpose of this project. And though, from our point of view, we're going to be following the Secretary of Interior Standards when we look at the bridge and its challenges. We're going

to, hopefully you know, the preservation standard is what we're going to use, hopefully, for all of them, but if we cannot, then there's a rehabilitation standards.

So each bridge will be looked at individually, and we'll be addressing -- we'll be identifying its character defining features for each bridge, and then we're going to address the historic integrity of it. There'll be structural engineers on the team that are going to address the structural integrity; we're going to address the historic integrity. And then we're going to also consider the bridge within the overall context of the entire district. And we're going to have to look at -- so some of the issues that are affecting the historic integrity as well as structural integrity, of course, the condition, and I'm sure some of you have driven over Hana, and some of you live that side, so you know better than us what the condition is on some of the bridges, and some of them are pretty scary, to put it mildly. So -- and this is just the parts that are showing, right, 'cause there are some under the bridge that have some challenges as well that all need to be addressed. So we have to address the condition, and we -- you know, things like even something as beautiful as the overgrowth of plants, we have to address because while it is very pretty, you know, a lot of these plants are not that good for the structure itself and underneath, you know, at sometime it's going to pop up the abutments, we have to watch for all that stuff, so all those have to be addressed as well as the safety issues, and we know that's really, really critical for the community especially because this is their lifeline. This is the way they go in and out. So, as you can see, there are like, you know, missing areas, missing guardrails. And then last one shows the traffic and the tourists, which is, you know, not exactly a bridge design issue, but it is really the reality of that highway, and I know that some of the issues that are happening on the sides of the bridges, because of this traffic and tourists, do in a way affect the bridges, so we will be putting them in the -- we'll be putting each bridge into its context as well, which brings us to the context.

So the context portion, you know, like there are water falls, and swimming holes, and people stop, and it's so pretty, and there's also, I think, no. 19 shows the East Maui Irrigation structures that are right next to it, and that, in itself, is a National Historic Civil Engineering Landmark, so we have to be aware of all these other things right next to the bridges that will affect the bridge as well. And there's archaeological sites and features that Tanya's going to help us with, and also that's what we're going to the community with a lot for 'cause, you know, we need to know from the community what's the importance of some of those bridges, and the waterfalls, and the features that are right next to it, how it's important to the community. So we've been trying to get all that kind of information before we go in and look at each bridge and then try and figure out what to do about each bridge. And next thing we also look at is the distinctive bridge types, as you've seen, you know, there's arches, and then there's solid, and then there's picket. So in the nomination form, it says, "The road includes the highest concentration of stylistically consistent historic bridges in the State of Hawaii." So we are going to try and protect all that when we do our preservation plan, and then, you know, and we would like input from as many people as

possible so that, you know, down the road, things will be easier for the DOT when they start doing an actual construction project, which they will also come back to everybody again but, you know, hopefully, it'll be like: We've gone through this process and, you know, this is what we know, where the issues are, and we can move on from there. So that's really all we have right now, and then we're going to come back later with when we figure out which bridge gets what kind of treatment, and then we'll come back to you guys again and, you know, hopefully, it's going to be a longer meeting, hopefully, you guys will have the time to, you know, sit with us while we kind of go through what each bridge will be, you know, what kind of treatment will each bridge have. So at this point, does anybody have any questions, or comments, or -- and --

Ms. Mowat: You know, I really appreciate you folks going to the different communities before you start. They are -- because they are the ones that know the history, yeah? And I'm curious, so you folks going to do the research on the names of the bridges?

Ms. Moy: Oh, yeah. Yeah.

Ms. Mowat: Yeah. 'Cause that tells a lot ...(inaudible)...

Ms. Moy: Right. Right. We have started that. We have this matrix of the Hawaiian names and we've been giving it to the communities for their input, and already it's like well that used to be named something else.

Ms. Mowat: Oh good.

Ms. Moy: Yeah.

Ms. Mowat: Good.

Ms. Moy: We're trying --

Ms. Mowat: And what is the -- what is the -- how is the community -- how are they reacting to ...(inaudible)... they must be really --

Ms. Moy: Well, there have been -- it's been very positive. They've been very -- really open and, you know, giving us all kinds of information, which is wonderful.

Ms. Mowat: Well, just looking at the pictures, you know, makes me want to take a ride over there already 'cause it is such a beautiful place, and I salute you folks for taking this process, you know, to really doing your homework and going to the sources. So that's all I wanted to say.

Ms. Moy: Thank you.

Dr. Six: I'm on the -- I'm a trustee on the Hana Cultural Center so I already saw this presentation, and we had many suggestions that didn't have a lot to do with the preservation of the bridge but mostly about traffic concerns, but I'm really glad you guys are addressing some of the waterfall turnouts, I'm really glad you guys are doing the archaeology and what's associated with near and around the bridges to understand it and protect it, and I'm really pleased that you're going to the community and getting information because you'll get contradictory information, but there's so many people that are happy to share, and love that road, and love those bridges and want to see them stay and not all be replaced with something that's more modern, and I like the fact that you were tasked with restoring or rehabing, or whatever your level of mitigation's going to be on these bridges because on some of them, I drive really fast to cross, so I really want to commend that. And I know that in Hana, at the cultural center, we had a very positive meeting and people were very pleased that you're reaching out to the community, so I want to commend you folks as well for that, and having such a comprehensive team in place to dealing with it all at once rather than going back and having to mitigate things that you might across, so thank you for that.

Ms. Moy: Thank you.

Chair Osako: So do the state and federal historic districts, basically, are they the same?

Ms. Moy: Yes. Yes.

Chair Osako: Okay.

Ms. Moy: It's the same set of -- the same nomination form.

Chair Osako: I mean, you know, the area and everything is the same?

Ms. Moy: Yeah. Right.

Dr. Six: And just a quick question. I think, if I remember from the last meeting, you're going to prioritize the bridges, like the real needs, not just cosmetic, but the real structural needs as well as making them appear, so I think that's going to be important when you come back with that priority of what bridge needs immediate -- and how you're going to deal with it so --

Ms. Moy: Yeah. And then --

Dr. Six: ...(inaudible)... job.

Ms. Moy: It has been interesting because the community sees some priorities, little different than maybe the engineers will see it, so we're going to have to try and meld all that.

Ms. Arleen Ricalde-Garcia: I think this is a wonderful thing that's being done. I'm just curious, what prompted it? Was it more the safety? Was it just a lot of things falling apart all at the same time? Or --

Ms. Moy: We can thank Paul.

Ms. Ricalde-Garcia: That's a segue?

Mr. Paul Santo: Well, you can thank your Senator English, partially, for -- because of his concern for the bridge and the safety along that highway that he recommended that we replace some of the bridges or rehabilitate some of the bridges to upgrade the load capacity on that highway, especially from the safety standpoint, fire trucks and so forth. So he's partially to thank for that. But this is going to be a long process. We have a lot of structures there that need to be upgraded, so it's more than my -- maybe my lifetime, but at least we're starting.

Dr. Six: You're going to be at least 140. And just to add to that, I think what happened too, when they the earthquake, that 6.8 that isolated the Kipahulu community, people started really thinking about these bridges and how many people will be impacted, not just tourists, but people that make their money off that traffic, van drivers, vendors, hotels, and the fact that it's a real lifeline to that community, and so when it did get isolated with that earthquake, it made Kalani -- I mean Senator English, my landlord think, think about that, so I'm please to hear that you mentioned the fact that he's the chair of the Department of Transportation and somebody had to say, hey, we need to look at those bridges. Thank you for that.

Ms. Ricalde-Garcia: And I'm also glad that you're addressing the traffic and the tourist attractions. I'm wondering if -- are you going to -- how are you going to resolve that problem because it's really dangerous? Are you going to make like an outing so that they can see the waterfalls because we don't want to deprive people from watching, but we don't want them to be in the precarious position where they get hit by a car?

Dr. Six: Or stop at every bridge to see the waterfall when you're trying to get home. You want them to enjoy it but you know.

Ms. Moy: Well, actually, it's been interesting to get some of the comments from the community 'cause some suggestions -- they had some really good suggestions, like some of them do have parking -- kinda like parking areas, but it's not right by the bridge, so

people stop at the bridge, so, you know, it may be the signage or, you know, something to discourage them from parking right there but moving on, and then another good idea that came up at your meeting and actually another subsequent meeting is etiquette for -- Hana Road etiquette that's given out at all the rental car agencies, you know.

Dr. Six: Pull over.

Ms. Moy: Yeah.

Dr. Six: Some of us live here. Yeah, no, but then also because road rage is a real issue when you get the person that will not let anybody get by you see the guy in the truck that's trying to get home and you see the anger and I think that causes accidents and it isn't a good way we want to reflect on the tourist but if they're informed and know, and I think Myrna was the one that said maybe after you have four cars behind you, you know, you can get a ticket, not that there's anyone to enforce it ...(inaudible)...

Ms. Ricalde-Garcia: It's even more of a concern now because the ambulance at Hana clinic will no longer be there. Is that right? The paramedics? So --

Dr. Six: I just know that they've been flying people on Mokulele, I think that's the airline that's operating now, they change so quickly, when we had the most recent real -- the tree fell on the guy at the Taro Fest, they took him out by plane. So I think in Hana, in the case of extreme emergencies, oftentimes, it's helicopter or the airport has been working with people to get people out. I wouldn't want to be in an ambulance on the -- I mean, you know ...(inaudible)...

Ms. Moy: No. I mean, yeah, even if all the bridges were perfect.

Dr. Six: But I think that they are dealing with that, like thinking about how do we get people out when -- 'cause people constantly hurt themselves and, you know, trees fall on them when they're buying popsicle and things like that so --

Chair Osako: Anything else?

Mr. Gaylord Kubota: I just want to say that I read your handout, and I was really impressed. This is really well planned. You guys are really doing a good thing.

Ms. Moy: Thanks. Thanks, Mike.

Dr. Six: And like Bridget said, going out to the community is smart rather than having them all up in arms later. Yeah. Very smart.

Ms. Moy: The earlier the better, right?

Chair Osako: Okay, let's move on.

Ms. Moy: Any other questions? You might have to see us for a long one next one, which won't be till probably January when we finally get all our information sort of started put together, but we may send Annalise some things ahead of time.

Dr. Six: I think you said you were also going to come, you know, once you got that, you were also planning on coming back to those community groups with it, not just here, so that's kind of nice too that you're going to give follow-ups to the community groups on your report, so thank you for that as well.

Ms. Moy: Thank you very much for your time.

Mr. Munekiyo: Thank you.

F. NEXT MEETING DATES:

July 10, 2014 - Site Inspection of the Lahaina Historic Districts
August 7, 2014 - Regular Meeting

Chair Osako: Okay, next meeting date is August 7.

Ms. Kehler: No.

Chair Osako: No? Oh, that's the 10th, next week.

Ms. McLean: That's the next regular meeting date, but also included in your packets is the agenda and map for the site visit next week.

Ms. Kehler: Yeah. It's at 9:15 in Lahaina.

Chair Osako: Okay.

Ms. Mowat: I have a question.

Chair Osako: Sure.

Ms. Mowat: Is everybody just driving their own cars? How is -- I'm coming in via airplane. I mean --

There being no further business brought before the Commission, the meeting was adjourned at 12:11 p.m.

Respectfully submitted by,

SUZETTE L. ESMERALDA
Secretary to Boards & Commissions

RECORD OF ATTENDANCE

Present

Warren Osako, Chairperson
Gaylord Kubota
Bridget Mowat
Arleen Ricalde-Garcia
Janet Six
Frank Skowronski

Excused

Kahulu Maluo
Bruce U'u, Vice-Chairperson
Owana Salazar

Others

Michele McLean, Deputy Planning Director
Annalise Kehler, Cultural Resources Planner
Richelle Thomson, Deputy Corporation Counsel

APPENDIX 7

ATTACHMENT 7f

JUNE 6, 2014

Aha Moku Advisory
Committee Representative
Meeting Summary



MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

October 1, 2014

MEETING MEMORANDUM

Date of Meeting: June 6, 2014 (3:30 p.m.)

Place of Meeting: Starbucks – Kaahumanu

Participants: Kyle Nakanelua, Maui Representative (*Aha Moku Advisory Committee*)
Charlene Shibuya, Senior Associate (*Munekiyo & Hiraga, Inc.*)

Subject: Hana Highway Historic District, State Department of Transportation (DOT) Bridge Preservation Plan

PURPOSE:

Introduce project team, objectives, schedule, and outreach strategy

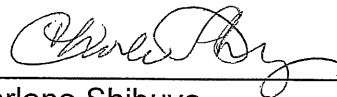
MEETING SUMMARY:

1. C. Shibuya thanked K. Nakanelua for taking the time to meet. Since the individual moku representatives were having difficulty in finding workable meeting times, K. Nakanelua agreed to meet and serve as communication liaison.
2. C. Shibuya asked K. Nakanelua to briefly explain his role in the structure of the Aha Moku Advisory Committee. Mr. Nakanelua is the Maui representative on this committee that reports directly to William Aila, Chair of the Department of Land and Natural Resources (DLNR). He takes concerns of the individual moku representative contacts for Maui and reports back to the committee.

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3. C. Shibuya went on to introduced the project by handing out the June 2014 Fact Sheet (**Exhibit "1"**) and presented the team consultants, project purpose, meeting purpose, project schedule/activities to occur from now to September 2015, 'Ahupuaa map overlay, and bridge/culvert lists. She presented photographic examples from the PowerPoint (**Exhibit "2"**), to illustrate some examples of preservation challenges to be presented at the public meetings. She added that the plan will be similar to the effort on the County's Bridge Preservation Plan prepared in 2001. Extra copies of the Fact Sheet were provided to pass on to the individual moku representatives.
4. C. Shibuya explained how the community outreach will be conducted in 3-cycles of meetings to: (1) introduce project; (2) to present preliminary findings/recommendations; and (3) to present a Final Report which addresses any comments, concerns, or issues brought up in all previous meetings. The three cycles of meetings in multiple locations will give people added opportunities to attend presentations.
5. Meetings have been scheduled with the Hana Community Association, Nahiku Community Associations, and Hana Cultural Center & Museum Board. The team has requested to get on the July agendas for both the Cultural Resources Commission (CRC) and Hana Advisory Committee (HAC).
6. MHI is attempting to contact Haiku Community Association with no success to date. Additionally, Councilmember Carroll suggested doing a presentation to the Kaupo Community Association even if that community is beyond the project limits.
7. K. Nakanelua commented that Hana Highway has a significant number of bicyclists on a road which does not have enough room. That there is a lot more tourist traffic than before, as well. For this bridge preservation plan project, he believes the most important thing for the residents is to keep the traffic flowing for commuting to and from work. When viewing the slide showing a metal guardrail tying in to an old bridge wall, he was concerned whether it was strong enough.
8. C. Shibuya asked him to encourage the other moku representatives to email any comments and input. If they prefer to wait until the preliminary findings and recommendations are developed, that is fine too. To aid Kyle in relaying information to various individual mokus, PDF versions of the Fact Sheet and photographic examples will be emailed and CD copies will be mailed to his address.



Charlene Shibuya
Senior Associate

CS:yp
Attachments

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APPENDIX 7

ATTACHMENT 7g

JUNE 19, 2014

Hana Cultural Center
and Museum
Meeting Summary



MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

October 1, 2014

MEETING MEMORANDUM

Date of Meeting: June 19, 2014 (10:00 a.m.)

Meeting Place: Hana Cultural Center and Museum

Participants: See Attached Sign-In Sheet
Virginia Murison, (*Fung Associates, Inc.*)
Tonia Moy, (*Fung Associates, Inc.*)
Michael T. Munekiyo, (*Munekiyo & Hiraga, Inc.*)

Subject: Hana Highway Historic District, State Department of Transportation
Bridge Preservation Plan

PURPOSE:

The purpose of the meeting was to introduce the members of the Hana Cultural Center and Museum Board to the Preservation Plan project for the Hana Highway Historic District and to solicit their initial comments on the plan's objectives and contents.

DISCUSSION ITEMS:

1. M. Munekiyo provided attendees with hard copies of the PowerPoint presentation. He then provided a "slide-by-slide" overview of the project, explaining the objectives of the project, its schedule and the role of community involvement in the process.

2. V. Murison presented the "Project Challenges" section of the handout, explaining the various preservation issues which will need to be addressed in the Preservation Plan.
3. Following the introductory overview presentation, members of the Board offered questions and comments.
4. J. Six asked if preservation designs will consider replacing guardrails with design features which are more historic in character. T. Moy responded that this kind of evaluation will be a part of the process and recommendations on how to address guardrails will be a part of the plan.
5. V. Murison added that the objective of the plan is to provide a consistent basis for preservation, restoration and rehabilitation.
6. In response to a question regarding the original proposal for National Register listing, T. Moy indicated that the County's Cultural Resources Commission was a key community collaboration partner in the nomination process.
7. S. Crawford recommended that the project team contact Kauai Kanakaole, as she is one who is knowledgeable of the region's local history and culture. The project team will follow up with Ms. Kanakaole.
8. M. Costello asked if work within the Hana Highway Historic District is governed by Federal rules. T. Moy responded in the affirmative, noting that work on any of the bridges will need to be in conformance with the Preservation Plan. She added that the Preservation Plan will be completed with input from the community.
9. E. Seneci asked how decisions will be made when undertaking work in the Hana Highway Historic District. T. Moy stated that depending on the situation, repairs will be done before consideration of a replacement alternative. She added that if replacement is needed, the goal would be to replicate the bridge design to the extent practicable, so that the historic integrity of the Historic District is not compromised.
10. M. Yacht asked if there would need to be realignment of the roadway in any instance. T. Moy responded that the goal of the Preservation Plan is to respect the existing Hana Highway right-of-way so that no realignment will be needed.
11. S. Crawford asked if the team has an overall understanding of bridge conditions. V. Murison explained that the team has bridge inspection reports, but the Preservation Plan will look into conditions in greater detail, keeping in mind criteria of historic character and safety.
12. T. Moy noted that at this point in time, DOT may have a better understanding of bridges which they believe have a higher priority in terms of needing repair and rehabilitation.

13. M. Yacht asked what is a "Hillside Bridge". The team explained that these are structures which were constructed to provide stability to roadway sections, where the roadway needed to be widened because of slope erosion conditions. While they are not technically a bridge, these structures, are being considered as part of the preservation plan.
14. M. Costello asked if the study will consider traffic problems because of the high volume of traffic on the highway. T. Moy explained that the project team includes a traffic engineer, and an evaluation of traffic conditions will be a part of the Preservation Plan.
15. S. Crawford asked if traffic control signs will be a part of the study. He cited the problem with slow moving traffic along the highway and the need for reminders that drivers pull over if traffic is backing up behind them. This problem is especially problematic at bridges, where multiple vehicles may be parked or slowing to observe scenic views.
16. J. Six reiterated this concern, noting that car rental companies should inform their customers of roadway etiquette on Hana Highway.
17. M. Costello expressed her concern on the ability of bridges to maintain their structural integrity over time. If there is a catastrophic failure, the entire community will be hurt.
18. Additional observations were provided, as follows:
 - Bridge widths should not be increased to accommodate two-way traffic.
 - There is a continuing increase traffic volumes on the roadway.
19. M. Munekiyo closed the meeting by explaining that the team will be back to meet with the Board following development of the preliminary preservation guidelines and concepts.

There being no other business, the meeting was adjourned at 11:20 a.m.



Michael T. Munekiyo, AICP
President

MTM:yp
Attachment

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District
Project Presentation to the Hana Cultural Center Museum Board

Thursday, June 19, 2014 – 10:00 a.m.

Hana Courthouse, 4974 Uakea Road

Attendance Sheet

PLEASE PRINT LEGIBLE

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS OR OTHER CONTACT INFORMATION	BOARD POSITION OR GUEST
1.	Scott Crawford			Trustee
2.	COLLA I EADE			TRUSTEE
3.	Margaret M. Pu			Volunteer
4.	Esse P. Sinenci			Recording Secretary
5.	Myrna S. Costello			Treasurer
6.	Harolen L. Kaiwi			President
7.	Janet Six			CRC member
8.	Martha Zech			HCC Board member
9.	Judy Kinser			HCC greeter
10.				Guest
11.				

APPENDIX 7

ATTACHMENT 7h

JUNE 19, 2014

Hana Community Association
Meeting Summary



MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

October 1, 2014

MEETING MEMORANDUM

Date of Meeting: June 19, 2014 (5:00 p.m.)

Meeting Place: Helene Hall

Participants: See Attached Sign-In Sheet
Paul Santo, (*State Department of Transportation*)
Ferdinand Cajigal, (*State Department of Transportation*)
Virginia Murison, (*Fung Associates, Inc.*)
Tonia Moy, (*Fung Associates, Inc.*)
Michael T. Munekiyo, (*Munekiyo & Hiraga, Inc.*)

Subject: Hana Highway Historic District, State Department of Transportation
Bridge Preservation Plan

PURPOSE:

The purpose of the meeting was to introduce the members of the Hana Community Association to the Preservation Plan project for the Hana Highway Historic District and to solicit their initial comments on the plan's objectives and contents.

DISCUSSION ITEMS:

1. P. Santo provided a high-level overview of the project purpose and objectives, noting that the Preservation Plan will help to streamline the implementation of bridge improvement projects in the Historic District

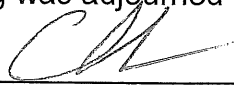
MAUI
305 High Street, Suite 104 Wailuku, Hawaii 96793
PH: (808) 244-2015 FAX: (808) 244-8729
OAHU
735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | PH: (808) 983-1233

2. M. Munekiyo provided attendees with hard copies of the PowerPoint presentation. He then provided a “slide-by-slide” overview of the project, explaining the objectives of the project, its schedule and the role of community involvement in the process.
3. V. Murison presented the “Project Challenges” section of the handout, explaining the various preservation issues which will need to be addressed in the Preservation Plan.
4. Following the introductory overview presentation, members of the Association offered questions and comments.
5. J. Mardfin pointed out hillside erosion at mile-marker 21. She asked if addressing this issue was part of the project’s scope of work. F. Cajigal explained that this particular item will be separately addressed under the Department of Transportation (DOT) rockslide mitigation program.
6. A. Rayne asked if bridges are upgraded, what the anticipated carrying capacity would be. P. Santo responded that if a bridge replacement is warranted the design criteria for new bridges would be up to current standards, which is 80,000 pounds capacity.
7. Members were concerned that creating bridges with higher weight-bearing capacity would encourage bigger loads to be on Hana Highway. P. Santo clarified that while structural design criteria would be 80,000 pounds, the posted weight limit would be less than the design capacity. He added that strengthening of existing bridges is not intended to change the character of the highway and the types of vehicles which ordinarily traverse the highway. The width of the travelway and horizontal curvatures of the roadway would also limit the types of vehicles using the road. He added that despite posted weight limits at bridges, vehicles which exceed the posted limits still cross the bridges.
8. P. Santo explained that the Preservation Plan will set the guidelines for design and that future projects for the Hana Highway bridges will be done as projects separate from the Preservation Plan project.
9. S. Church asked how many bridges will need undergo restoration. P. Santo replied that the nature of improvements required for each bridge will, in part, be guided by the outcome of the Preservation Plan.
10. S. Church asked how environmental impacts on bridge work will be addressed. P. Santo explained that contractors will be required to follow Best Management Practices, to ensure that downstream waters are not adversely affected. In this regard, an Environmental Assessment will be prepared for each bridge improvement project, as applicable.

11. T. Moy added that the Preservation Plan will consider construction methods and cultural practices in future bridge work. In this regard she noted the importance of construction management to ensure environmental and design integrity.
12. D. Lono reiterated that each stream is sensitive and needs to be protected from adverse impacts during construction.
13. S. Church sought clarification as to when the Hana Highway's jurisdiction was transferred to the State of Hawaii. F. Cajigal stated that the DOT's current jurisdiction over Hana Highway was transferred in 1970.
14. D. Lono requested that names of each bridge crossing be placed on the bridge. P. Santo replied that this is a goal of the DOT. He noted the problem with name plates being removed and taken; thus a more permanent marking solution would be need to be identified.
15. S. Church noted his understanding that some bridges are within private property, and that the Preservation Plan should clarify landownership of the bridges.
16. In response to S. Church's question regarding the fees allocated to the Preservation Plan, P. Santo stated that the Preservation Plan project costs \$1.6 million, including administrative costs for the DOT.
17. S. Church asked how community "buy-in" to the plan is documented. T. Moy suggested that minutes of meetings with stakeholders may serve that purpose.
18. D. Lono asked if there are funds already approved for actual construction. P. Santo responded that there are no construction funds allocated at this time.
19. In response to a question regarding implementation priorities, P. Santo stated that the DOT has identified a number of bridges which may be worthy of higher priority in terms of improvements to be made. Among the higher priority bridges are the Kailua Stream Bridge, Ula'ino Stream Bridge, Puahakamoa Stream Bridge and Mokulehua Stream Bridge. P. Santo clarified that these bridges are among those which have a lower-rated carrying capacity. The Preservation Plan will further clarify priorities.
20. S. Church asked for information on the life expectancy of concrete structures. P. Santo explained that concrete structures are durable and can have a long useable life with proper maintenance.
21. D. Lono added that some bridges are subjected to flood waters running over the bridges, which may compromise their structural integrity. P. Santo responded that the Preservation Plan will consider these issues.

22. Y. Samson expressed concern about the bridges' capacity to handle loads on a long-term basis. In this regard, P. Santo stated that the bridges identified for early work (i.e., Kailua, Ula'ino, etc.) are those which DOT believes to be priority structures.
23. D. Lono explained that Hana Highway is the lifeline to the Hana community. It is important that construction activities do not significantly interrupt traffic flows to and from Hana. T. Moy noted that construction methods will be considered in the Preservation Plan, taking into account the need to maintain the highway's continued operation.
24. S. Church mentioned that safety along the entire stretch of highway is a concern. Will this project address safety issues related to non-bridge areas? P. Santo replied that the Preservation Plan project will be limited to bridges only.
25. S. Church asked if any features of the East Maui Irrigation's (EMI) system will be affected, and whether coordination has been undertaken with EMI. V. Murison explained that the scope of the Preservation Plan is limited to the highway right-of-way only and adjacent structures such as those operated by EMI will be avoided.
26. S. Church asked for a definition of "defining character" in reference to each bridge. V. Murison responded that this term refers to the uniqueness each bridge in the Historic District possesses.
27. In response to an inquiry regarding the structural integrity of the bridges, P. Santo explained that the DOT conducts regular bridge inspections and has an ongoing maintenance program to ensure each bridge's integrity.
28. D. Lono suggested that the team talk to Kupuna at the Hana Senior Center to elicit comments, as many of them are familiar with the bridges within the Historic District. The project team will work with D. Lono to schedule a meeting with representatives of the Hana Senior Center.
29. S. Church pointed out that parking at Waikani is a problem; this problem should be addressed. Meeting attendees suggested better signage or placement of jersey barriers to discourage parking along the road.
30. A. Smith reiterated the previously stated concern that construction activities should not disrupt traffic flow into and out of East Maui.

There being no other business, the meeting was adjourned at 7:15 p.m.



Michael T. Munekiyo, AICP
President

MTM:yp
Attachment

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District
Public Informational Meeting with Hana Community Association

Thursday, June 19, 2014 – 5:00 p.m.
 Helene Hall, 150 Keawa Place, Hana Bay

Attendance Sheet

PLEASE PRINT LEGIBLE

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS OR OTHER CONTACT INFORMATION	ORGANIZATION (IF APPLICABLE)
1.	Dawn Lono			Hana Council Office
2.	Joanne Young			Hana Community Assoc.
3.	Dan F. Aray			Hana Community Assoc.
4.	Barbara Ann Benton			Hana Community Assoc.
5.	Kelle Samson			HCA
6.	Tam Stoddin			
7.	Andrew Young			HBC
8.	Sgt. Chene			HCA
9.	Michaelani Smith			KCA
10.				
11.				
12.				
13.				

APPENDIX 7

ATTACHMENT 7i

JUNE 21, 2014

Kaupo Community Association
Meeting Summary



MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

October 1, 2014

MEETING MEMORANDUM

Date of Meeting: June 21, 2014 (10:00 a.m.)

Meeting Place: Old Kaupo School

Participants: See Attached Sign-In Sheet
Michael T. Munekiyo, (*Munekiyo & Hiraga, Inc.*)

Subject: Hana Highway Historic District, State Department of Transportation
Bridge Preservation Plan

PURPOSE:

The purpose of the meeting was to introduce the members of the Kaupo Community Association to the Preservation Plan project for the Hana Highway Historic District and to solicit their initial comments on the plan's objectives and contents.

DISCUSSION ITEMS:

1. M. Munekiyo provided attendees with hard copies of the PowerPoint presentation. He then provided a "slide-by-slide" overview of the project, explaining the objectives of the project, its schedule and the role of community involvement in the process. M. Munekiyo's presentation included an overview of preservation issues which will need to be addressed in the Preservation Plan.
2. Following the introductory overview presentation, members of the Board offered questions and comments.

MAUI
305 High Street, Suite 104 Wailuku, Hawaii 96793
PH: (808) 244-2015 FAX: (808) 244-8729
OAHU
735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | PH: (808) 983-1233

3. A member of the audience asked if it is feasible from a cost standpoint, to bring all of the bridges up to current design and historic standards. M. Munekiyo explained that projects will be prioritized by the State Department of Transportation (DOT), and that projects will be implemented over time in keeping with funding availability.
4. In reference to the 2006 earthquake which cut off portions of East Maui from the rest of the island, M. Aina asked if alternative routing scenarios will be considered as part of the study. M. Munekiyo noted that the study will be limited in scope to address bridge preservation-related issues.
5. J. Starr stated that the DOT should be aware that the construction work on the bridges should not disrupt traffic flow along Hana Highway, such that traffic will be diverted through Kaupo.
6. After some discussion, members of the Kaupo Community Association voted to approve the following motion offered by J. Starr:
 - a. It was moved, seconded and unanimously approved that *"in the process of repairing or replacing bridges along Hana Highway, the DOT shall not cause traffic to be diverted through Kaupo, except in cases of emergency"*.
7. J. Starr stated that the Preservation Plan should address traffic calming and pedestrian safety issues at the bridges, as this is a concern.
8. J. Starr explained that the Hana Highway Historic District currently ends in Kipahulu. While he was not familiar with the rationale for establishing limits of the Historic District, he felt that the district should extend through Kaupo and beyond. He asked if this scenario is a possibility. M. Munekiyo explained that he was not familiar with the process of extending the limits of the Historic District.
9. Towards clarifying requirements for extending the limits of the Historic District, the Kaupo Community Association (KCA) agreed to send a letter to M. Munekiyo, asking that he provide the responsible authorities with the KCA's inquiry.
10. In closing discussion on the Preservation Plan, the KCA expressed gratitude for the opportunity to be a part of the stakeholder input process.

There being no other business, the Preservation Plan portion of the meeting was closed at 11:20 a.m.



Michael T. Munekiyo, AICP
President

MTM:yp
Attachment

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District
Project Presentation to the Kaupo Community Association
Saturday, June 21, 2014 – 10:00 a.m.
Old Kaupo School
Attendance Sheet

PLEASE PRINT LEGIBLE

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS OR OTHER CONTACT INFORMATION	ORGANIZATION (IF APPLICABLE)
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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District
Project Presentation to the Kaupo Community Association
Saturday, June 21, 2014 – 10:00 a.m.
Old Kaupo School
Attendance Sheet

PLEASE PRINT LEGIBLE

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS OR OTHER CONTACT INFORMATION	ORGANIZATION (IF APPLICABLE)
12.	Sam Aina			Kaupo
13.	JONATHAN STORR			11
14.	Mack/K Kalala			
15.	Linda & Mari Domen			
16.	Valda & Rogelio Andaya			
17.	Helan Nielsen			Kaupo
18.	Kate & Dina Akin			
19.	Linda & Graylene Carr			
20.	Mika & Alpha Smith			
21.				
22.				

Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District
Project Presentation to the Kaupo Community Association
Saturday, June 21, 2014 – 10:00 a.m.
Old Kaupo School
Attendance Sheet

PLEASE PRINT LEGIBLE

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS OR OTHER CONTACT INFORMATION	ORGANIZATION (IF APPLICABLE)
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APPENDIX 7

ATTACHMENT 7j

JUNE 29, 2014

Nahiku Community Association
Meeting Summary



MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

October 1, 2014

MEETING MEMORANDUM

Date of Meeting: June 29, 2014 (1:00 p.m.)

Meeting Place: 540 L. Nahiku Road

Participants: See Attached Sign-In Sheet
Tonia Moy (*Fung Associates, Inc.*)
Alison Chiu, (*Fung Associates, Inc.*)
Michael T. Munekiyo, (*Munekiyo & Hiraga, Inc.*)

Subject: Hana Highway Historic District, State Department of Transportation
Bridge Preservation Plan

PURPOSE:

The purpose of the meeting was to introduce the members of the Nahiku Community Association to the Preservation Plan project for the Hana Highway Historic District and to solicit their initial comments on the plan's objectives and contents.

DISCUSSION ITEMS:

1. M. Munekiyo provided attendees with hard copies of the PowerPoint presentation. He then provided a "slide-by-slide" overview of the project, explaining the objectives of the project, its schedule and the role of community involvement in the process.

MAUI
305 High Street, Suite 104 Wailuku, Hawaii 96793
PH: (808) 244-2015 FAX: (808) 244-8729
OAHU
735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | PH: (808) 983-1233

www.mhplanning.com

2. T. Moy presented the “Project Challenges” section of the handout, explaining the various preservation issues which will need to be addressed in the Preservation Plan.
3. Following the introductory overview presentation, members of the Nahiku Community Association offered questions and comments.
4. D. Lono explained that car rental companies should be asked to inform their customers of roadway etiquette when traveling along Hana Highway.
5. C. Noel expressed concern regarding traffic congestion at Waikani Bridge. She noted that she observed 30 to 40 cars backed up at the bridge on her way to the meeting. The ability of emergency vehicles passing through this area during these conditions is a liability.
6. P. Bodnar noted that there are 52 bridges leading to Hana. T. Moy clarified that the scope of the Preservation Plan is limited to the State Department of Transportation’s (DOT) section of the highway, which includes 43 bridges. The other bridges noted, fall under the jurisdiction of the County of Maui.
7. C. Kekahuna asked if the project team was working with East Maui Irrigation (EMI). T. Moy noted that EMI’s facilities will not be a part of the project scope, but that coordination will be undertaken with EMI.
8. C. Kekahuna noted that EMI’s ditches runs near the Hanawi Bridge. She asked if water issues will be discussed with EMI. T. Moy noted that water issues are separate from the Preservation Plan for the Hana Bridges.
9. K. Kaho’okele explained that the Makapipi Bridge crosses the Kapipiwai Stream. She noted that the origin of the “Makapipi” name should be researched since it does not align with the stream name. The project team will investigate this item.

Noting that bridge signs have been stolen, vandalized, or hidden by vegetative overgrowth, K. Kaho’okele asked if signage will be restored on the bridges. T. Moy responded that preparing a signage program/plan for the bridges will be a part of the Preservation Plan.

10. Adding that night safety is an issue at Puua Kaa State Wayside Park, she asked if the DOT has plans to add security lighting at the park. It was noted that this particular issue was not part of the Preservation Plan work.
11. D. Lono asked if the team could confirm the spelling of the Kawaihapapa Bridge. She noted kupuna familiar with the area may have information pertinent to the study. M. Munekiyo confirmed that a meeting with kupuna is being coordinated through the Hana Senior Center.

12. C. Noel stated that Inez Ashdown had compiled the names of all bridges. The project team should check this reference.
13. C. Noel asked what the life expectancy of a bridge might be. T. Moy explained that with proper maintenance, concrete structures can last for many years. She added that the Preservation Plan will address maintenance requirements for bridges.
14. M. Kekahuna explained that EMI's water conveyance systems traverse near bridge structures, and that any work done on the bridges should ensure that the water supply will not be contaminated by construction activities.
15. He asked if the team could provide the Nahiku Community Association with the name of the project's archaeologist. T. Moy responded that the project archaeologist is Tanya Greig of Cultural Surveys Hawaii. Her contact information will be provided to the Nahiku Community Association.
16. M. Kekahuna noted the need for weight limit signs at each bridge. He added that weigh stations should be considered to ensure that weight limits are respected. T. Moy explained that although truck weights are not currently monitored, the team recognizes the importance of respecting bridge capacities.
17. M. Kekahuna added that any bridge closure will adversely impact the East Maui community, especially if there is a need for emergency vehicles to get in and out of the region. T. Moy agreed, stating that bridge construction methods will be a part of the Preservation Plan to ensure that disruption to the community is minimized.
18. M. Kekahuna asked which bridges have the highest priority in terms of need for attention. A. Chiu provided the DOT's initial list of priorities as follows: Makanali Bridge; Kailua Bridge; Puohakamoi Bridge; Punalau Bridge; Kopili'ula Bridge; Kapa'ula Bridge; Makapipi Bridge; Helele'ike'oha Bridge; Ula'ino Bridge; and Mokulehua Bridge.
19. M. Kekahuna asked what specific issues are of concern with these bridges. T. Moy explained that carrying capacity is the criteria which is being considered. She added that the DOT conducts bridge inspections every two (2) years to maintain an accurate record of conditions.
20. K. Kaho'okele reported that the Waikani Bridge (also known as Wailuanui) and the adjoining roadway approaches are eroding. M. Kekahuna reiterated this concern.
21. M. Kekahuna stated that all East Maui communities will be affected by bridge construction work. He asked that the DOT consider the impacts of construction to these communities.

22. He noted that water conveyance capacities of bridges should be recognized. During heavy rains, standing water will be found on some bridges. The stormwater condition at mile marker 23 was highlighted as a particular concern.
23. M. Kekahuna explained that in addition to bridges, the DOT should be aware that the roadway itself is in need of repair and maintenance. He added that the DOT should be made aware of this need, as their response times have been slow. He added that methods of cleaning bridges should consider impacts to the environment.
24. T. Moy asked if the ferry alternative is being pursued as a means of keeping the communities "connected". D. Lono stated that funding is available to consider this option, but the implications of this alternative to the community needs to be further discussed.
25. K. Kaho'okele commented that the conditions of bridges today are the worse that she can remember.

There being no other business, the Hana Bridge Preservation Plan portion of the meeting was adjourned at 2:15 p.m.



Michael T. Munekiyo, AICP
President

MTM:yp

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District
Project Presentation to the Nahiku Community Association

Sunday, June 29, 2014 – 1:00 p.m.

540 Lower Nahiku Road

Attendance Sheet

PLEASE PRINT LEGIBLE

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS OR OTHER CONTACT INFORMATION	ORGANIZATION (IF APPLICABLE)
1.				
2.	Renate Greene			
3.	Mauna Lani			NCA Board
4.	Mauna Lani			NCA President
5.	Mauna Lani			NCA Sec.
6.	Mauna Lani			NCA
7.	Pamela			NCA
8.	POI D. DOWNEY			MPD
9.	Alison Chin			FAH
10.	May			
11.	Dawn Long			Maine County Council Office

Hana

Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District
Project Presentation to the Nahiku Community Association

Sunday, June 29, 2014 – 1:00 p.m.

540 Lower Nahiku Road

Attendance Sheet

PLEASE PRINT LEGIBLE

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS OR OTHER CONTACT INFORMATION	ORGANIZATION (IF APPLICABLE)
12.	Carole N. Noël			member NCP Resident
13.				
14.				
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APPENDIX 7

ATTACHMENT 7k

AUGUST 16, 2014

Kipahulu Community Association
Meeting Summary



MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

October 1, 2014

MEETING MEMORANDUM

Date of Meeting: August 16, 2014 (12:00 p.m.)

Meeting Place: Kipahulu Community Center

Participants: See Attached Sign-In Sheet
Charlene Shibuya, (*Munekiyo & Hiraga, Inc.*)

Subject: Hana Highway Historic District, State Department of Transportation
Bridge Preservation Plan

PURPOSE:

The purpose of the meeting was to introduce the members of the Kipahulu Community Association to the Preservation Plan project for the Hana Highway Historic District and to solicit their initial comments on the plan's objectives and contents.

DISCUSSION ITEMS:

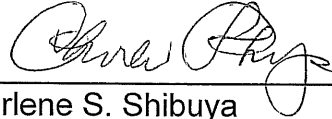
1. C. Shibuya provided attendees with hard copies of the PowerPoint presentation. She then provided a "slide-by-slide" overview of the project, explaining the objectives of the project, its schedule and the role of community involvement in the process. She, further explained that since the Kipahulu community has already experienced the County's bridge preservation plan development and actual implementation, that input on 'lessons learned' would be valuable.
2. The slide presentation also contained photographs of various bridges which C. Shibuya used to illustrate and describe preservation challenges with broken

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bridge elements, overgrowths, safety, traffic, tourists, and distinctive geographical, historic, and architectural designs.

3. Upon concluding the presentation, questions and comments were received as follows:
 - a. K. Kanekoa pointed out that there are potholes at the Waikani Bridge approaches. Will the plan take care of it? C. Shibuya responded that bridge work would probably take care of the immediate approaches but the overall deteriorated road conditions would normally be handled under the routine road resurfacing and repair projects.
 - b. T. Lind asked if we could restrict parking along Hana Highway at Waikani Bridge. C. Shibuya responded that it would be difficult to get people to comply and enforce the restriction.
 - c. T. Firestone asked if Koukouai Bridge is the next one to be done. C. Shibuya clarified that Koukouai is under the County's jurisdiction handled by their Department of Public Works.
4. After concluding the bridge preservation plan presentation, C. Shibuya handed out a Contact Information sheet so people can call or email comments and/or questions and comments later.
5. Following C. Shibuya's presentation, Senator J. Kalani English talked about some of the State legislative initiatives concerning the east side communities. The Senator was followed by the Mayor, and Councilmember Bob Carroll who also entertained questions from attendees.
6. Questions relating to the bridge preservation plan that carried over into the Senator and Mayor's portion of the meeting were as follows:
 - a. A gentleman asked what could be done about slow tourist drivers not pulling over to allow locals to pass. C. Shibuya stated that a suggestion has been made to State Department of Transportation (DOT) to ask that the Drive Guides for rent-a-cars have information instructing them to pull over for local drivers. Another idea could be message stickers in the rent-a-cars.
 - b. C. Natale expressed to the Mayor that bridge safety is most important but that herbicide spray is not supported by the community.

There being no other bridge preservation project business, the guest speakers portion of the meeting ended at 2:00 p.m.

A handwritten signature in cursive script, appearing to read "Charlene Shibuya", written in black ink.

Charlene S. Shibuya
Senior Associate

CSS:yp
Attachment

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District
Public Informational Meeting with Kipahulu Community Association
Saturday, August 16, 2014 – 12:00 p.m.
Kipahulu Community Center
Attendance Sheet

PLEASE PRINT LEGIBLE

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS OR OTHER CONTACT INFORMATION	ORGANIZATION (IF APPLICABLE)	PHONE NUMBER
1.	Crichton Lind			Myself	
2.	STEVE NATALE			com	
3.	CHARLOTTE NATALE			com	
4.	Stephan Reeve				
5.	Kaimane Kane Kee Hobbs			Kipahulu Ohana Kipahulu comm. ass.	
6.	Tawestie Lind				
7.	Kuanini Link				
8.	Kara French				
9.	ROGER W HOBBS				
10.	Mack K Kalalan				
11.	Greg Lind sr.			Kipahulu	

Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District
Public Informational Meeting with Kipahulu Community Association
Saturday, August 16, 2014 – 12:00 p.m.
Kipahulu Community Center
Attendance Sheet

PLEASE PRINT LEGIBLE

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS OR OTHER CONTACT INFORMATION	ORGANIZATION (IF APPLICABLE)	PHONE NUMBER
12.	Jae Pontanilla			com	
13.	Georgina Barros				
14.	PATRICK O'CONNELL				
15.	Robert Carroll				
16.	Mike Nolan			com	
17.	Alan Arauca			com	
18.	Scott Crawford			Kipahulu Homes	
19.	Dawn Lano			com	
20.	G. Kalani English			Slater	
21.	Neo Freston			KCA President	
22.	JONATHAN STARR				

Patricia O'Connell
Eunice Lind

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Kipahulu Homes

APPENDIX 7

ATTACHMENT 7I

JULY 22, 2014

Kaui Kanakaole
Meeting Summary



MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

October 1, 2014

MEETING MEMORANDUM

Date of Meeting: July 22, 2014

Meeting Place: 4195 Hana Highway (Kanakaoale Residence)

Participants: Kauai Kanakaoale, English Teacher at Hana High School, Hula Instructor, Researcher and Report Writer on Water Sources in Hana District

Subject: Hana Highway Historic District, State Department of Transportation Bridge Preservation Plan

PURPOSE:

To introduce the project and consult with Ms. Kanakaoale on her specialized knowledge on various water resources (streams, springs, aquifers, ponds, etc.) as it may relate to bridges being evaluated.

DISCUSSION ITEMS:

1. C. Shibuya used the PowerPoint copy to introduce the project. Left with her copies of the Fact Sheet with Ahupua'a Overlay Map, Contact Information Sheet and hard copy of FAI's spreadsheet of bridge name meanings using the 1990 Hawaii Heritage Center Report, FAI Research, and Cultural Surveys Research with shaded cells highlighting the differences.

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2. Kauai asked for the source of the 1990 Hawaii Heritage Center Report to which C. Shibuya will inquire with FAI.
3. C. Shibuya explained the importance of the preservation plan being a long-term document in which the team wants the Hawaiian names with diacritical marks be accurate as possible. Kauai explained that old land maps did not use diacritical marks so it can be difficult to verify. She has used Lloyd Soran's research on land grants and maps as a source for her work.
4. Kauai has taken two (2) years off from teaching to work under a research grant to complete research and write a report on various water resources titled "Ke Ala Huii Waihanau" or "The Pathway Leading to Prolific Water". She has identified numerous water resources in Ahupua'a Moku land divisions, Koolau, Hana, Kipahulu, and Kaupo. She is using Lexicology (study of word parts) to look at meanings by breaking up the words and interpreting them with and without the diacritical marks (okinas). If she finds conflicting meanings she goes out to these locations and takes photos. Since Hawaiian place names are not randomly picked but typically will reflect the nature of the surrounding, events at the site, what the area was used for, etc., she uses the photos to see which meaning best corresponds to the areas' characteristics. The report writing has a deadline to be completed in November 2014 and she can make it available to our team then.
5. C. Shibuya asked Kauai if she has information on why Makapipi Bridge crosses a different stream name. Explained to her that the question came out of a recent Nahiku Community Association meeting that the name Makapipi is not aligned with the stream name. Kauai checked with her large USGS map on the stream name that Makapipi Bridge crosses adjacent to Lower Nahiku Road. According to that map, the stream that runs under Makapipi Bridge does have the same stream name.
6. C. Shibuya encouraged Kauai to e-mail comments or thoughts regarding the spreadsheet as she goes through completing her research on the numerous water resources in the Hana District.

7. Kauai's family is deeply involved with teaching Hula workshops abroad and she just returned from a trip to Europe doing that. They also go to Japan regularly to do the same. Her auntie is a judge at the Merrie Monarch Festival. Her father is from Hawaii Island and her mother is from Hana. Kauai grew up in Hana, is an English teacher at the high school, and sat on the Hana Community Advisory Committee for nine (9) years finishing someone's term and doing another term.



Charlene Shibuya
Senior Associate

CSS:tn

Attachments

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Hawaiian Place Names Research

	MP	Bridge/Stream	Hawaiian Name	Year	Ahupuaa	Possible Meanings - to be confirmed		
						Hawaii Heritage Center Report (1990)	Team Research 1	Team Research 2
1.00	5.09	Hoalua Stream Bridge		1929	West Hanawana and Hanehoi	(---)	(---)	Bay, fishing site, landing
2	5.86	Kailua Stream Bridge		1929	Puuomaile and Papaaea	"Kai-lua" means 'two streams'	"Two seas"	Lit., two seas/currents
3	6.22	Naililihaele Stream Bridge	Nā'ilī'iilihā'eie	1930	Papaaea and Papaaea Nui	"Na-ili'iili'haele" means 'to do a pebble dance'	"Traveling pebbles"	Lit., walking pebbles
4	7.94	Oopuola Stream Bridge	O'opuola	1925	East Makaiwa and West Makaiwa	"O'o-pu-ola" means 'life maturing'	"Live mud fish" ?	A stroke in lua fighting, Lit., alive
5	8.24	Makanali Stream Bridge	Makanali	1928	East Makaiwa	"Ma-ka-na-le" means 'bright vision'	(---)	(---)
6	8.57	Kaaiea Stream Bridge	Ka'aiea	1928	East Makaiwa and Mooloa	(---)	Aiea = (Nothocestrum) tree	Lit., Nothocestrum tree (hardwood species)
7	9.88	Waikamoi Stream Bridge	Waikamoi	1911	Kolea	"Wai-aka-mo'i" means 'waters of the kings'	"Water of the (moi) taro" or "Water acquired by the threadfish"	Lit., water of the moi taro
8	10.97	Puohokamoa Stream Bridge	Puohokamoa	1912	Kolea and Loiloa	"Pu-o-ho-ka-moa" means 'sudden awakening'	"The chicken awakes or is startled"	Lit., the fowl was startled
9	11.44	Haipua'ena Stream Bridge	Haipua'ena	1912	Keopuka	"Hai-pue-na" means 'glowing hearts'	(---)	Lit., broken wildflower
10	13.16	Kolea (Punalau Stream) Bridge	Kōlea	1911	Honomanu	"Puna-lau" means 'many springs'	(---)	Lit., plover
11	13.71	Honomanu Stream Bridge	Honomanū	1911	Honomanu	"Hono-manu" means 'bird valley'	(---)	Lit., shoulders puffed with fatness
12	15.39	Nuaailua Stream Bridge	Nua'ailua	1911	Kearae and Honomanu	"Nu'a-'ailua" means 'large abundance'	(---)	Stream and point in Ke'anae quadrant
13	16.60	Piinaau Stream Bridge (Pi-na-aa is correct name of stream? Verify)	Pi'ina'au	1916	Kearae	"Pi-na-aa" means 'kind-hearted'	(---)	(---)

Hawaiian Place Names Research

	MP	Bridge/Stream	Hawaiian Name	Year	Ahupuaa	Possible Meanings - to be confirmed		
					<i>Hana Highways Bridge Preservation Plan (2015)</i>	<i>Hawaii Heritage Center Report (1990)</i>	<i>Team Research 1</i>	<i>Team Research 2</i>
14	16.77	Palauhulu Stream Bridge	Palauhulu	1916	Keanae and Pahoa	"Pa-lauhulu" means 'leaf sheltered'	"To take all of a fish catch for a chief instead of dividing it" Stream begins at junction of Hauoi Wahine Stream to Kano Stream, joins Piinau Stream to Keanae Stream	Banana leaf enclosure
15	18.07	Waiokamilo Stream Bridge	Waiokamilo	1921	Pauwalu and Wailuanui	"Wai-o-ka-milo" means 'whirling waters'	"Water of the milo tree" Flows to sea	Lit., Kamilo's water
16	19.39	Waikani Stream Bridge	Waikani	1926	Wailuanui	"Waikani" means 'sounding water'	(---)	Lit., sound of the water
17	20.83	West Wailuaiki Stream Bridge	West Wailuaiki	1937	Wailua Nui and Wailua Iki	"Wai-lua-iki" means 'diminishing waters'	"Small wailua (two waters)" Flows to Wailuaiki Bay	Little Wailua (Wailua = Lit., spirit or ghost)
18	21.30	East Wailuaiki Stream Bridge	East Wailuaiki	1926	Wailua Iki and Kaliae	"Wai-lua-iki" means 'diminishing waters'	"Small wailua (two waters)" Flows to Wailuaiki Bay	Little Wailua (Wailua = Lit., spirit or ghost)
19	21.81	Kopiliula Stream Bridge	Kopili'ula	1926	Kaliae and Kekuapawela	"Ko-pi-li-ula" means 'sacred ceremony'	"Thin, red tapa made of mulberry bark" Between Kaliae and Kekuapawela	A red birth gift
20	22.31	Puaakaa Stream Bridge	Pua'aka'a	1926	Kekuapawela and Waiohue	"Pu'a-aka-a" means 'open laughter'	"Rolling pig" Joins Kopiliula Stream. Between Kekuapauaela and Waiohune	Lit., rolling pig
21	22.47	Waiohue Stream Bridge	Waiohue	1937	Waiohue and Nakapehu	"Wai-o-hu-e" means 'deceptive waters'	(---)	Water of Hue
22	22.95	Waiohuo'lua Stream Br. (Unknown Stream #1)		1920	Puakea	(---)	(---)	(---)
23	23.00	Unknown Stream #2		1920	Puakea	(---)	(---)	(---)
24	23.01	Unknown Stream #3 (Paakea)		1920	Puakea and Paakea	(---)	Pa'akea = "coral bed/ limestone"	(---)

Hawaiian Place Names Research

	MP	Bridge/Stream	Hawaiian Name	Year	Ahupuaa	Possible Meanings - to be confirmed		
						Hawaii Heritage Center Report (1990)	Team Research 1	Team Research 2
25	23.39	Kapaula	Kapā'ūla	1926	Kapaula and Puuhaehae	"Ka-pa-'ūla" means 'to hold- secret ' sacred'	"Red enclosure, red kapa (bark cloth)" Flows to sea.	<i>Lit.</i> , the red enclosure
26	23.99	Hanawi	Hanawī	1926	Hopenui	"Hana-wi" means 'whistling wind'	(---)	<i>Lit.</i> , seeking freshwater shellfish
27	24.16	East Hanawi	East Hanawī	1926	Hopenui	"Hana-wi" means 'whistling wind'	(---)	<i>Lit.</i> , the red enclosure [East]
28	24.98	Makapipi	Makapipi	1926	Honolulu Iki and Makapipi	"Ma-ka-pi-pi" means 'desire for blessings'	(---)	<i>Lit.</i> , sprinkled eyes
29	25.20	Kuhiwa Stream Bridge	Kūhiwa	1926	Makapipi and Kuhiwa	"Ku-hiwa" means 'precious love'	"A special taboo made by a chief" Flows to sea	Special taboo made by a chief
30	25.42	Kupukoi	Kupukoi	1926	Kuhiwa	"Ku-pu-koi" means 'claiming tribute'	(---)	(---)
31	25.95	(Unnamed Bridge) Kahalaowaka Stream	Kahalaowaka	1926	Waiahole and Maino	(---)	(---)	(---)
32	26.48	Pupape-Manawaikeae Stream Bridge	Pupape	1926	Maino and Puupaipaia	"Pu-a-pa-pe" means 'baptismal'	(---)	(---)
33	26.60	Kahawaihapapa Stream Bridge	Kahawaihapapa	1922	Puupaipaia and Keaa	"Ka-ha-wai-ha-pa-pa" means 'extensive valley'	"Shallow stream"	Shallow aqueduct
34	26.77	Keaaiiki Stream Bridge	Kea 'āiki	1921	Keaa	"Ke-a-a-iki" means 'burning star (Sirius)'	"Small Keaa" ?	Small Kea'ā (<i>Lit.</i> , the scoria lava)
35	26.94	West Waioni Stream Bridge	West Waioni	1920	Keaa	"Wai-oni" means 'ruffled waters'	(---)	Waioni = moving water
36	27.01	Waioni Stream Bridge	Waioni	1920	Keaa	"Wai-oni" means 'ruffled waters'	(---)	Moving water
37	27.76	Lanikele Stream Bridge	Lanikele	1917	Heleleikeoho and Ulaino	"Lani-ke-le" means 'heavenly mist'	(---)	Watery heaven or watery sky
38	27.92	Heleleikeoha Stream Bridge	Helele'ike'ōhā	1917	Ulaino	"He-le-le-i-ke-o-ha" means 'extending sorrow'	"The taro sprout falls"	<i>Lit.</i> , to become a garland of spreading vines or roots
39	27.98	Ulaino Stream Bridge	Ula'ino	1914	Ulaino	"Ula-i-no" means 'intense sorrow'	"Stormy red"	<i>Lit.</i> , red sin or red evil
40	28.31	Mokulehua Stream Bridge	Mokulehua	1908	Ulaino and Makapuu	"Moku-lehua" means 'solemn feast'	(---)	Solemn feast after the cutting (moku) of an 'ōhi'a log for a temple image; or cluster of lehua trees

Hawaiian Place Names Research

	MP	Bridge/Stream	Hawaiian Name	Year	Ahupuaa	Possible Meanings - to be confirmed		
					Hana Highways Bridge Preservation Plan (2015)	Hawaii Heritage Center Report (1990)	Team Research 1	Team Research 2
41	29.18	Oilowai Stream Bridge		1914	West Honomaele	"O-i-lo-wai" means 'first sprouting'	"Seedling/Sprout/Young"	Lit., seedling water
42	29.54	Honomaele Stream Bridge	Honomā'ele	1924	West Honomaele and East Honomaele	"Hono-ma-'e-le" means 'land of deep love'	"Numb bay" Flows to sea	Lit., numb bay
43	33.44	Kawaipapa Stream Bridge	Kawaipapa	1947	Kawaipapa	(---)	"The stratum stream" Flows to Hana Bay	Lit., the shallow water or the stratum stream

APPENDIX 7

ATTACHMENT 7m

JULY 24, 2014

State Historic Preservation
Division – Maui Office
Meeting Summary

M U N E K I Y O H I R A G A , I N C .

MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

July 30, 2014

MEETING MEMORANDUM

Date of Meeting: July 24, 2014 (2:30 p.m.)

Meeting Place: State Department of Transportation, Highways
Division, Maui District Office

Participants: Ferdinand Cajigal, (*Department of Transportation*)
Jenny Pickett, (*State Historic Preservation Division*)
Tanya Lee-Grieg, (*Cultural Surveys Hawaii*)
Michael T. Munekiyo, (*Munekiyo & Hiraga, Inc.*)

Subject: Hana Highway Historic District, State Department of Transportation
Bridge Preservation Plan

PURPOSE:

The purpose of the meeting was to introduce Ms. Pickett to the Preservation Plan project for the Hana Highway Historic District and to solicit initial comments on the plan's objectives and contents.

DISCUSSION ITEMS:

1. M. Munekiyo provided Ms. Pickett with an overview of the project, explaining the objectives of the project, its schedule and the role of community involvement in the process.

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2. M. Munekiyo explained that the outreach efforts to date have included meetings with various community associations, as well as the County's Cultural Resources Commission. The objective of these meetings was to introduce the project to the various stakeholders and to inform them of future meetings to be held regarding preliminary recommendations from the Preservation Plan.
3. T. Lee-Grieg explained the role of Cultural Surveys Hawaii in the project. She noted the importance of continuing communication with the State Historic Preservation Division. In this regard, she asked Ms. Pickett to feel free to communicate with her if there is useful information regarding archaeological resources or issues which may be shared with the project team.
4. While Ms. Pickett did not have specific comments to offer at this stage of the study, she indicated that she appreciates the collaborative approach the Department of Transportation is taking in undertaking the study. She looks forward to reviewing the preliminary recommendations from the team.

There being no other business, the Hana Bridge Preservation Plan portion of the meeting was adjourned at 3:00 p.m.



Michael T. Munekiyo, AICP
President

MTM:lh

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APPENDIX 7

ATTACHMENT 7n

AUGUST 4, 2014

Historic Hawaii Foundation
and SHPD – Architecture Branch
Meeting Summary



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FINAL MEETING MINUTES

By Alison Chiu & Mayu Ohama
August 11, 2014

Project: Hana Highway Bridge Preservation Plan

Meeting Date: July 25, 2014

Time: 2:00 pm

Location: HDOT Kapolei Office – Conference Room 111A/B

Attendees:

HDOT Bridge Design Section	Paul Santo, Neil Hasegawa
FHWA	Domingo Galicinao, Meesa Otani
SHPD Architecture Branch	Mike Gushard, Anna Broverman, Jessica Puff
Historic Hawaii Foundation	Tanya Gumapac-McGuire
Outdoor Circle	Joel Kurokawa
Hana Community Member	Ward Mardfin
FAI	Tonia Moy, Virginia Murison, Alison Chiu, Mayu Ohama, Michelle Cheang

I. Introductions

- a. Ward Mardfin noted that he is attending as a private citizen, although he is a member of the Hana Advisory Committee to the Maui Planning Commission.

II. Project Overview

- a. FAI provided attendees with hard copies of the PowerPoint presentation. Tonia Moy presented a “slide-by-slide” overview of the project, explaining the project’s objectives, its schedule, and the role of community involvement in the process. Items of note include the following:
 - i. This is not a construction project: It involves developing a plan for preservation priority, based on a variety of technical and cultural factors, to aid in HDOT’s future planning and decision making with regards to historic bridges along Hana Highway.
 - ii. DOT’s bridge projects with federal funds still need to go through the historic preservation consultation and this Preservation Plan will aid the process by narrowing and prioritizing the recommended options.



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- iii. FAI requested contact information for additional stakeholders, if known, so that the team may reach out to them.
- iv. Stressed early engagement with community and a holistic preservation approach.
- v. Recommendations for the bridges will be made according to the Secretary of the Interior's (SOI) Standards.
- vi. It was noted that County bridges are not included in this plan; a separate Preservation Plan for County bridges was prepared in 2001.
- vii. Several culverts are located along the route, but the team will primarily address the 12 historic culverts identified in the HAER (2005) and National Register Historic District Nomination Report (2001).
- viii. Goal is to provide a safe highway that is pleasant for residents and visitors.
- ix. Project Schedule
 - Draft due in September
 - Workshop in November
 - Second community meeting in January 2015
 - Final report expected September 2015
- b. Preservation Challenges
 - a. Virginia Murison explained the various preservation issues which will need to be addressed in the Preservation Plan.
 - Defined bridges vs culverts vs hillside bridges
 - Hillside bridges will be treated as a group

III. Comments & Questions

a. Bridge Repair

- i. Will bridges be upgraded if they are scheduled for repair? (SHPD)
- ii. DOT aims to eventually have all bridges with a carrying capacity of 80 tons (current posted limit is 10 tons). Six bridges are currently scheduled to be repaired over the next ~3 years to address carrying capacity. (HDOT)
- iii. The team has reviewed the County Preservation Plan and noted little community involvement; the team's goal is to overcome some of these hurdles through the early engagement process. In response to an HHF question regarding the County Preservation Plan, it was also noted that the County's plan recommended replacement of most bridges; the State Preservation Plan will seek to make preservation recommendations based on SOI Standards. (FAI)



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b. Bridge Width & Design Exceptions

- i. Hana residents are concerned with retaining the original look and width. Is it possible to receive a waiver from Federal guidelines on width? Waipae Bridge was cited as an example of extensive widening. (Mardfin)
- ii. FHWA acknowledged community request for single-lane bridges and noted that FHWA and DOT traveled to Oregon to look at historic bridge design exceptions.
 1. Oregon bridges experience lower volume traffic compared to Hana bridges, which experiences growing annual traffic. Future concerns for highway safety are a priority for Hana Highway. (HDOT)
- iii. Bridges will be striped accordingly as single- or double-lanes with signage. (HDOT)
- iv. Single-lane bridges are believed to slow traffic, and are thus desired. (Mardfin)
- v. Overall community comments thus far regarding priorities for maintaining the current aesthetics and width of the bridges is acknowledged. The team is reviewing FHWA's Flexible Design Guidelines and Context Sensitive Solutions (CSS). (FAI) Meesa Otani is the contact for CSS in Hawaii. FHWA offered to provide contact information for others as requested.

c. Federal Funding

- i. All federal funding surface transportation programs have been combined into MAP-21 (Moving Ahead for Progress in the 21st Century).

d. Roadway Issues

- i. Pull-Offs
 1. Request to add more pull-off locations for visitors. (Mardfin)
 2. County has added pull-offs at some locations. (FHWA)
 3. Will recommend developing a traffic etiquette booklet for visitors. (FAI)
- ii. Flooding/Overtopping
 1. Suggestion to contact County Road crew, since they also perform maintenance on State roads. (Mardfin)

e. Railing Design

- i. Height requirement for automobiles at low speed: 27". (DOT)
- ii. Height requirement for pedestrians and bicycles: 42". (DOT)
- iii. Railing heights will be addressed in the Preservation Plan. (FAI)
- iv. Asphalt overlay contributes to decreased railing height over time.
 1. In response to a question from Outdoor Circle regarding feasibility of removing existing asphalt overlay, DOT explained that removal of asphalt at bridge deck will also impact adjacent roadway; however, this option may be considered. There is a limited number of recorded drawings available, and capacity of many bridges is unknown/unconfirmed.
 2. Road level difference noted at Bridge #16 – Waikani and others may present challenges with ACROW bridges. (Mardfin) Potentially long spans are acknowledged. (DOT)



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- v. Railing designs will be based on crash-tested FHWA-acceptable examples; non-standard designs will require justification. Each bridge will be looked at individually. (DOT/FAI)
- vi. Considerations will be based on SOI Standards: Repair (1st option), Replace-in-Kind of selected components (2nd option), Full Bridge Replacement that meets current codes/standards with character-defining railing design (3rd option). (FAI)
- vii. Existing baluster railings are all under-reinforced. Bridges are inspected on a 2-year cycle. (DOT)
- viii. Depending on width allowance, DOT is willing to consider an up-to-code railing built inset of the existing historic railings per SHPD's suggestion.
- ix. Suggestion to investigate crash-tested option called "Stealth Rail" and to review Oregon DOT's heritage bridge examples. (SHPD) FAI requested contacts.
- f. *Construction*
 - i. It was noted that current re-direction of traffic has not been met well by community in Haumoa. (Mardfin)
 - ii. Temporary by-pass bridges will be considered to avoid disruption of traffic. (DOT/FAI)
- g. *Related Concerns*
 - i. Related concerns will be noted in the Preservation Plan but will not be developed.
 - ii. Excluded:
 - 1. Rockfall mitigation.
 - 2. Statewide Sustainable Landscape Master Plan: Provides guidance on geographical context along DOT's right-of-way. (Outdoor Circle)
 - 3. Driving etiquette: Recommend providing brochure for tourists. (DOT/FAI)
 - a. Possible funding sources for brochure may be Scenic Byways or Maui CLG. (SHPD/FHWA)
 - b. DOT may also be able to fund. (DOT)
- h. *Hawaiian Names*
 - i. Name plates are not extant. Team will look at options for adding names with proper spelling at bridge locations. (FAI)
 - ii. The State can use diacritical markings but will check with the administration. (DOT)
 - iii. Suggestion to check with community if they would prefer no sign v. a sign without diacritical markings, which may be considered "wrong." (Mardfin)
 - iv. Theft and vandalism of signs is a concern that should also be addressed. (Mardfin)
- i. *Section 106*
 - i. In response to FHWA's question if this project will address Section 106, DOT explained that individual construction projects will still go through Section 106. The aim of the Preservation Plan is to guide DOT's planning and to streamline the process. Bridges may also be packaged as a group to streamline the process and in the hopes of reducing costs. (DOT)



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j. Community Input

- i. HHF and SHPD requested a copy of community's comments summary. FAI to provide.
- ii. Concern expressed about lack of services and access for residents if there is a bridge failure; it was noted that Kipahulu required service by helicopter when it was isolated recently. (Mardfin)
- iii. Concerns about roadway access and sharp turns and drops. (Mardfin)
 1. If exact spots are known, information regarding potential safety issues should be provided. (DOT)

IV. Completed Action Items

- a. DOT provided draft of Hawaii Statewide Sustainable Landscape Master Plan: Maui Master Plan. (7/29/2014)
- b. FAI provided community meeting comments summary and meeting matrix to SHPD/HHF. (7/28/2014)

V. ACTION ITEMS

- a. SHPD to provide contact information for ODOT's heritage bridge program.
- b. FAI to investigate brochure funding from Scenic Byways (contact: David Zegenberger) and Maui CLG (contact: Annalise Kehler).
- c. Team to investigate "stealth rail" and crash-tested inset rail options.
- d. Team to contact County Road crew regarding recurring roadway flood areas.



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SIGN IN SHEET

Project: Hana Highway Preservation Plan

Meeting Date: July 25, 2014

Time: 2:00 PM

Location: DOT Office Conference Room 111A/B, Kapolei

Attendees:

NAME	COMPANY	PHONE	EMAIL
Paul Santo <i>PS</i>	Hwy-DB	(808) 692-7611	Paul.Santo@hawaii.gov
Neil Hasegawa <i>NH</i>	Hwy-DB	(808) 692-7610	Neil.S.Hasegawa@hawaii.gov
Domingo Galicinao <i>DG</i>	Federal Highway Administration Hawaii Division	(808) 541-2700 x. 2302	Domingo.Galicinao@dot.gov
Meesa Otani <i>MO</i>	Federal Highway Administration Hawaii Division	(808) 541-2316	meesa.otani@dot.gov
Mike Gushard <i>MG</i>	SHPD Architecture Branch	(808) 692-8026	Michael.J.Gushard@hawaii.gov
Anna Broverman <i>AB</i>	SHPD Architecture Branch	(808) 692-8026	Anna.E.Broverman@hawaii.gov
Jessica Puff <i>JP</i>	SHPD Architecture Branch	(808) 692-8026	Jessica.L.Puff@hawaii.gov
X Kiersten Faulkner	Historic Hawaii Foundation	(808) 523-2900	Kiersten@historichawaii.org
Tanya Gumapac-McGuire <i>TGM</i>	Historic Hawaii Foundation	(808) 523-2900 x. 23	Tanya@historichawaii.org
X David Zegenbergen	Hawaii Scenic Byways Coordinator, State of Hawaii Department of Transportation, Highways Division, Advanced Planning Section	(808) 587-6357	david.l.zegenbergen@hawaii.gov
Joel Kurokawa <i>JK</i>	Outdoor Circle	(808) 593-0300	joelk@kilandarch.com
Douglas Ward Mardfin <i>WM</i>	Hana Community Member	(808) 281-4234 c	mardfin@gmail.com
Tonia Moy <i>TM</i>	Fung Associates, Inc.	(808) 941-3000	Tonia@funghawaii.com
Virginia Murison <i>VM</i>	Fung Associates, Inc.	(808) 536-3320	Virginia@funghawaii.com
Alison Chiu <i>AC</i>	Fung Associates, Inc.	(808) 941-3000	Alison@funghawaii.com
Mayu Ohama <i>MO</i>	Fung Associates, Inc.	(808) 941-3000	Mayu@funghawaii.com
Michelle Cheang <i>MC</i>	Fung Associates, Inc.	(808) 941-3000	Michelle@funghawaii.com

APPENDIX 7

ATTACHMENT 7o

AUGUST 25, 2014

Hana Lani Senior Citizens
Meeting Summary



MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

October 1, 2014

MEETING MEMORANDUM

Date of Meeting: August 25, 2014 (9:30 a.m.)

Meeting Place: Hana Community Center (Old Hana School)
5101 Uakea Road

Participants: See Attached Sign-In Sheet
Charlene Shibuya, (*Munekiyo & Hiraga, Inc.*)

Subject: Hana Highway Historic District, State Department of Transportation
Bridge Preservation Plan

PURPOSE:

The purpose of the meeting was to introduce the Hana Lani Senior Citizen members to the Preservation Plan project for the Hana Highway Historic District and to solicit their initial comments on the plan's objectives and contents. The meeting was also an opportunity to receive input from kupuna who may have valuable historical knowledge on any of the bridges being studied.

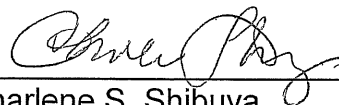
DISCUSSION ITEMS:

1. C. Shibuya projected a PowerPoint presentation to the group, narrating the overview of the project, objectives of the project, its schedule and the role of community involvement in the process. She also explained that the team is looking for seniors or kupuna who may have special historical knowledge on the bridges being studied or who may know of other individuals with such knowledge. She further added that Kauai Kanakaole, (teacher and researcher on

MAUI
305 High Street, Suite 104 Wailuku, Hawaii 96793
PH: (808) 244-2015 FAX: (808) 244-8729
OAHU
735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | PH: (808) 983-1233

water sources) and Melody Cosma (Hawaiian language teacher) has been consulted with on correctness of bridge names with okinas.

2. The presentation also contained photographs of various bridges which C. Shibuya used to illustrate and describe preservation challenges with broken bridge elements, overgrowths, safety, traffic, tourists, and distinctive geographical, historic, and architectural designs.
3. Upon concluding the presentation, questions and comments were received as follows:
 - a. A woman identified as Ulu requested that bridge name signs be painted on the bridge. C. Shibuya responded that this request has been brought up previously and the team and State Department of Transportation (DOT) are looking into the best method of achieving this.
 - b. A. Gilbert asked if bridges will keep its looks. C. Shibuya explained that structural elements that can be repaired or rehabilitated will retain its historic look. If elements cannot be structurally repaired and has to be replaced, then its historic features will be duplicated.
 - c. A. Gilbert questioned the difference between a box culvert and a bridge. C. Shibuya explained that a box culvert is usually a rectangular shaped concrete structure under the roadway versus a bridge which spans over a larger defined gulch.
4. After concluding the bridge preservation plan presentation, C. Shibuya offered the group to take home a Contact Information sheet so people can call or email comments and/or questions later.
5. The group was thanked and reminded that the consultant team would be back in January 2015 for a second round of meetings to present their findings and preliminary preservation plan recommendations for each bridge and culvert.



Charlene S. Shibuya
Senior Associate

CSS:yp

K:\DATA\Nagamine\HanaHwyBridgePreserv\08.25.14meetingmemo.HLSeniorCit.doc

Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District
Public Informational Meeting with Hana Lani Senior Citizen
Monday, August 25, 2014 – 9:30 a.m.
Old Hana School Cafeteria
Attendance Sheet

PLEASE PRINT LEGIBLE

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS OR OTHER CONTACT INFORMATION	ORGANIZATION (IF APPLICABLE)	PHONE NUMBER
1.	Carolyn Fuhrmann			Hana Lani	
2.	Myrna S. Costello			Hana Lani Senior Club	
3.	Kelly Hill			Hana Lani	
4.	Amy Oliveira			Hana Lani	
5.	Veronica Lind			Hana Lani	
6.	Lorraine Akoi			Hana Lani	
7.	Milton Kawaiaka			Hana Lani	
8.	Ida K. Oliveira			Hana Lani	
9.	John Kawaiaka			Hana Lani	
10.	Yvette Samson			Hana Lani	
11.	Joloyce Kaita			Hana Lani	

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PLEASE PRINT LEGIBLY

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS OR OTHER CONTACT INFORMATION	ORGANIZATION (IF APPLICABLE)	PHONE NUMBER
12.	Masa Hashimoto			Hana Lani Sr.	
13.	Annie Gilbert			10 10 11	
14.	Susan Hankins			10 10 11	
15.	David Hunkins			10 10 11	
16.					
17.					
18.					
19.					
20.					
21.					
22.					

APPENDIX 7

Index 1

(Exhibit “1”) Draft
May 2014 Fact Sheet

Preservation Plan Project for Bridges Within the Hana Highway Historic District

**A Project of the State of Hawaii,
Department of Transportation**

May 2014

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by Muneldyo & Hiraga, Inc



The Project Team:

- State Department of Transportation, Highways Division
- Nagamine Okawa Engineers, Inc.
 - Prime Consultant and Structural Engineers
- Fung Associates, Inc.
 - Architectural Preservation Specialists
- Austin Tsutsumi & Associates, Inc.
 - Traffic and Civil Engineers
- Ronald N.S. Ho & Associates, Inc.
 - Electrical Engineers
- Munekiyo & Hiraga, Inc.
 - Planning and Community Outreach Consultants
- Cultural Surveys Hawaii
 - Archaeological & Cultural Consultants

Overall Project Purpose:

- Develop a preservation plan for approximately 50 bridges and 12 box culvert structures found within the Hana Highway Historic District.
- Assist HDOT with context sensitive design philosophies
 - Gather public input early in the planning process
 - Take a holistic approach to preservation of entire district

Purpose of this Meeting:

- To introduce the project and its objectives to affected and interested stakeholders
- To explain how the project will be conducted
- To receive early input from stakeholders

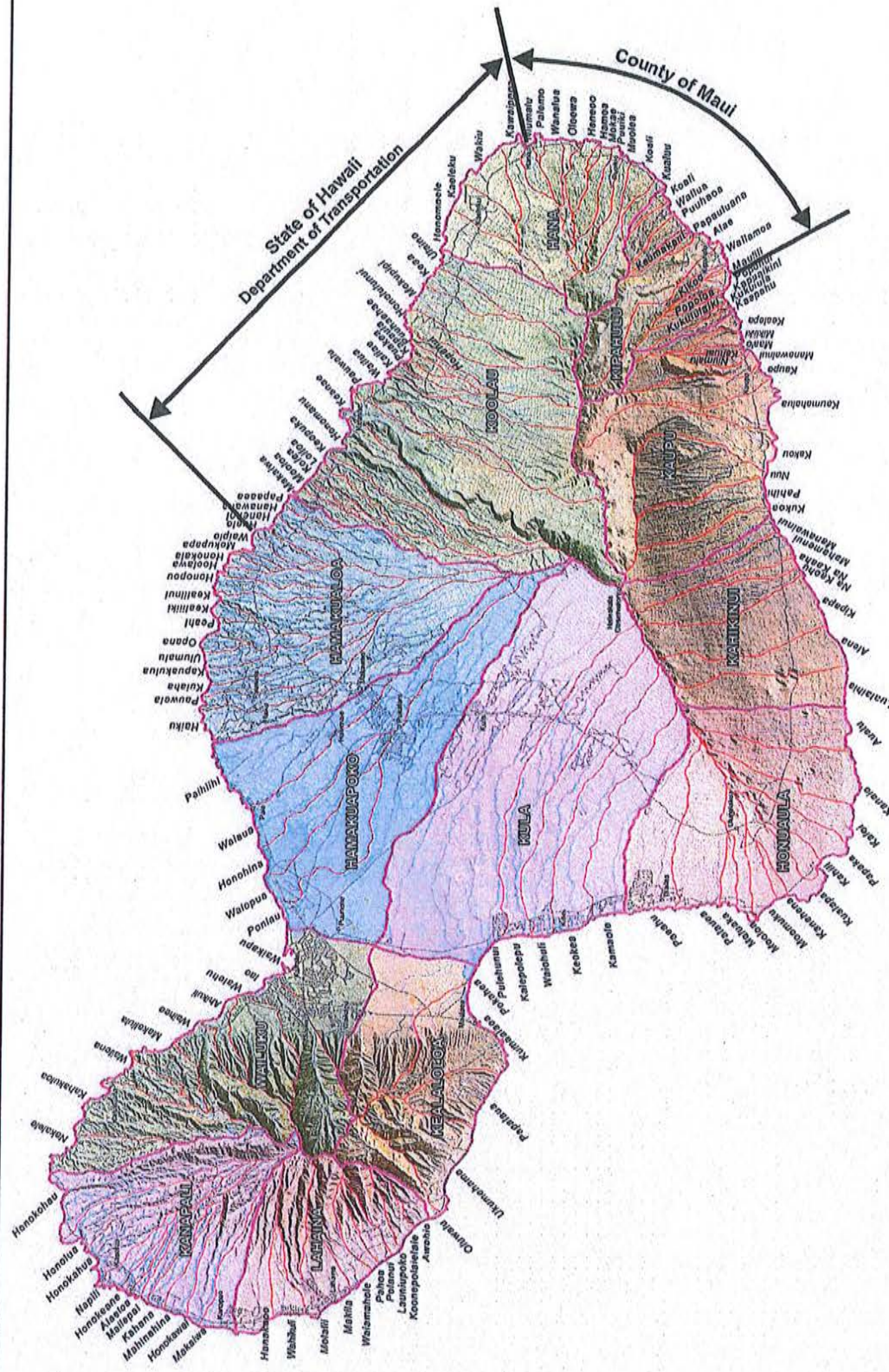
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- **May 2014 to September 2014**
 - Data gathering, site visits, and detailed studies
 - Community-Wide Meeting (June/July 2014)
- **October 2014 to June 2015**
 - Prepare bridge preservation concepts and drawings
 - Community-Wide Meeting (January 2015)

- **July 2015 to September 2015**
 - Prepare report with recommendations
 - Community-Wide Meeting (July 2015)

The Hana Highway Historic District:

- The Hana Highway Historic District extends from milepost 2.8, shortly before Hō‘alua Bridge near Huelo to Kalepa Gulch past Kipahulu, approximately milepost 51 of Pi‘ilani Highway. Koukou‘ai Bridge is the last bridge in the Historic District. The width of the District is the historic highway right-of-way (approximately 40’ but varies).
- The Hana Highway Historic District is listed on the Hawaii Register of Historic Places and the National Register of Historic Places
- The scope of this preservation plan project is defined by those State bridges within the Historic District, from Hō‘alua Stream Bridge to Kawaipapa Stream Bridge in Hana.



NOT TO SCALE



Never as Headstrong as you are!

Hana Highway Historic District Overlaid on 'Ahupua'a Map

Source: www.islandbreath.org

Prepared for: State of Hawaii, Department of Transportation

Specific Project Objectives:

- Study the affected bridges to document each bridge's historic character
- Evaluate each bridge with respect to condition and public safety considerations
- Develop a community and agency consultation process to ensure that input is received regarding the bridge evaluation and preservation process
- Prepare recommendations for historic preservation for each bridge considering historic qualities, public safety, funding options, and community/agency input

List of Bridges to be Evaluated

Bridge Name	Mile Post	Year Constructed
Hoalua Stream Bridge	5.07	1929
Kailua Stream Bridge	5.85	1929
Nailiilihaele Stream Bridge	6.20	1930
Oopuola Stream Bridge	7.92	1925
Makanali Stream Bridge	8.22	1928
Kaaiea Stream Bridge	8.55	1928
Waikamoi Stream Bridge	9.86	1912
Puohokamoa Stream Bridge	10.95	1912
Hillside Bridge No. 1	11.40	2003
Haipuaena Stream Bridge	11.42	1912
Hillside Bridge No. 2	12.80	2003
Hillside Bridge No. 3	12.83	2003
Kolea (Punalau Stream) Bridge	13.13	1911
Honomanu Stream Bridge	13.68	1911
Hillside Bridge No. 4	14.30	2003
Nuaailua Stream Bridge	15.34	1911
Piinaau Stream Bridge	16.56	1916
Palauhulu Stream Bridge	16.73	1916
Waiokamilo Stream Bridge	18.09	1921
Hillside Bridge No. 5	19.10	2004
Hillside Bridge No. 6	19.20	2001
Waikani Stream Bridge	19.35	1926
Hillside Bridge No. 7	19.80	2003
West Wailuaiki Stream Bridge	20.78	1926
East Wailuaiki Stream Bridge	21.23	1926
Kopiliula Stream Bridge	21.73	1926
Puaakaa Stream Bridge	22.23	1926
Waiohue Stream Bridge	22.41	1937
Unknown Stream No.1 Bridge (Waiohuolua)	22.86	1920
Unknown Stream No. 2 Bridge	22.89	1920
Unknown Stream No. 3 (Paakea) Bridge	22.91	1920
Kapaula Bridge	23.31	1926

Bridge Name	Mile Post	Year Constructed
Hanawi Stream Bridge	23.93	1926
East Hanawi Stream Bridge	24.10	1926
Makapipi Stream Bridge	24.92	1926
Kuhiwa Stream Bridge	25.14	1926
Kupukoi Stream Bridge	25.36	1926
Kahalaowaka Bridge	25.89	1926
Pupape Stream Bridge	26.42	1926
Kahawaihapapa Stream Bridge	26.54	1922
Keaaiki Stream Bridge	26.70	1921
West Waioni Stream	26.87	1920
Waioni Stream Bridge	26.92	1920
Lanikele Stream Bridge	27.69	1917
Heleleikeoha Stream Bridge	27.85	1917
Ulaino Stream Bridge	27.92	1914
Mokulehua Stream Bridge	28.25	1908
Oilowai Stream Bridge	29.12	1914
Honomaele Stream Bridge	29.47	1924
Kawaipapa Stream Bridge	33.37	1947

List of Culverts to be Evaluated

Culvert Name	Mile Marker	Year Constructed
Culvert No. 1	7.03	unknown
Culvert No. 2	17.48	circa 1937-1940
Culvert No. 3	17.53	circa 1937-1940
Culvert No. 4	17.55	circa 1937-1940
Waiokamilo Culvert	18.00	unknown
East Hanawi Culvert	24.20	unknown
Culvert No. 5	29.85	unknown
Culvert No. 6	30.09	unknown
Culvert No. 7	30.20	unknown
Culvert No. 8	30.57	unknown
Culvert No. 9 (Holoinawawae Stream)	33.74	1915
Culvert No. 10	34.00	1915

APPENDIX 7

Index 2

(Exhibit “1”) Final
June 2014 Fact Sheet

Preservation Plan Project for Bridges Within the Hana Highway Historic District

**A Project of the State of Hawaii,
Department of Transportation**

June 2014

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- The Hana Highway Historic District is listed on the Hawaii Register of Historic Places and the National Register of Historic Places
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- Study the affected bridges to document each bridge's historic character
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APPENDIX 7

Index 3

(Exhibit “1”) (Revised)
Final June 2014 Fact Sheet

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**A Project of the State of Hawaii,
Department of Transportation**

June 2014

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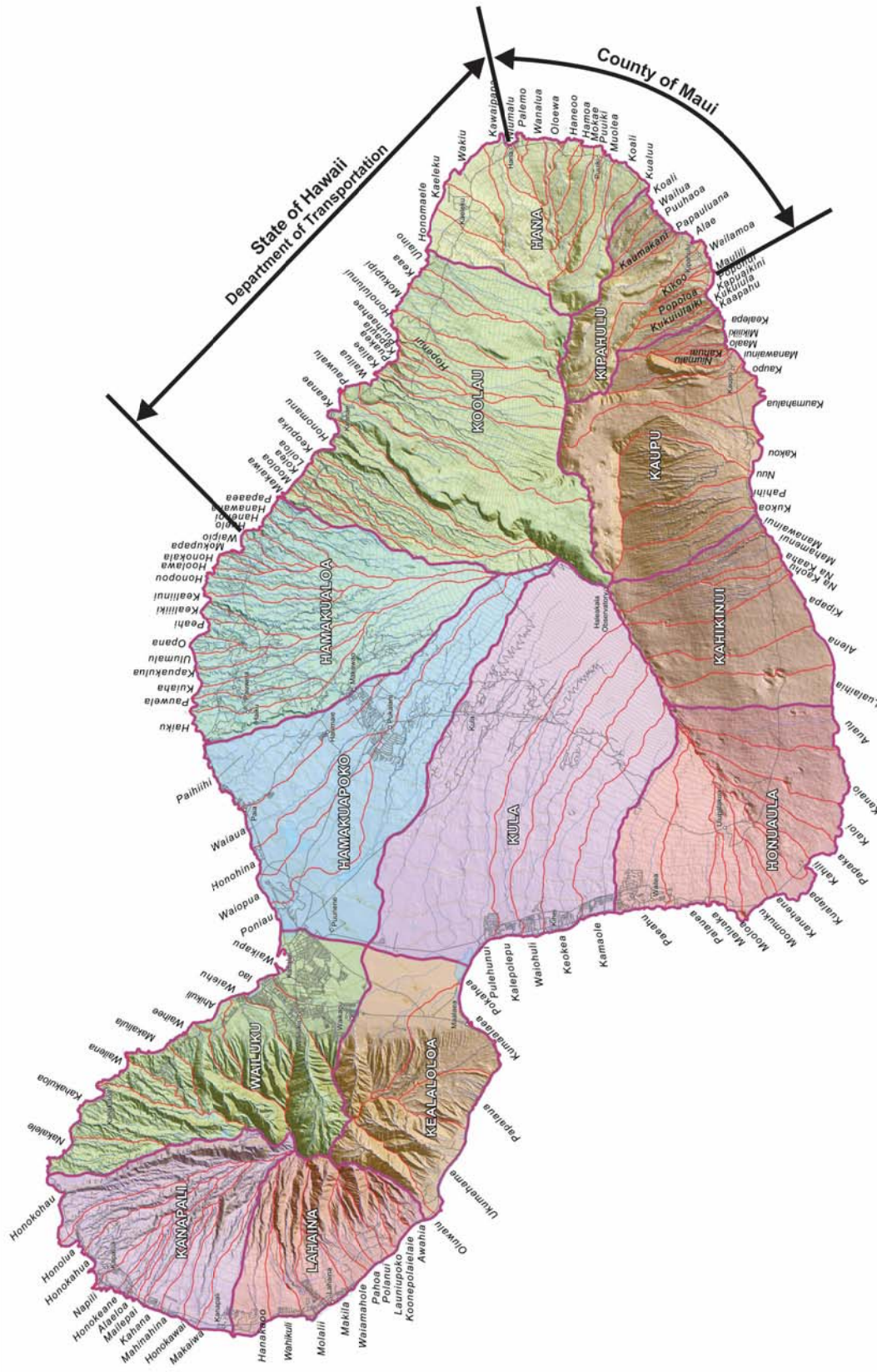
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Source: www.islandbreath.org



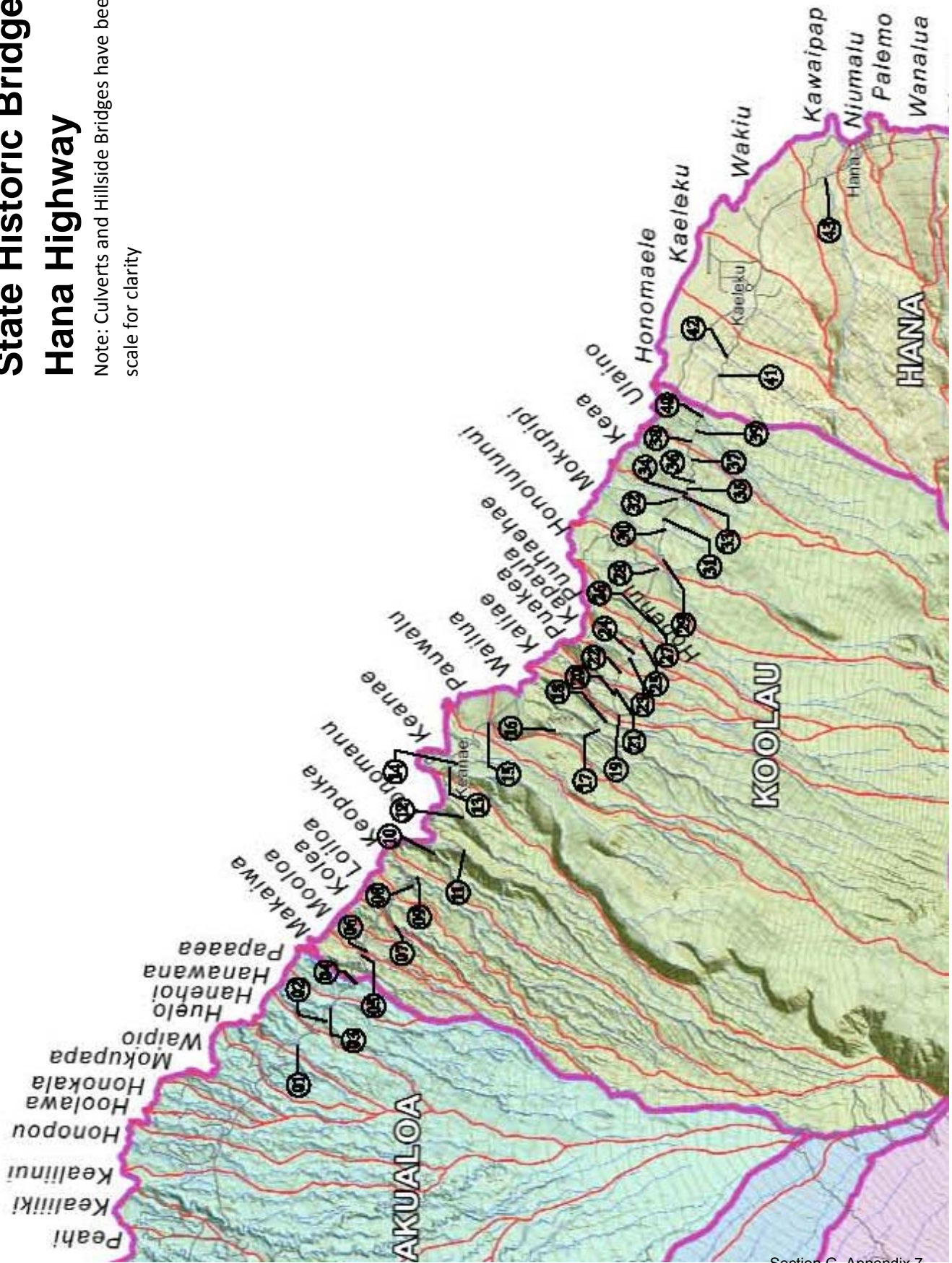
Hana Highway Historic District Overlaid on 'Ahupua'a Map

NOT TO SCALE

Prepared for: State of Hawaii, Department of Transportation

State Historic Bridges along Hana Highway

Note: Culverts and Hillside Bridges have been omitted at this scale for clarity



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Kapaula Bridge	23.31	1926

Bridge Name	Mile Post	Year Constructed
Hanawi Stream Bridge	23.93	1926
East Hanawi Stream Bridge	24.10	1926
Makapipi Stream Bridge	24.92	1926
Kuhiwa Stream Bridge	25.14	1926
Kupukoi Stream Bridge	25.36	1926
Kahalaowaka Bridge	25.89	1926
Pupape Stream Bridge	26.42	1926
Kahawaihapapa Stream Bridge	26.54	1922
Keaaiki Stream Bridge	26.70	1921
West Waioni Stream	26.87	1920
Waioni Stream Bridge	26.92	1920
Lanikele Stream Bridge	27.69	1917
Heleleikeoha Stream Bridge	27.85	1917
Ulaino Stream Bridge	27.92	1914
Mokulehua Stream Bridge	28.25	1908
Oilowai Stream Bridge	29.12	1914
Honomaele Stream Bridge	29.47	1924
Kawaipapa Stream Bridge	33.37	1947

List of Culverts to be Evaluated

Culvert Name	Mile Marker	Year Constructed
Culvert No. 1	7.03	unknown
Culvert No. 2	17.48	circa 1937-1940
Culvert No. 3	17.53	circa 1937-1940
Culvert No. 4	17.55	circa 1937-1940
Waiokamilo Culvert	18.00	unknown
East Hanawi Culvert	24.20	unknown
Culvert No. 5	29.85	unknown
Culvert No. 6	30.09	unknown
Culvert No. 7	30.20	unknown
Culvert No. 8	30.57	unknown
Culvert No. 9 (Holoinawawae Stream)	33.74	1915
Culvert No. 10	34.00	1915

APPENDIX 7

Index 4

(Exhibit “2”) Site Photos

Preservation Challenges

Condition



9 HAIPUAENA
broken parapet



33 KAHAWAIHAPAPA
broken parapet



11 HONOMANU
exposed re-bar / spalling



23 UNNAMED BRIDGE
broken wing wall

Preservation Challenges

Overgrowth



21 WAIOHUE
overgrowth ferns

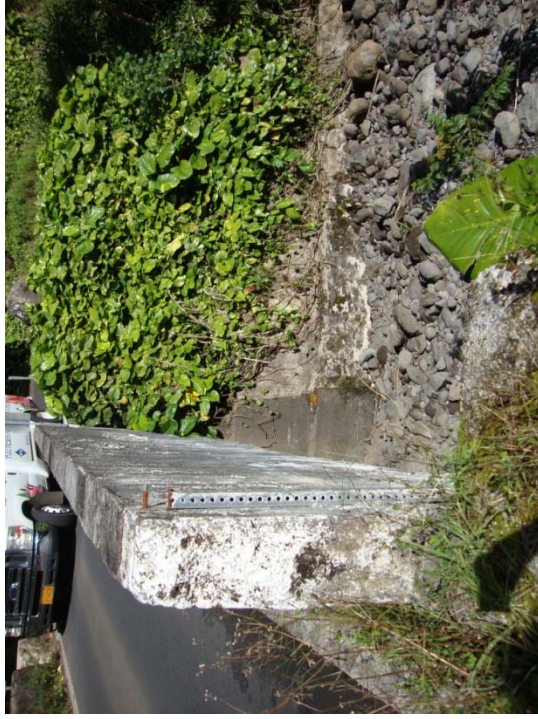


40 MOKULEHUA
overgrowth ferns



39 ULAINO
overgrowth moss

Safety



10 KOLEA-PUNALAU
missing reflectors



30 KUPUKOI
missing parapet/wing wall/guardrail



22 UNNAMED BRIDGE 1 - WAIOHUOLUA
"W" guardrail attachment



16 WAIKANI
traffic/tourists

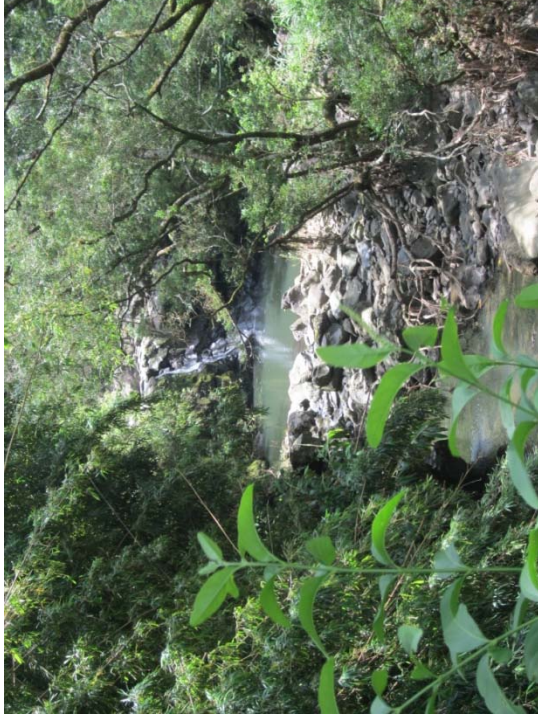
Preservation Challenges

Adjacent/Geographical Features & Historic Sites



16 WAIKANI

view/scenery/waterfalls



7 WAIKAMOI

view/scenery/waterfalls



19 KOPILIULA

east Maui irrigation



14 PALAUHULU

swimming hole

Distinctive Bridge Types



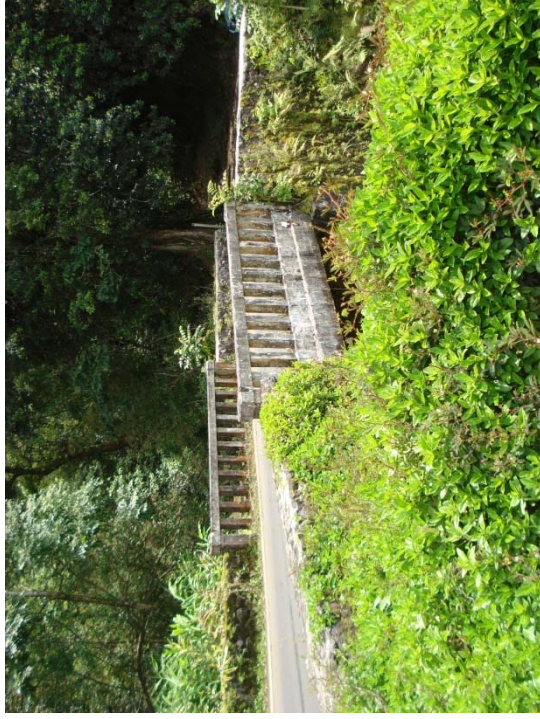
16 WAIKANI
open spandrel concrete arch



10 KOLEA-PUNALAU
concrete tee-beam



26 HANAWI
single span concrete arch



5 MAKANALI
flat slab

APPENDIX 7

Index 5

PowerPoint Slide Presentation

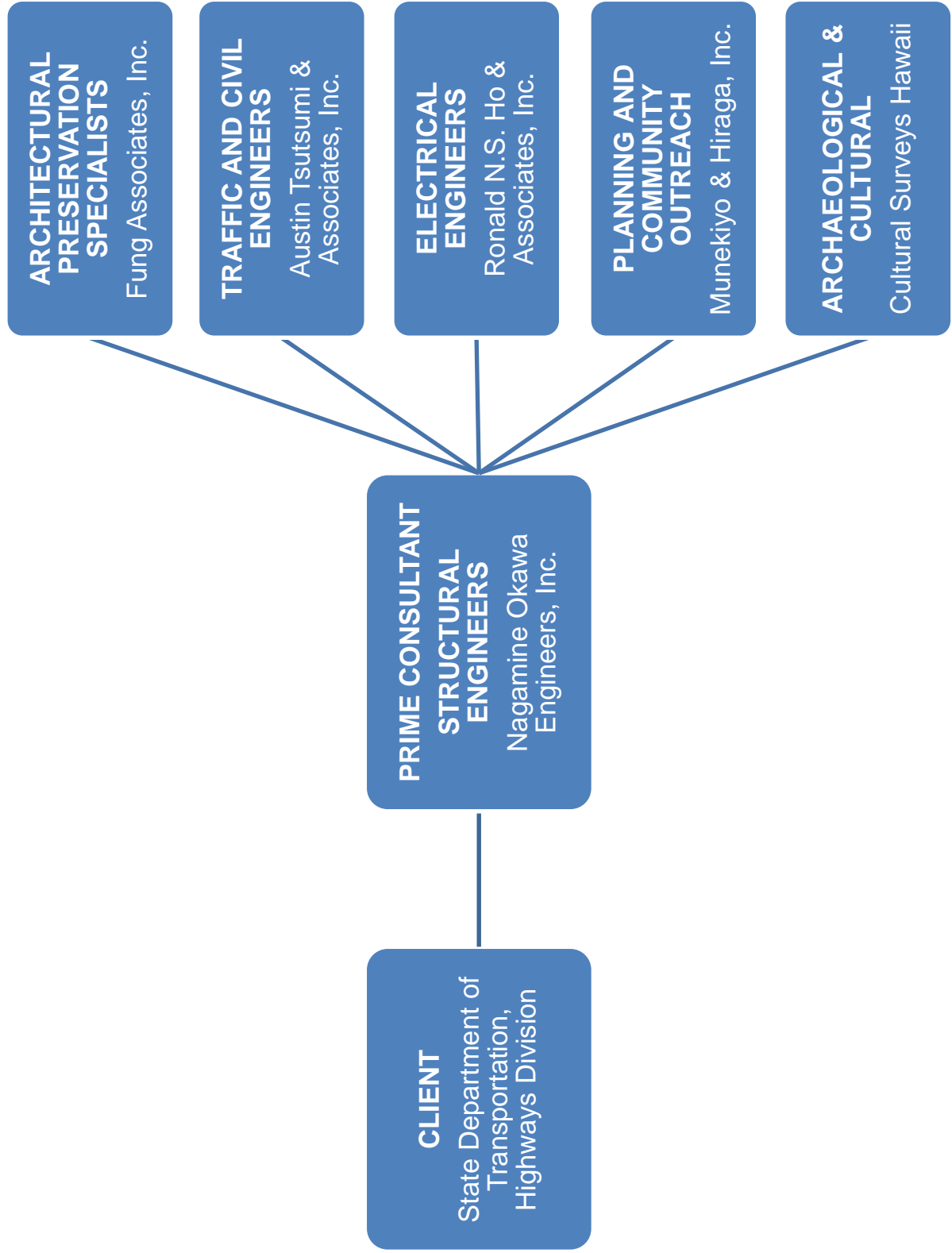
Preservation Plan Project for Bridges Within the

Hana Highway Historic District



a project of the
State of Hawaii
Department of Transportation

The Project Team



Overall Project Purpose



Preservation Plan

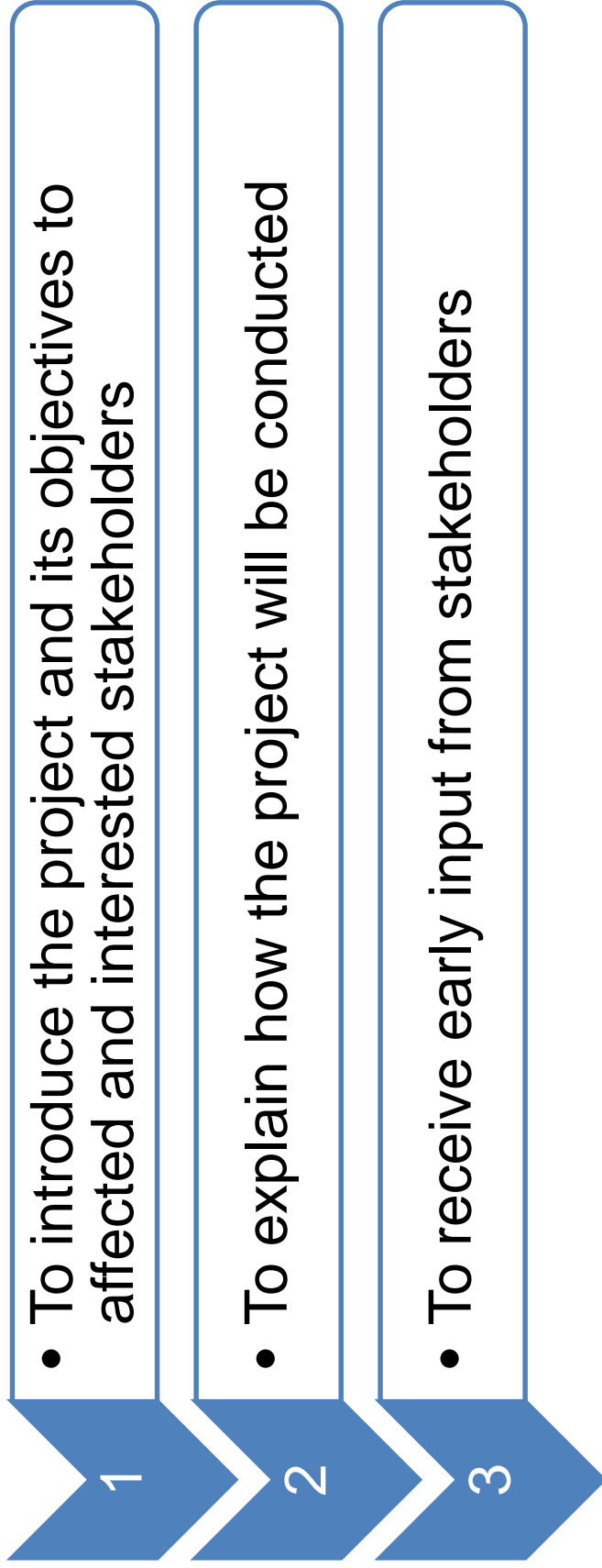
- Develop a preservation plan for approximately 50 bridge structures and 12 box culvert structures found within the Hana Highway Historic District.



Context Sensitive Design

- Assist HDOT with context sensitive design philosophies:
 - Gather public input early in the planning process
 - Take holistic approach to entire district

Purpose of this Meeting



Tentative Project Schedule

2014

MAY - SEPTEMBER

- Data gathering, site visits, and detailed studies
- Community-wide Meetings (June/July 2014)

2014 - 2015

OCTOBER - JANUARY

- Prepare bridge preservation concepts and drawings
- Community-wide Meetings (January 2015)

2015

FEBRUARY - JULY

- Prepare report with recommendations
- Community-wide Meetings (July 2015)

The Hana Highway Historic District

1

- Extends from milepost 2.8 shortly before Hōʻalua Bridge near Huelo to Kalepa Gulch past Kipahulu, approximately milepost 51 of Piʻilani Highway.

2

- Koukouʻai Bridge is the last bridge in the Historic District.

3

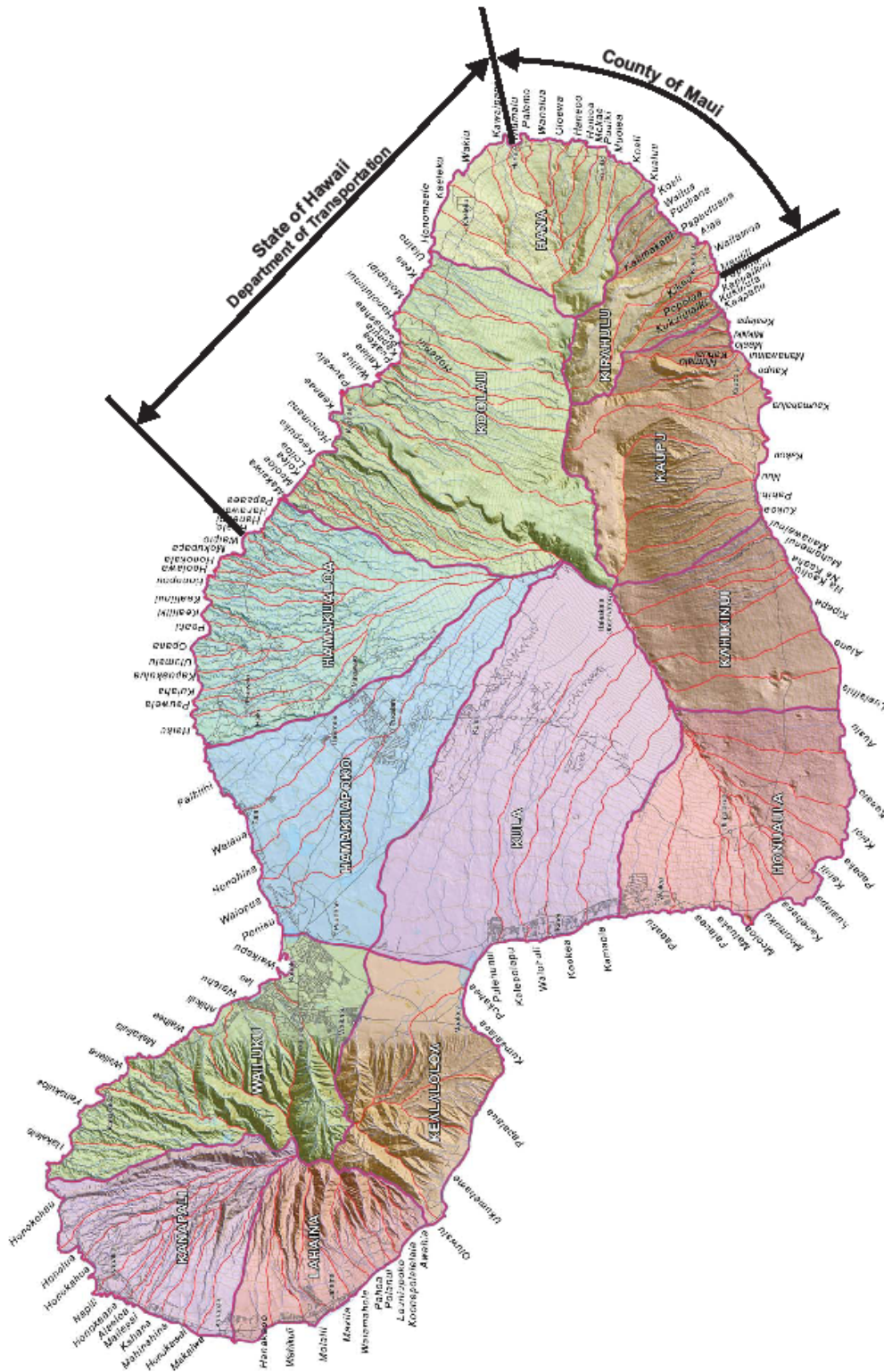
- The width of the district is the historic highway right-of-way (approximately 40ʻ but varies).

4

- Is listed on the Hawaii Register of Historic Places and the National Register of Historic Places.

5

- The scope of this preservation plan project is defined by those State bridges within the historic district, from Hōʻalua Stream Bridge to Kawaipapa Stream Bridge in Hana.



Hana Highway Historic District Overlaid on 'Ahupua'a Map

NOT TO SCALE



Section G, Appendix 7

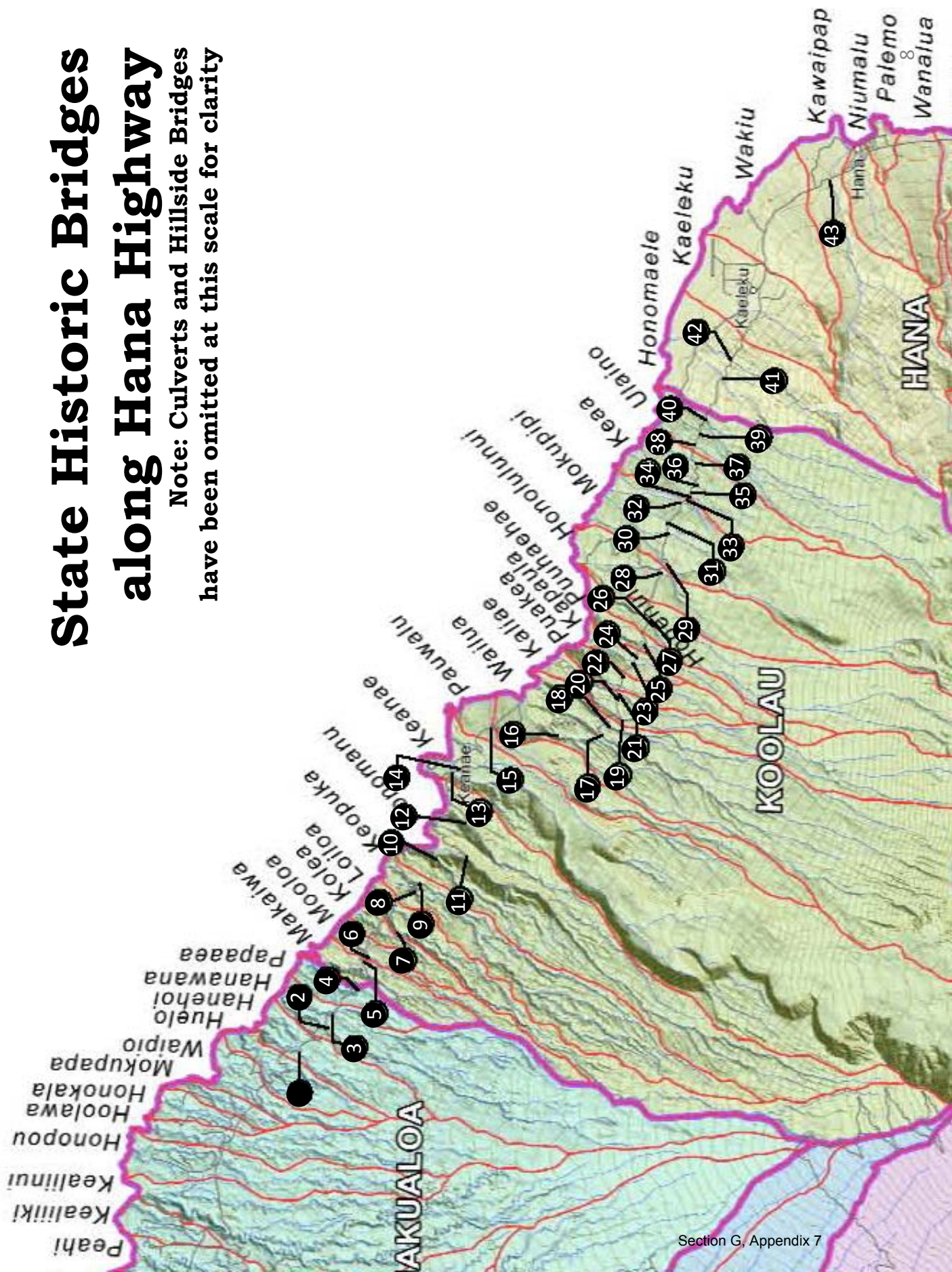
Prepared for: State of Hawaii, Department of Transportation



Map prepared by Munekiyo & Hiraga, Inc. on 10/1/2010

State Historic Bridges along Hana Highway

Note: Culverts and Hillside Bridges have been omitted at this scale for clarity



Specific Project Objectives

1

- Study the affected bridges to document each bridge's historic character.

2

- Evaluate each bridge with respect to condition and public safety considerations.

3

- Develop a community and agency consultation process to ensure that input is received regarding the bridge evaluation and preservation process.

4

- Prepare recommendations for historic preservation for each bridge considering historic qualities, public safety, funding options, and community/agency input.

List of Bridges to be Evaluated

No.	Bridge Name	Mile Marker	Year Constructed
1	Hoalua Stream Bridge	5.09	1929
2	Kailua Stream Bridge	5.86	1929
3	Nā'ili'iilihaele Stream Bridge	6.22	1930
4	'O'opuola Stream Bridge	7.94	1925
5	Makanali Stream Bridge	8.24	1928
6	Ka'aiea Stream Bridge	8.57	1928
7	Waikamoi Stream Bridge	9.88	1911
8	Puohokamoa Stream Bridge	10.97	1912
--	Hillside Bridge No. 1	11.40	2003
9	Haipua'ena Stream Bridge	11.44	1912
--	Hillside Bridge No. 2	12.80	2003
--	Hillside Bridge No. 3	12.83	2003
10	Punalau Stream (Kolea) Bridge	13.16	1911
11	Honomanū Stream Bridge	13.71	1911

List of Bridges to be Evaluated

Continued...

No.	Bridge Name	Mile Marker	Year Constructed
--	Hillside Bridge No. 4	14.30	2003
12	Nua'ailua Stream Bridge	15.39	1911
13	Pi'ina'au Stream Bridge	16.60	1916
14	Palauhulu Stream Bridge	16.77	1916
15	Waiokamilo Stream Bridge	18.07	1921
--	Hillside Bridge No. 5	19.10	2004
--	Hillside Bridge No. 6	19.20	2001
16	Waikani Stream Bridge	19.39	1926
--	Hillside Bridge No. 7	19.80	2003
17	West Wailuaiki Stream Bridge	20.83	1937
18	East Wailuaiki Stream Bridge	21.30	1926
19	Kopili'ula Stream Bridge	21.81	1926
20	Puaka'a Stream Bridge	22.31	1926

List of Bridges to be Evaluated

Continued...

No.	Bridge Name	Mile Marker	Year Constructed
21	Waiohue Stream Bridge	22.47	1937
22	Unknown Stream No.1 Bridge	22.95	1920
23	Unknown Stream No. 2 Bridge	23.00	1920
24	Unknown Stream No. 3 (Pa'akea) Bridge	23.01	1920
25	Kapa'ula Bridge	23.39	1926
26	Hanawī Stream Bridge	23.99	1926
27	East Hanawī Stream Bridge	24.16	1926
28	Makapipi Stream Bridge	24.98	1926
29	Kuhiwa Stream Bridge	25.20	1926
30	Kupukoi Stream Bridge	25.42	1926
31	Unnamed Stream (Kahalaowaka) Bridge	25.95	1926

List of Bridges to be Evaluated

Continued...

No.	Bridge Name	Mile Marker	Year Constructed
32	Pupape (Manawaikeae) Stream Bridge	26.48	1926
33	Kahawaihāpapa Stream Bridge	26.60	1922
34	Kea'aiki Stream Bridge	26.77	1921
35	West Waioni Stream	26.94	1920
36	Waioni Stream Bridge	27.01	1920
37	Lanikele Stream Bridge	27.76	1917
38	Helele'ike'ōhā Stream Bridge	27.92	1917
39	'Ula'ino Stream Bridge	27.98	1914
40	Mokulehua Stream Bridge	28.31	1908
41	Oilowai Stream Bridge	29.18	1914
42	Honomā'ele Stream Bridge	29.54	1924
43	Kawaipapa Stream Bridge	33.44	1947

List of Culverts to be Evaluated

Bridge Name	Mile Marker	Year Constructed
Culvert No. 1	7.05	unknown
Culvert No. 2	17.48	circa 1937-1940
Culvert No. 3	17.53	circa 1937-1940
Culvert No. 4	17.55	circa 1937-1940
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Culvert No. 9	33.74	1915
Culvert No. 10	34.00	1915

Preservation Challenges . . .

Condition



9 HAIPUAENA
broken parapet



33 KAHAWAIHAPAPA
broken parapet



11 HONOMANU
exposed re-bar / spalling



23 UNNAMED BRIDGE
broken wing wall

Overgrowth



21 WAIOHUE
overgrowth ferns



39 ULAINO
overgrowth moss



40 MOKULEHUA
overgrowth ferns

Safety



10 KOLEA-PUNALAU
missing reflectors



30 KUPUKOI
missing parapet/wing wall/guardrail



22 UNNAMED BRIDGE 1 - WAIOHUOLUA
“W” guardrail attachment



16 WAIKANI
traffic/tourists

Adjacent/Geographical Features & Historic Sites



16 WAIKANI
view/scenery/waterfalls



7 WAIKAMOI
view/scenery/waterfalls



19 KOPILIULA
east Maui irrigation



14 PALAUHULU
swimming hole

Distinctive Bridge Types



16 WAIKANI
open spandrel concrete arch



10 KOLEA-PUNALAU
concrete tee-beam



26 HANAWI
single span concrete arch



5 MAKANALI
flat slab

Questions/Comments?

APPENDIX 7

ISSUES MANAGEMENT MATRIX

Project Initiation Stage
(May to August 2014)

Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

First Cycle of Community Meetings (May to August 2014)

No.	Origin	Meeting Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
1	Nalani Kaaahamo							
1(a)	Telephone Conference	5/7/14		Need names on all the bridge structures or sign designating its name. They've talked to Bill Medeiros (Mayor's office) before.	Other	HDOT	We are continuing to track names, spelling and a proposed design, possibly in the CRM walls, along with community input. Refer to Item Nos. 3(c) & 4(p) below. As the bridges are rehabilitated, appropriate means of attaching a bridge name will be devised.	4/6/15 via telephone
2	AHA MOKU ADVISORY COMMITTEE - Maui Po'o (Kyle Nakanelua)							
2(a)	Individual Meeting	6/6/14		i) Most important to keep traffic flowing so residents can get to and from work	Traffic	HDOT, ATA	The Preservation Plan (herein after referred to as "The Plan") verifies existing traffic volumes to develop an effective Traffic Management Plan. It gives future designers of any specific bridge or culvert a general approach for phasing traffic control and detours during construction. See Chapter 5, <i>Public Safety</i> . Also, The Plan recommends temporary bypass bridges and use of detours as much as possible. Additional discussion concerning traffic routing options are included in Chapter 6, <i>Related Issues Along the Hana Highway</i> .	See Attachment "A", 2/19/2015 letter response.
2(b)				ii) Hana Highway has too many bicyclist on a road that does not have enough room	Traffic	HDOT, NOEL, ATA	HDOT has to reasonably accommodate all modes of transportation which also include bicyclists. There are challenges to comfortably accommodate cyclist due to the narrow, windy, and steep road inclines. See discussion in Chapter 6, <i>Related Issues Along the Hana Highway</i> . The Plan is limited to the bridges/culverts and does not include the entire Hana Highway. However, as road improvement projects are undertaken along the route such as resurfacing, HDOT has been paving the shoulders where space is available. This will allow cyclists, as well as, slow driving tourists to pull over and allow other drivers to pass.	Refer to Attachment "A", 2/19/2015 letter response.

* Categories: Archaeological, Historic, Cultural, Architectural, Traffic, Aesthetic, Environmental, Legislative, Other
 ** Responsible Teams:
 ATA Austin Tsutsumi & Associates, Inc.
 CSH Cultural Surveys of Hawaii
 FAI Fung Associates, Inc.
 HDOT Hawaii Department of Transportation
 MH Munkioy Hiraga
 NOEL Nagamine Okawa Engineers, Inc.
 RNSH Ronald N.S. Ho & Associates, Inc.

Note: Italicized verbiage are responses provided by the presenters at each meeting. Verbiage noted in regular red text are responses/actions developed after further evaluation of bridge sites and preliminary recommendations were formulated.

Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

First Cycle of Community Meetings (May to August 2014)

No.	Origin	Meeting Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
2(c)				iii) A lot more tourist on Hana Highway than before	Traffic	HDOT, FAL, NOEI, ATA	<p>The number of tourist travelling on Hana Highway has probably increased over the years. HDOT acknowledges the problem of tourists unfamiliar with the windy road drive too slow without allowing local residents to pass.</p> <p>There is a recommendation in the Plan in Chapter 6, <i>Related Issues Along the Hana Highway</i> regarding collaborating with rental car companies, airlines, travel experience companies and the Hawaii Tourism Authority to develop and provide travel literature to educate visitors on driving etiquette along Hana Highway. A small example is included in the <i>Maui Visitor Guide</i> magazine publication which has in their Hana coverage, "Tips for the Trip to Hana: Enjoy a relaxed pace on the road, but pull over often to wave local drivers by – they've seen the sights before and prefer to hurry home".</p>	Refer to Attachment "A", 2/19/2015 letter response.
3	HANA CULTURAL CENTER AND MUSEUM BOARD							
3(a)	Presentation at regular board meeting	6/19/14	Janet Six (board member)	i) Will preservation design consider replacing guardrails with design features which are more historic?	Historic	FAL	<i>T. Moy - This kind of evaluation will be part of process and recommendations on how to address guardrails will be part of plan.</i>	6/19/2014

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

First Cycle of Community Meetings (May to August 2014)

No.	Origin	Meeting Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered See Attachment "B", 2/18/2015 letter response.
3(b)				ii) Reiterated slow-moving traffic concern and noted that car rental companies should inform customers of roadway etiquette on Hana Highway.	Traffic	HDOT	HDOT acknowledges the problem of tourists unfamiliar with the windy road drive too slow without allowing local residents to pass. There is a recommendation in the Plan in Chapter 6, <i>Related Issues Along the Hana Highway</i> for HDOT regarding collaborating with rental car companies, airlines, travel experience companies and the Hawaii Tourism Authority to develop and provide travel literature to educate visitors on driving etiquette along Hana Highway. A small example is included in the <i>Maui Visitor Guide</i> magazine publication which has in their Hana coverage, "Tips for the Trip to Hana: Enjoy a relaxed pace on the road, but pull over often to wave local drivers by – they've seen the sights before and prefer to hurry home".	
3(c)			Scott Crawford (Trustee)	i) Recommended contact with resident Kaui Kanakaole who is very knowledgeable on region's local history and culture.	Historic & Cultural	MHI	Met with Kaui at her residence on 7/22/14 to discuss the project and consult on questions that have come up thus far on names of bridges and streams in the Hana region.	Refer to Attachment "B", 2/18/2015 letter response.
3(d)				ii) Does team have overall understanding of bridge conditions?	Other	FAI	V. Murison explained that team has bridge inspection reports, but the plan will look at conditions in greater detail while keeping in mind criteria of historic character & safety. T. Moy - HDOT may have a better understanding of higher priority bridges needing repair or rehabilitation.	6/19/2014
3(e)				iii) Will traffic control signs be part of study? Cites problem with slow-moving traffic that needs reminders to pull over if traffic backing behind them. Problem is especially bad at bridges where multiple vehicles may be parked or slowing to observe scenic views.	Traffic	HDOT	The Plan is a planning document that leaves the more detailed design to the design team that will later be tasked with applying the Plan's principles. See Chapter 4, <i>Design Guidelines</i> and Chapter 5, <i>Public Safety</i> . The Plan addressed traffic control signs specific to temporary work zone application and permanent signage and striping to address basic traffic control devices standards. The Plan is limited to the bridges/culverts and does not include the entire Hana Highway. See Action/Response in Item No. 3(b).	Refer to Attachment "B", 2/18/2015 letter response.

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

First Cycle of Community Meetings (May to August 2014)

No.	Origin	Meeting Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
3(f)			Myrna Costello (Treasurer)	i) Is work within Hana Highway Historic District governed by Federal rules?	Other	FAL, NOEI	Note that both the Maui Island Plan (MIP) and the Hana Community Plan recommend implementing a Hana Roadway Management Plan including 'comprehensive roadway signage'.	
3(g)				ii) Concerned on ability of bridges to maintain their structural integrity over time. Catastrophic failure will hurt entire community.	Other	HDOT	Refer to Chapter 1.iv. Regulatory Background. HDOT has a program that applies National Bridge Inspection Standards that was established in 1971. Certified bridge inspectors has been conducting inspections every two years and carefully monitor the integrity of all bridges throughout the island. HDOT's Bridge Engineer oversees the program that structurally assesses the bridges and establishes a priority for rehabilitation or replacement. Hana Highway bridges, due to their limited weight capacities, have a 10 ton weight limit and HDOT Maui ensures vehicle weight limits are complied with through their Application to Operate Oversized and Overweight Vehicles on State Highways permit process.	Refer to Attachment "B", 2/18/2015 letter response.
3(h)				iii) Will study consider traffic problems because of high traffic volume?	Traffic	FAL	T. Moy - Yes. Work on any bridges will have to conform with the preservation plan. T. Moy - Team includes a traffic engineer and evaluation will be part of plan.	6/19/2014
3(i)			Esse Sinenci (Recording Secretary)	How will decisions be made when undertaking work?	Historic	FAL	T. Moy - Depending on situation, repairs will be done before considering replacement. For replacements, goal is to replicate the bridge design to the extent practicable so historic integrity not compromised.	6/19/2014

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

First Cycle of Community Meetings (May to August 2014)

No.	Origin	Meeting Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
3(j)			Martha Yacht (Greeter)	i) Is realignment of the roadway needed in any instance?	Other	FAI	<i>T. Moy - Goal of the plan is to respect the existing highway ROW to avoid realignment.</i>	6/19/2014
3(k)				ii) What is a "Hillside Bridge"?	Other	MHI, FAI	<i>Team - Structures which were constructed to provide stability of widened roadway sections due to slope erosion, are being considered as part of the plan.</i>	6/19/2014
4	HANA COMMUNITY ASSOCIATION							
4(a)	Presentation at regular monthly meeting	6/19/14	Joan Mardfin	Pointed out hillside erosion at Mile Marker 21. Is addressing that issue part of the project's scope?	Other	HDOT	<i>F. Cajigal - No. It will be separately addressed under HDOT's rockslide mitigation program.</i>	6/19/2014
4(b)			Andrew Rayne (HCA member)	If bridges are upgraded, what would the carrying capacity be?	Other	HDOT	<i>P. Santo - Design criteria for new bridges would be up to current standard of 80,000 pounds capacity.</i>	6/19/2014
4(c)			Members in General	Concerned that creating bridges with higher weight-bearing capacity would encourage bigger loads on Hana Highway.	Other	HDOT	<i>P. Santo - Clarified that while structural design criteria would be 80,000 pounds, the posted weight limit would be less than the design capacity. Strengthening the bridges is not intended to change the character of the highway and type of vehicles which ordinarily use it.</i>	6/19/2014
4(d)			S. Church (HCA member)	i) How many bridge will undergo restoration?	Other	HDOT	<i>P. Santo - Nature of improvements will be in part guided by outcome of plan.</i> Refer to specific bridge recommendations listed under Section B. of the Plan.	6/19/2014 See Attachment "C", 2/19/2015 letter response.

* Categories: Archaeological, Historic, Cultural, Architectural, Traffic, Aesthetic, Environmental, Legislative, Other
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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

First Cycle of Community Meetings (May to August 2014)

No.	Origin	Meeting Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
4(e)				ii) How will environmental impacts associated with bridge work be addressed?	Environmental	HDOT	<i>P. Santo - Contractors will follow BMPs to ensure downstream waters not adversely impacted. EA will be prepared for each bridge improvement as applicable. T. Moy added that plan will consider construction methods needed to ensure best practices in future work.</i>	6/19/2014
4(f)				iii) Sought clarification as to when highway jurisdiction was transferred to the State.	Other	HDOT	<i>F. Cajigal - Jurisdiction transferred in 1970.</i>	6/19/2014
4(g)				iv) His understanding is that some bridges are within private property and The Plan should clarify owner.	Other	HDOT	According to HDOT, there are no right-of-way maps available for this route. Therefore, the civil consultant was not able to clarify the matter. At the time that a bridge's design is undertaken, the design team will need to conduct more detailed survey and boundary research on adjacent private properties to confirm whether encroachments will need to be resolved.	Refer to Attachment "C", 2/19/2015 letter response.
4(h)				v) What are fees allocated to The Plan?	Other	HDOT	<i>P. Santo - \$1.6 million including administrative costs.</i>	6/19/2014
4(i)				vi) How is community 'buy-in' to The Plan documented?	Other		<i>T. Moy suggested that minutes of meetings with stakeholders may serve that purpose.</i>	6/19/2014
4(j)				vii) Asked for information of life expectancy of concrete structure.	Other		<i>P. Santo - concrete structures are durable and have a long useable life with proper maintenance.</i>	6/19/2014
4(k)				viii) Noted that safety along entire highway is a concern. Will project address safety area related to non-bridge areas?	Other		<i>P. Santo - Plan will be limited to bridges only.</i>	6/19/2014
4(l)				ix) Asked if any East Maui Irrigation (EMI) system will be affected and whether coordination undertaken with EMI?	Other		<i>V. Murison - Scope of The Plan is limited to highway right-of-way only and adjacent structures like EMI facilities will be avoided though EMI will be on the list of stakeholders.</i>	6/19/2014

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

First Cycle of Community Meetings (May to August 2014)

No.	Origin	Meeting Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
4(m)				x) What is definition of "defining character"?	Architectural	FAI	<i>V. Murison - Term refers to uniqueness of each bridge.</i> Character defining features are those aspects of a historic resource that are essential for conveying its identity and significance; and include materials, craftsmanship and decorative details as well as the various aspects of its site and environment.	6/19/2014
4(n)				xi) Waikani Bridge has a problem with parking; meeting attendees suggested better signage or placement of jersey barriers to discourage parking along road.	Traffic	HDOT, ATA	HDOT acknowledges the parking problems at Waikani Bridge and has installed some NO PARKING signs and will continue to monitor if additional signage may be necessary.	Refer to Attachment "C", 2/19/2015 letter response.
4(o)			Dawn Lono (Hana Council Office)	i) Reiterated that each stream is sensitive and needs to be protected from adverse impacts during construction.	Environmental	ATA	See response for Issue No. 4(e).	Refer to Attachment "C", 2/19/2015 letter response.
4(p)				ii) Requested names of each bridge crossing be placed on bridge.	Other	HDOT	<i>P. Santo - This is a goal of DOT. More permanent solution needs to be identified since name plates get removed and taken.</i> Refer to response to Issue No. 3(c)	6/19/2014 Refer to Attachment "C", 2/19/2015 letter response.
4(q)				iii) Are funds already approved for actual construction?	Other	HDOT	<i>P. Santo - No construction funds allocated at this time.</i>	6/19/2014
4(r)				iv) Some bridges are subjected to flood waters running over the bridge which may compromise structural integrity.	Other	HDOT	<i>P. Santo - Plan will consider these issues.</i>	6/19/2014

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

First Cycle of Community Meetings (May to August 2014)

No.	Origin	Meeting Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
4(s)				v) Hana Hwy is lifeline to Hana community so it's important that construction activities do not significantly interrupt traffic flows.	Traffic	FAI	<i>T. Moy - construction methods in the plan will consider the need to maintain the highway's continued operation.</i> <i>See response for Issue No. 2(a).</i>	6/19/2014 Refer to Attachment "C", 2/19/2015 letter response.
4(t)				vi) Suggested that team talk to Kupuna at the Hana Senior Center as many are familiar with the bridges.	Cultural	MHI	Per recommendation, a meeting with Hana Lani Senior Citizens was held on 8/25/14.	8/25/2014
4(u)			Unidentified Attendee	What are implementation priorities?	Other	HDOT	<i>P. Santo - DOT has identified a number of bridges which may be high priority (Kailua, Ula'ino, Mokulehua, and Puohokamoa) due to its lower-rated carrying capacity.</i>	6/19/2014
4(v)			Yvette Samson	Concerned about bridges' capacity to handle loads on a long-term basis.	Other	HDOT	<i>P. Santo - bridges identified for early work are DOT's high priority structures.</i>	6/19/2014
4(w)			Alohalani Smith (President, Kipahulu Association)	Reiterated previously stated concern that construction activities should not disrupt traffic flow into and out of East Maui.	Traffic	FAI	<i>Refer to response for Issue No. 2(a).</i>	Refer to Attachment "C", 2/19/2015 letter response.

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ISSUES MANAGEMENT MATRIX

First Cycle of Community Meetings (May to August 2014)

No.	Origin	Meeting Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
5	KAUPO COMMUNITY ASSOCIATION							
5(a)	Presentation at regular monthly meeting	6/21/14	Unidentified Member	Is it feasible from a cost standpoint to bring all bridges up to current design and historic standards?	Historic	FAI, NOEI, HDOT	M. Munekiyo - Projects will be prioritized by DOT and implemented over time in keeping with funding availability.	6/21/2014
5(b)			Sam Aina	With reference to the 2006 earthquake which cut off portions of East Maui, will alternative routing scenarios be considered as part of the study?	Traffic	MHI	M. Munekiyo - Study will be limited in scope to address bridge preservation related issues.	6/21/2014
5(c)			Johnathan Starr	i) DOT should be aware that the construction work on bridges not disrupt traffic flow along Hana Hwy such that it gets diverted through Kaupo. A motion was approved that "in the process of repairing or replacing bridges along Hana Highway, the DOT shall not cause traffic to be diverted through Kaupo, except in cases of emergency". ii) Plan should address traffic calming and pedestrian safety issues at the bridges.	Traffic	NOEI, ATA, HDOT	The Preservation Plan (herein after referred to as "The Plan") verifies existing traffic volumes to develop and effective Traffic Management Plan. It gives future designers of any specific bridge or culvert a general approach for phasing traffic control and detours during construction. See Chapter 5b, Public Safety. Also, The Plan recommends temporary bypass bridges and use of detours as much as possible. Additional discussion concerning traffic routing options are included in Chapter 6b, <i>Related Issues Along the Hana Highway</i> .	See Attachment "D", 2/17/2015 letter response.
5(d)					Traffic	NOEI, ATA, HDOT	For the most part, the posted speed limit along the narrow windy road sections of Hana Highway is 15 MPH. The one-lane nature of most of the bridges prompts drivers to constantly YIELD to one another. Therefore, the natural character of Hana Highway forces drivers to slow down at bridges where pedestrians typically congregate. Chapter 5, <i>Public Safety</i> , provides design standards for the future design team to use in addressing traffic and pedestrian safety.	Refer to Attachment "D", 2/17/2015 letter response.

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

First Cycle of Community Meetings (May to August 2014)

No.	Origin	Meeting Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
5(e)				iii) Historic District currently ends in Kipahulu. While not familiar with the rationale for establishing limits, feels that district should extend through Kaupo and beyond. Is scenario possible? KCA can consider sending a letter to M. Munekiyo asking that he provide the responsible authorities with this inquiry.	Historic	FAI, NOEL, HDOT	Should the Kaupo Community Association wish to extend the Historic Highway District, they have the opportunity to start the nomination process with the State Historic Preservation Division.	Refer to Attachment "D", 2/17/2015 letter response.
6	NAHIKU COMMUNITY ASSOCIATION							
6(a)	Regular monthly meeting	6/29/2014	Dawn Lono (Hana Council office)	i) Car rental companies should be asked to inform customers of roadway etiquette when travelling Hana Highway	Traffic	HDOT	HDOT acknowledges the problem of tourists unfamiliar with the windy road drive too slow without allowing local residents to pass. There is a recommendation in the Plan in Chapter 6a, <i>Related Issues Along the Hana Highway</i> regarding collaborating with rental car companies, airlines, travel experience companies and the Hawaii Tourism Authority to develop and provide travel literature to educated visitors on driving etiquette along Hana Highway. A small example is included in the <i>Mauit Visitor Guide</i> magazine publication which has in their Hana coverage, "Tip for the Trip to Hana: Enjoy a relaxed pace on the road, but pull over often to wave local drivers by – they've seen the sights before and prefer to hurry home".	See Attachment "E", 2/18/2015 letter response.
6(b)				ii) Confirm spelling of Kawaihapapa Bridge	Other	FAI	There is both a Kawaihapapa Stream Bridge at Mile Point 26.60 and a Kawaihapapa Stream Bridge at Mile Point 33.44. Ward Mardfin, Hana Advisory Committee member and researcher on Hana Bridges; Melody Cosma, Hawaiian Language teacher at Hana High & Elementary School; and Kauai Kanakaole, Hana High School teacher & research writer on water resources in Hana District, were all consulted with the spellings of the bridge lists included in the Plan. Additional community input to be received.	Refer to Attachment "E", 2/18/2015 letter response.

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

First Cycle of Community Meetings (May to August 2014)

No.	Origin	Meeting Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
6(c)			Carole Noel (resident member)	i) Expressed concern regarding traffic congestion at Waikani Bridge. On her way to the meeting, she observed 30 to 40 cars backed up at the bridge. This conditions creates an issue for emergency vehicles passing through this area.	Traffic	HDOT	HDOT acknowledges the parking problems at Waikani Bridge and has installed some NO PARKING signs and will continue to monitor if additional signage may be necessary.	Refer to Attachment "E", 2/18/2015 letter response.
6(d)				ii) Inez Ashdown had compiled names of all bridges. Project team should check this reference.	Other	FAI	MHI staff researched Inez Ashdown's writings on file at the Baily House Museum and did not find additional documentation concerning names of all the Hana Highway bridges.	Refer to Attachment "E", 2/18/2015 letter response.
6(e)				iii) What is life expectancy of bridge?	Other	FAI	T. Moy - With proper maintenance, concrete structures can last for many years. Plan will address maintenance requirements for bridges.	6/29/2014
6(f)			Paul Bodnar (Public Safety Director)	There are 52 bridges leading to Hana.	Other	FAI	T. Moy - Clarified that scope of plan is limited to DOT section of highway which includes 43 bridges. The other bridges noted fall under the County.	6/29/2014
6(g)			Corina Kekahuna (Treasurer)	i) Is project team working with East Maui Irrigation (EMI)?	Other	FAI	T. Moy - Noted that EMI facilities will not be part of project scope but coordination will be undertaken with them.	6/29/2014
6(h)				ii) EMI ditches run through Hanawi. She asked if water issues will be discussed with EMI?			T. Moy - Noted that water issues are separate from the plan, which focuses on bridge preservation.	6/29/2014

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

First Cycle of Community Meetings (May to August 2014)

No.	Origin	Meeting Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
6(i)			Kamalu Kahookele (President)	i) Explained that Makapipi Bridge crosses Kapiiwai Stream. Origin of "Makapipi" name should be researched since it does not align with the stream name.	Other	FAI, NOEI	MHI consulted with Kaui Kanakaole and confirmed with her maps that show Makapipi Bridge crossing Makapipi Stream . Awaiting further community input on Hawaiian stream and place names , spellings and meaning .	Refer to Attachment "E" , 2/18/2015 letter response.
6(j)				ii) Since bridge signs have been stolen, vandalized, or hidden by vegetation, will signage be restored?	Other	FAI	<i>T. Moy – Preparation of a signage program/plan will be part of Preservation Plan.</i>	6/29/2014
6(k)				iii) Night safety is an issue at Puua Kaa State Wayside Park. Does DOT have plans to add security lighting at the park?	Other	FAI	<i>T. Moy - This particular issue is not part of plan work.</i>	6/29/2014
6(l)				iv) Waikani Bridge (aka Wailuanui) adjoining roadway approaches are eroding. Mapu Kekahuna reiterated this concern.	Other	HDOT	<i>The Hana Highway resurfacing, vicinity of Honomanu Bridge to Waikani Bridge, Project No. 360AB-01-11M is currently addressing pavement on the bridge and expected to be completed by summer 2015.</i>	2/18/2015
6(m)			Mapu Kekahuna (Vice President)	i) EMI's water conveyance systems traverse near bridge structures, and work should ensure that water supply will not be contaminated by construction by products.	Environmental	NOEI, HDOT	P. Santo – Contractors will follow BMP's to ensure downstream waters not adversely impacted. EA will be prepared for each bridge improvement as applicable. T. Moy added that plan will consider construction method needed to ensure best practices in future work.	Refer to Attachment "E" , 2/18/2015 letter response.
6(n)				ii) Who is the project's archaeologist?	Archaeological	FAI	<i>T. Moy - Archaeologist is Tanya Lee-Greig of Cultural Surveys Hawaii.</i>	6/29/2014

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

First Cycle of Community Meetings (May to August 2014)

No.	Origin	Meeting Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
6(o)				iii) Need to have weight limit signs at each bridge and weigh stations should be considered to ensure weight limits are respected.	Other	HDOT	<i>T. Moy responded that although truck weights are not monitored, the team recognizes the importance of respecting bridge capacities.</i>	6/29/2014
6(p)				iv) Any bridge closure will adversely impact the East Maui community, especially for emergency vehicles. He asked that DOT consider impacts.	Traffic	FAI, NOEI, HDOT	Weigh stations were discontinued due to lack of manpower and costs. Also, weigh stations were ineffective due to truckers quickly alerting fellow truckers on the presence of the weigh station. <i>T. Moy - Agreed and stated that bridge construction methods will be part of plan to ensure that disruption to the community is minimized.</i>	Refer to Attachment "E", 2/18/2015 letter response. 6/29/2014
6(q)				v) Which bridges have the highest priority in terms of need for attention?	Other	FAI	The Preservation Plan Plan (herein after referred to as "The Plan") verifies existing traffic volumes to develop an effective Traffic Management Plan. It gives future designers of any specific bridge or culvert a general approach for phasing traffic control and detours during construction. See Chapter 5, Public Safety. Also, The Plan recommends temporary bypass bridges and use of detours as much as possible. Additional discussion concerning traffic routing options are included in Chapter 6, Related Issues Along the Hana Highway. <i>A. Chiu provided DOT's initial list of priorities as follows: Makanalai, Kailua, Puohokamoa, Punalau, Kopili'ula, Kapa'ula, Makapipi, Helele'ike'oha, Ula'ino, and Mokulehu.</i>	Refer to Attachment "E", 2/18/2015 letter response. 6/29/2014
6(r)				vi) What specific issues are of concern with these bridges?	Other	FAI	<i>T. Moy - Carrying capacity is the criteria which is being considered. DOT conducts bridge inspections every 2 years to maintain an accurate record of conditions.</i>	6/29/2014

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

First Cycle of Community Meetings (May to August 2014)

No.	Origin	Meeting Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
6(s)				vii) Water conveyance capacities of the bridges should be recognized. During heavy rains, standing water will be found on some bridges.	Other	NOEI, HDOT ATA	Future design teams will implement specific bridge deck and approach designs to avoid ponding or standing water in the travelway.	Refer to Attachment "E", 2/18/2015 letter response.
6(t)				viii) In addition to bridges, DOT should be aware that the roadway itself needs repair and maintenance. DOT's response times have been slow.	Other	HDOT	DOT Maui District has an annual special maintenance program (SMP) that allots funding to incrementally complete road resurfacing on the islands of Maui, Molokai, and Lanai. The cycle of resurfacing generally occurs every ten years subject to the availability of funding. In the interim, HDOT's road maintenance crews will perform routine pavement maintenance within their resource capabilities.	Refer to Attachment "E", 2/18/2015 letter response.
7	CULTURAL RESOURCES COMMISSION							
7(a)	Regular monthly meeting	7/3/2014	Commissioner Mowat	Noted her support for the project team's efforts in meeting with community stakeholders.	Other	FAI, MHI	No action/response required.	---
7(b)			Commission Six	Noted she attended the Hana Cultural Center & Museum Board presentation and supports the objective of the Preservation Plan to ensure that public input is incorporated as part of the plan.	Other	FAI, MHI	No action/response required.	---
7(c)			Commission Chair Osako	Is limits of the Hawaii Register and National Register for the Hana Highway Historic District identical?	Other	FAI	T. Moy - Responded they are the same.	7/3/2014
7(d)			Commissioner Ricalde-Garcia	i) What prompted the project?	Other	HDOT	P. Santo - Explained that Senator Kalani English recognized the need to comprehensively consider public safety and historic preservation requirements for bridges within the Historic District. He, therefore, sought funding to implement the project. The implementation phase of the work, which is separate from The Preservation Plan, will be a lengthy process.	7/3/2014

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District
ISSUES MANAGEMENT MATRIX
First Cycle of Community Meetings (May to August 2014)

No.	Origin	Meeting Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
7(e)				ii) How will traffic issues be addressed?	Traffic	FAI, ATA, HDOT	<p><i>T. Moy - Explained that there have been suggestions provided as to how to better manage traffic flow along the highway. For example, suggestions have been made to have car rental companies provide educational information to customers, informing them of roadway etiquette when driving along Hana Highway. However, it should be noted that the project is to provide a plan for safe bridges.</i></p> <p><i>The Preservation Plan Plan (herein after referred to as "The Plan") verifies existing traffic volumes to develop an effective Traffic Management Plan. It gives future designers of any specific bridge or culvert a general approach for phasing traffic control and detours during construction. See Chapter 5, Public Safety. Also, The Plan recommends temporary bypass bridges and use of detours, as much as possible. Additional discussion concerning traffic routing options are included in Chapter 6, Related Issues Along the Hana Highway.</i></p> <p><i>HDOT acknowledges the problem of tourists unfamiliar with the windy road drive too slow without allowing local residents to pass. There is a recommendation in the Plan in Chapter 6a, Related Issues Along the Hana Highway regarding collaborating with rental car companies, airlines, travel experience companies and the Hawaii Tourism Authority to develop and provide travel literature to educated visitors on driving etiquette along Hana Highway. A small example is included in the Maui Visitor Guide magazine publication which has in their Hana coverage, "Tip for the Trip to Hana: Enjoy a relaxed pace on the road, but pull over often to wave local drivers by – they've seen the sights before and prefer to hurry home".</i></p>	See Attachment "F", 2/19/2015 letter response.

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ISSUES MANAGEMENT MATRIX

First Cycle of Community Meetings (May to August 2014)

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7(f)				iii) Noted that traffic congestion and its effect to emergency vehicles should be considered.	Traffic	FAI, ATA, HDOT	Comment acknowledged.	---
7(g)			Commissioner Kubota	Noted his support for the team's community outreach process	Other	FAI, MHI	Comment acknowledged.	---
8	KIPAHULU COMMUNITY ASSOCIATION							
8(a)	Regular Monthly Meeting	8/16/2014	K. Kanekoa	Will The Plan take care of potholes on the Waikani Bridge approaches?	Other	HDOT	C. Shibuya responded that bridge work would probably take care of the immediate approaches but overall deteriorated road conditions would normally be handled under the routine road resurfacing and repair projects. The Hana Highway resurfacing, vicinity of Honomanu Bridge to Waikani Bridge, Project No. 360AA-01-11M is currently addressing pavement on the bridge and expected to be completed by summer 2015.	8/16/2014 See Attachment "G", 2/18/2015 letter response.
8(b)			T. Lind	Questioned whether parking along Hana Highway at Waikani Bridge can be restricted?	Traffic	HDOT	C. Shibuya responded that it would be difficult to get people to comply and to enforce the restriction. HDOT can nonetheless, install NO PARKING signs along problematic spots to at least discourage parking from obstructing smooth vehicular traffic flow. HDOT acknowledges the parking problems at Waikani Bridge and has installed some NO PARKING signs and will continue to monitor if additional signage may be necessary.	8/6/2014 Refer to Attachment "G", 2/18/2015 letter response.

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8(c)			G. Lind	What can be done about slow tourist drivers not pulling over to allow locals to pass?	Traffic	HDOT	<p>C. Shibuya stated that a suggestion has been made for State DOT to ask that the Drive Guides for rent-a-cars have information instructing them to pull over for local drivers. Another idea could be message stickers in the rent-a-cars.</p> <p>C. Shibuya responded that the team is looking into the best method of achieving this.</p> <p>HDOT acknowledges the problem of tourists unfamiliar with the windy road drive too slow without allowing local residents to pass. There is a recommendation in the Plan in Chapter 6a, Related Issues Along the Hana Highway regarding collaborating with rental car companies, airlines, travel experience companies and the Hawaii Tourism Authority to develop and provide travel literature to educated visitors on driving etiquette along Hana Highway. A small example is included in the Maui Visitor Guide magazine publication which has in their Hana coverage, "Tip for the Trip to Hana: Enjoy a relaxed pace on the road, but pull over often to wave local drivers by – they've seen the sights before and prefer to hurry home".</p>	8/15/2014
9	HANA LANI SENIOR CITIZENS							
9(a)	Regular Monthly Meeting	8/25/2014	Ulu	Requested bridge names be printed on the bridges	Other	HDOT	<p>P. Santo – This is a goal of DOT. More permanent solution needs to be identified since name plates get removed and taken.</p> <p>The consultant team continues to track names, spelling and a proposed design, possibly in the CRM walls, along with community input. As the bridges are rehabilitated, appropriate means of attaching a bridge name will be devised.</p>	8/25/2014

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9(b)			A. Gilbert	Will bridges keep its look?	Historic	NOEI/FAI/ HDOT	<p><i>C. Shibuya responded that the goal is to have repairs or rehabilitation retain its historic looks.</i></p> <p>To retain its historic appearance, replacement will complement existing bridge appearance, in terms of proportion and character-defining details, in keeping with National Preservation Standards and consultation with the SHPD.</p>	8/25/2014 Refer to Attachment ‘H’ , 2/18/2015 letter response.

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APPENDIX 7

ATTACHMENT 7p

Aha Moku Advisory Committee, Maui
(Kyle Nakanelua)
Response Letter



MUNEKIYO HIRAGA

Planning. Project Management. Sustainable Solutions.

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2795 Kauhikoalani Place
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SUBJECT: Hana Highway Route 360, Bridge Preservation Plan within the
Hana Highway Historic District, Federal Aid Project No. BR-
360(012)

Dear Mr. Nakanelua:

Thank you for participating last summer, in the first round of meetings with the State Department of Transportation (DOT), Highways Division's consultant team, to hear about the project's purpose, scope, and methodology. As you recall, the meetings were held to gather early input and respond to questions, and concerns.

As a follow-up to the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan that was previously distributed, we would like to provide responses to your questions and concerns summarized in the table below:

QUESTIONS/CONCERNS		ACTION/RESPONSE
1	i) Most important to keep traffic flowing so residents can get to and from work	The Preservation Plan (herein after referred to as "The Plan") verifies existing traffic volumes to develop an effective Traffic Management Plan. It gives future designers of any specific bridge or culvert a general approach for phasing traffic control and detours during construction. See Chapter 5, <i>Public Safety</i> . Also, The Plan recommends temporary bypass bridges and use of detours as much as possible. Additional discussion concerning traffic routing options are included in Chapter 6, <i>Related Issues Along the Hana Highway</i> .

Maui: 305 High Street, Suite 104 * Wailuku, Hawaii 96793 * Tel: 808.244.2015 * Fax: 808.244.8729

Oahu: 735 Bishop Street, Suite 238 * Honolulu, Hawaii 96813 * Tel: 808.983.1233

www.munekiyohiraga.com

QUESTIONS/CONCERNS		ACTION/RESPONSE
2	ii) Hana Highway has too many bicyclist on a road that does not have enough room	HDOT has to reasonably accommodate all modes of transportation which also include bicyclists. There are challenges to comfortably accommodate cyclist due to the narrow, windy, and steep road inclines. See discussion in Chapter 6, <i>Related Issues Along the Hana Highway</i> . The Plan is limited to the bridges/culverts and does not include the entire Hana Highway. However, as road improvement projects are undertaken along the route such as resurfacing, HDOT has been paving the shoulders where space is available. This will allow cyclists, as well as, slow driving tourists to pullover and allow other drivers to pass.
3	iii) A lot more tourist on Hana Highway than before	<p>The number of tourist travelling on Hana Highway has probably increased over the years. HDOT acknowledges the problem of tourists unfamiliar with the windy road drive too slow without allowing local residents to pass.</p> <p>There is a recommendation in the Plan in Chapter 6, <i>Related Issues Along the Hana Highway</i> regarding collaborating with rental car companies, airlines, travel experience companies and the Hawaii Tourism Authority to develop and provide travel literature to educate visitors on driving etiquette along Hana Highway. A small example is included in the <i>Maui Visitor Guide</i> magazine publication which has in their Hana coverage, "Tips for the Trip to Hana: Enjoy a relaxed pace on the road, but pull over often to wave local drivers by – they've seen the sights before and prefer to hurry home".</p>
Note: The Chapter references in the above table are those found in the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan.		

We look forward to presenting our preliminary findings and receipt of your additional questions and/or comments.

Kyle Nakanelua
February 19, 2015
Page 3

Thank you again for your participation in this important project.

Very truly yours,



Charlene Shibuya
Senior Associate

CSS:yp

cc: Paul Santo, Department of Transportation, Highways Bridge Design Section
Cody Aihara, Nagamine Okawa Engineers
Alison Chiu, Fung Associates

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APPENDIX 7

ATTACHMENT 7q

Hana Cultural Center & Museum
(Harolen Kaiwi, Board President)
Response Letter



MUNEKIYO HIRAGA

Planning, Project Management, Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT

Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT

Mark Alexander Roy
VICE PRESIDENT

Tessa Munekiyo Ng
VICE PRESIDENT

Gwen Ohashi Hiraga
SENIOR ADVISOR

Mitsuru "Mich" Hirano
SENIOR ADVISOR

February 18, 2015

Email: hkaiwi@aol.com

Harolen Kaiwi, Board President
Hana Cultural Center and Museum
4974 Uakea Road
Hana, Hawaii 96713

SUBJECT: Hana Highway Route 360, Bridge Preservation Plan within the
Hana Highway Historic District, Federal Aid Project No. BR-
360(012)

Dear Ms. Kaiwi:

Thank you for participating last summer, in the first round of meetings with the State Department of Transportation (DOT), Highways Division's consultant team to hear about the project's purpose, scope, and methodology. As you recall, the meetings were held to gather early input and respond to questions, and concerns.

As a follow-up to the previously distributed 75% Draft of the Hana Highway Historic District Bridge Preservation Plan, we would like to provide responses to those questions and comments provided by your organization. See the attached **Exhibit "A"**.

We look forward to presenting our preliminary findings and receipt of your additional questions and/or comments at your next meeting

Harolen Kaiwi, Board President
February 18, 2015
Page 2

Thank you again for your participation in this important project.

Very truly yours,


 Charlene Shibuya
Senior Associate

CSS:yp
Attachment

cc: Paul Santo, Department of Transportation, Highways Bridge Design Section
Cody Aihara, Nagamine Okawa Engineers
Alison Chiu, Fung Associates

K:\DATA\Nagamine\HanaHwyBridgePreserv\Preservation Plan Report (75 percent)\HCC&M.letter.doc

EXHIBIT “A”

Comments Provided by Hana Cultural Center and Museum, and Responses to Comments

COMMENTING PARTY		QUESTIONS/CONCERNS	ACTION/RESPONSE
1	Janet Six (board member)	i) Will preservation design consider replacing guardrails with design features which are more historic?	<i>T. Moy - This kind of evaluation will be part of process and recommendations on how to address guardrails will be part of plan^a.</i>
2		ii) Reiterated slow-moving traffic concern and noted that car rental companies should inform customers of roadway etiquette on Hana Highway.	HDOT acknowledges the problem of tourists unfamiliar with the windy road drive too slow without allowing local residents to pass. There is a recommendation in the Plan in Chapter 6 ^b , <i>Related Issues Along the Hana Highway</i> for HDOT regarding collaborating with rental car companies, airlines, travel experience companies and the Hawaii Tourism Authority to develop and provide travel literature to educate visitors on driving etiquette along Hana Highway. A small example is included in the <i>Maui Visitor Guide</i> magazine publication which has in their Hana coverage, “Tips for the Trip to Hana: Enjoy a relaxed pace on the road, but pull over often to wave local drivers by – they’ve seen the sights before and prefer to hurry home”.
3	Scott Crawford (Trustee)	i) Recommended contact with resident Kaui Kanakaole who is very knowledgeable on region’s local history and culture.	Met with Kaui at her residence on 7/22/14 to discuss the project and consult on questions that have come up thus far on names of bridges and streams in the Hana region.
4		ii) Does team have overall understanding of bridge conditions?	<i>V. Murison explained that team has bridge inspection reports, but the plan will look at conditions in greater detail while keeping in mind criteria of historic character & safety. T. Moy - HDOT may have a better understanding of higher priority bridges needing repair or rehabilitation.</i>
<p>^a The Chapter references in Exhibit “A”, are those found in the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan.</p> <p>^b Italicized responses are those provided by presenters at each meeting. Non-italicized responses are those prepared following the meeting.</p>			

COMMENTING PARTY		QUESTIONS/CONCERNS	ACTION/RESPONSE
5		iii) Will traffic control signs be part of study? Cites problem with slow-moving traffic that needs reminders to pull over if traffic backing behind them. Problem is especially bad at bridges where multiple vehicles may be parked or slowing to observe scenic views.	<p>The Plan is a planning document that leaves the more detailed design to the design team that will later be tasked with applying the Plan's principles. See Chapter 4, <i>Design Guidelines</i> and Chapter 5, <i>Public Safety</i>. The Plan addressed traffic control signs specific to temporary work zone application and permanent signage and striping to address basic traffic control devices standards. The Plan is limited to the bridges/culverts and does not include the entire Hana Highway.</p> <p>HDOT acknowledges the problem of tourists unfamiliar with the windy road drive too slow without allowing local residents to pass. There is a recommendation in the Plan in Chapter 6, <i>Related Issues Along the Hana Highway</i> regarding collaborating with rental car companies, airlines, travel experience companies and the Hawaii Tourism Authority to develop and provide travel literature to educate visitors on driving etiquette along Hana Highway. A small example is included in the <i>Maui Visitor Guide</i> magazine publication which has in their Hana coverage, "Tips for the Trip to Hana: Enjoy a relaxed pace on the road, but pull over often to wave local drivers by – they've seen the sights before and prefer to hurry home".</p> <p>Note that both the Maui Island Plan (MIP) and the Hana Community Plan recommend implementing a Hana Roadway Management Plan including 'comprehensive roadway signage'.</p>
6	Myrna Costello (Treasurer)	i) Is work within Hana Highway Historic District governed by Federal rules?	<p><i>T. Moy - Yes. Work on any bridges will have to conform with the preservation plan.</i></p> <p>Refer to Chapter 1.iv. Regulatory Background.</p>
7		ii) Concerned on ability of bridges to maintain their structural integrity over time. Catastrophic failure will hurt entire community.	<p>HDOT has a program that applies National Bridge Inspection Standards that was established in 1971. Certified bridge inspectors have been conducting inspections every two years and carefully monitor the integrity of all bridges throughout the island. HDOT's Bridge Engineer oversees the program that structurally assesses the bridges and establishes a priority for rehabilitation or replacement. Hana Highway bridges, due to their limited weight capacities, have a 10 ton weight limit and HDOT Maui ensures vehicle weight limits are complied with through their Application to Operate Oversized and Overweight Vehicles on State Highways permit process.</p>
8		iii) Will study consider traffic problems because of high traffic volume?	<p><i>T. Moy - Team includes a traffic engineer and evaluation will be part of plan.</i></p>
<p>^a The Chapter references in Exhibit "A", are those found in the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan.</p> <p>^b Italicized responses are those provided by presenters at each meeting. Non-italicized responses are those prepared following the meeting.</p>			

COMMENTING PARTY		QUESTIONS/CONCERNS	ACTION/RESPONSE
9	Esse Sinenci (Recording Secretary)	How will decisions be made when undertaking work?	<i>T. Moy - Depending on situation, repairs will be done before considering replacement. For replacements, goal is to replicate the bridge design to the extent practicable so historic integrity not compromised.</i>
10	Martha Yacht (Greeter)	i) Is realignment of the roadway needed in any instance?	<i>T. Moy - Goal of the plan is to respect the existing highway ROW to avoid realignment.</i>
11		ii) What is a "Hillside Bridge"?	<i>Team - Structures which were constructed to provide stability of widened roadway sections due to slope erosion, are being considered as part of the plan.</i>
<p>^a The Chapter references in Exhibit "A", are those found in the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan.</p> <p>^b Italicized responses are those provided by presenters at each meeting. Non-italicized responses are those prepared following the meeting.</p>			

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APPENDIX 7

ATTACHMENT 7r

Hana Community Association
(Sol Church, President)
Response Letter



MUNEKIYO HIRAGA

Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT

Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT

Mark Alexander Roy
VICE PRESIDENT

Tessa Munekiyo Ng
VICE PRESIDENT

Gwen Ohashi Hiraga
SENIOR ADVISOR

Mitsuru "Mich" Hirano
SENIOR ADVISOR

February 19, 2015

Sol Church, President
Hana Community Association
P.O. Box 561
Hana, Hawaii 96713

SUBJECT: Hana Highway Route 360, Bridge Preservation Plan within the
Hana Highway Historic District, Federal Aid Project No. BR-
360(012)

Dear Mr. Church:

Thank you for participating last summer, in the first round of meetings with the State Department of Transportation (DOT), Highways Division's consultant team to hear about the project's purpose, scope, and methodology. As you recall, the meetings were held to gather early input and respond to questions, and concerns.

As a follow-up to the distribution of the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan, we would like to provide responses to those questions and concerns brought up by the Association at its June 16, 2014 meeting. See attached **Exhibit "A"**.

We look forward to presenting our preliminary findings and receipt of your additional questions and/or comments.

Sol Church, President
February 19, 2015
Page 2

On behalf of DOT, we wish to express our appreciation for the Association's participation in this project's public input process.

Very truly yours,



Charlene Shibuya
Senior Associate

CSS:yp

Attachments

cc: Paul Santo, Department of Transportation, Highways Bridge Design Section
Cody Aihara, Nagamine Okawa Engineers
Alison Chiu, Fung Associates

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EXHIBIT “A”

Comments Provided by the Hana Community Association and Responses to Comments

COMMENTING PARTY		QUESTIONS/CONCERNS	ACTION/RESPONSE
1	Joan Mardfin	Pointed out hillside erosion at Mile Marker 21. Is addressing that issue part of the project's scope?	<i>F. Cajigal – The erosion issue will be separately addressed under HDOT's rockslide mitigation program.</i>
2	Andrew Rayne (HCA member)	If bridges are upgraded, what would the carrying capacity be?	<i>P. Santo - Design criteria for new bridges would be up to current standard of 80,000 pounds capacity.</i>
3	Members in General	Concerned that creating bridges with higher weight-bearing capacity would encourage bigger loads on Hana Highway.	<i>P. Santo - Clarified that while structural design criteria would be 80,000 pounds, the posted weight limit would be less than the design capacity. Strengthening the bridges is not intended to change the character of the highway and type of vehicles which ordinarily use it.</i>
4	S. Church (HCA member)	i) How many bridge will undergo restoration?	<i>P. Santo - Nature of improvements will be in part guided by outcome of plan.</i> Refer to specific bridge recommendations listed under Section B. of the Plan.
5		ii) How will environmental impacts associated with bridge work be addressed?	<i>P. Santo - Contractors will follow BMPs to ensure downstream waters not adversely impacted. EA will be prepared for each bridge improvement as applicable. T. Moy added that plan will consider construction methods needed to ensure best practices in future work.</i>
6		iii) Sought clarification as to when highway jurisdiction was transferred to the State.	<i>F. Cajigal - Jurisdiction transferred in 1970.</i>
7		iv) His understanding is that some bridges are within private property and The Plan should clarify owner.	According to HDOT, there are no right-of-way maps available for this route. Therefore, the civil consultant was not able to clarify the matter. At the time that a bridge's design is undertaken, the design team will need to conduct more detailed survey and boundary research on adjacent private properties to confirm whether encroachments will need to be resolved.
Notes: <ul style="list-style-type: none"> • Italicized responses are those provided by presenters at each meeting. Non-italicized responses are those prepared following the meeting. • The Chapter references in Exhibit “A” are those found in the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan. 			

COMMENTING PARTY		QUESTIONS/CONCERNS	ACTION/RESPONSE
8		v) What are fees allocated to The Plan?	<i>P. Santo - \$1.6 million including administrative costs.</i>
9		vi) How is community 'buy-in' to The Plan documented?	<i>T. Moy suggested that minutes of meeting with stakeholder may serve that purpose.</i>
10		vii) Asked for information of life expectancy of concrete structure.	<i>P. Santo - concrete structures are durable and have a long useable life with proper maintenance.</i>
11		viii) Noted that safety along entire highway is a concern. Will project address safety area related to non-bridge areas?	<i>P. Santo - Plan will be limited to bridges only.</i>
12		ix) Asked if any East Maui Irrigation (EMI) system will be affected and whether coordination undertaken with EMI?	<i>V. Murison - Scope of The Plan is limited to highway right-of-way only and adjacent structures like EMI facilities will be avoided though EMI will be on the list of stakeholders.</i>
13		x) What is definition of "defining character"?	<i>V. Murison - Term refers to uniqueness of each bridge.</i> Character defining features are those aspects of a historic resource that are essential for conveying its identity and significance; and include materials, craftsmanship and decorative details as well as the various aspects of its site and environment.
14		xi) Waikani Bridge has a problem with parking; meeting attendees suggested better signage or placement of jersey barriers to discourage parking along road.	HDOT acknowledges the parking problems at Waikani Bridge and has installed some NO PARKING signs and will continue to monitor if additional signage may be necessary.
15	Dawn Lono (Hana Council Office)	i) Reiterated that each stream is sensitive and needs to be protected from adverse impacts during construction.	<i>P. Santo - Contractors will follow BMPs to ensure downstream waters not adversely impacted. EA will be prepared for each bridge improvement as applicable. T. Moy added that plan will consider construction methods needed to ensure best practices in future work.</i>
Notes: <ul style="list-style-type: none"> • Italicized responses are those provided by presenters at each meeting. Non-italicized responses are those prepared following the meeting. • The Chapter references in Exhibit "A" are those found in the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan. 			

COMMENTING PARTY		QUESTIONS/CONCERNS	ACTION/RESPONSE
16		ii) Requested names of each bridge crossing be placed on bridge.	<p><i>P. Santo - This is a goal of DOT. More permanent solution needs to be identified since name plates get removed and taken.</i></p> <p>Also met with Kauai at her residence on 7/22/14 to discuss the project and consult on questions that have come up thus far on names of bridges and streams in the Hana region.</p>
17		iii) Are funds already approved for actual construction?	<i>P. Santo - No construction funds allocated at this time.</i>
18		iv) Some bridges are subjected to flood waters running over the bridge which may compromise structural integrity.	<i>P. Santo - Plan will consider these issues.</i>
19		v) Hana Hwy is lifeline to Hana community so it's important that construction activities does not significantly interrupt traffic flows.	<p><i>T. Moy - construction methods in the plan will consider the need to maintain the highway's continued operation.</i></p> <p>The Preservation Plan verifies existing traffic volumes to develop an effective Traffic Management Plan. It gives future designers of any specific bridge or culvert a general approach for phasing traffic control and detours during construction. See Chapter 5, <i>Public Safety</i>. Also, The Plan recommends temporary bypass bridges and use of detours as much as possible. Additional discussion concerning traffic routing options are included in Chapter 6, <i>Related Issues Along the Hana Highway</i>.</p>
20		vi) Suggested that team talk to kupuna at the Hana Senior Center as many are familiar with the bridges.	Per recommendation, a meeting with Hana Lani Senior Citizens was held on 8/25/14.
21	Unidentified Attendee	What are implementation priorities?	<i>P. Santo - DOT has identified a number of bridges which may be high priority (Kailua, Ula'ino, Mokulehua, and Puohokamoa) due to its lower-rated carrying capacity.</i>
<p>Notes:</p> <ul style="list-style-type: none"> • Italicized responses are those provided by presenters at each meeting. Non-italicized responses are those prepared following the meeting. • The Chapter references in Exhibit "A" are those found in the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan. 			

COMMENTING PARTY		QUESTIONS/CONCERNS	ACTION/RESPONSE
22	Yvette Samson	Concerned about bridges' capacity to handle loads on a long-term basis.	<i>P. Santo - Bridges identified for early work are DOT's high priority structures.</i>
23	Alohalani Smith (President, Kipahulu Association)	Reiterated previously stated concern that construction activities should not disrupt traffic flow into and out of East Maui.	The Preservation Plan verifies existing traffic volumes to develop an effective Traffic Management Plan. It gives future designers of any specific bridge or culvert a general approach for phasing traffic control and detours during construction. See Chapter 5, <i>Public Safety</i> . Also, The Plan recommends temporary bypass bridges and use of detours as much as possible. Additional discussion concerning traffic routing options are included in Chapter 6, <i>Related Issues Along the Hana Highway</i> .
Notes: <ul style="list-style-type: none"> • Italicized responses are those provided by presenters at each meeting. Non-italicized responses are those prepared following the meeting. • The Chapter references in Exhibit "A" are those found in the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan. 			

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APPENDIX 7

ATTACHMENT 7s

Kaupo Community Association
(Linda Clark, President)
Response Letter



MUNEKIYO HIRAGA

Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT

Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT

Mark Alexander Roy
VICE PRESIDENT

Tessa Munekiyo Ng
VICE PRESIDENT

Gwen Ohashi Hiraga
SENIOR ADVISOR

Mitsuru "Mich" Hirano
SENIOR ADVISOR

February 17, 2015

Via mail and email: clarkl004@gmail.com

Linda Clark, President
Kaupo Community Association
244 Lauie Drive
Kula, Hawaii 96790

SUBJECT: Hana Highway Route 360, Bridge Preservation Plan within the
Hana Highway Historic District, Federal Aid Project No. BR-
360(012)

Dear Ms. Clark:

Thank you for participating last summer, in the first round of meetings with the State Department of Transportation (DOT) – Highways Division's consultant team to hear about the project's purpose, scope, and methodology. As you recall, the meetings were held to gather early input and respond to questions, and concerns.

As a follow-up to the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan that was previously distributed to the Kaupo Community Association, we would like to provide responses to those questions and concerns brought up by the Association at its June 21, 2014 meeting. See attached **Exhibit "A"**.

We look forward to presenting our preliminary findings and receipt of your additional questions and/or comments at our meeting with the Kaupo Community Association.

Linda Clark, President
February 17, 2015
Page 2

Thank you again for your participation in this important project.

Very truly yours,

A handwritten signature in black ink, appearing to be 'CS' or similar, written in a cursive style.

Charlene Shibuya
Senior Associate

CSS:yp
Attachment

cc: Paul Santo, Department of Transportation, Highways Bridge Design Section
Cody Aihara, Nagamine Okawa Engineers
Alison Chiu, Fung Associates

K:\DATA\Nagamine\HanaHwyBridgePreserv\Preservation Plan Report (75 percent)\KaupoCommAss.letter.doc

EXHIBIT "A"

Comments Provided by the Kaupo Community at the Association Meeting and Responses to Comments

	COMMENTING PARTY	QUESTIONS/CONCERNS	ACTION/RESPONSE
1	Unidentified Member	Is it feasible from a cost standpoint to bring all bridges up to current design and historic standards?	<i>M. Munekiyo - Projects will be prioritized by DOT and implemented over time in keeping with funding availability^a.</i>
2	Sam Aina	With reference to the 2006 earthquake which cut off portions of East Maui, will alternative routing scenarios be considered as part of the study?	<i>M. Munekiyo - Study will be limited in scope to address bridge preservation related issues.</i>
3	Johnathan Starr	i) DOT should be aware that the construction work on bridges not disrupt traffic flow along Hana Hwy such that it gets diverted through Kaupo. A motion was approved that "in the process of repairing or replacing bridges along Hana Highway, the DOT shall not cause traffic to be diverted through Kaupo, except in cases of emergency" .	The Preservation Plan (herein after referred to as "The Plan") verifies existing traffic volumes to develop an effective Traffic Management Plan. It gives future designers of any specific bridge or culvert a general approach for phasing traffic control and detours during construction. See Chapter 5 ^b , <i>Public Safety</i> . Also, The Plan recommends temporary bypass bridges and use of detours as much as possible. Additional discussion concerning traffic routing options are included in Chapter 6 ^b , <i>Related Issues Along the Hana Highway</i> .
4		ii) Plan should address traffic calming and pedestrian safety issues at the bridges.	For the most part, the posted speed limit along the narrow windy road sections of Hana Highway is 15 MPH. The one-lane nature of most of the bridges prompts drivers to constantly YIELD to one another. Therefore, the natural character of Hana Highway forces drivers to slow down at bridges where pedestrians typically congregate. Chapter 5 ^b , <i>Public Safety</i> , provides design standards for the future design team to use in addressing traffic and pedestrian safety.
5		iii) Historic District currently ends in Kipahulu. While not familiar with the rationale for establishing limits, feels that district should extend through Kaupo and beyond. Is scenario possible? KCA can consider sending a letter to the consultant team.	Should the Kaupo Community Association wish to extend the Historic Highway District, they have the opportunity to start the nomination process with the State Historic Preservation Division.
^a Italicized responses are those provided by presenters at each meeting. Non-italicized responses are those prepared following the meeting. ^b The "Chapters" referred to in Exhibit "A" , are those found in the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan			

APPENDIX 7

ATTACHMENT 7t

Nahiku Community Association
(Kamalu Kahookele, President)
Response Letter



MUNEKIYO HIRAGA

Planning, Project Management, Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT

Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT

Mark Alexander Roy
VICE PRESIDENT

Tessa Munekiyo Ng
VICE PRESIDENT

Gwen Ohashi Hiraga
SENIOR ADVISOR

Mitsuru "Mich" Hirano
SENIOR ADVISOR

February 18, 2015

Via mail and email: NCAMAUI@gmail.com

Kamalu Kahookele, President
Nahiku Community Association
540 Lower Nahiku Road
Hana, Hawaii 96713

SUBJECT: Hana Highway. Route 360, Bridge Preservation Plan within the
Hana Highway Historic District, Federal Aid Project No. BR-
360(012)

Dear Ms. Kahookele

Thank you for participating last summer, in the first round of meetings with the State Department of Transportation (DOT), Highways Division's consultant team to hear about the project's purpose, scope, and methodology. As you recall, the meetings were held to gather early input and respond to questions, and concerns.

As a follow-up to the previously distributed 75% Draft of the Hana Highway Historic District Bridge Preservation Plan, we would like to provide responses to those questions and comments provided by your organization. See the attached **Exhibit "A"**.

We look forward to presenting our preliminary findings and receipt of your additional questions and/or comments.

Kamalu Kahookele, President
February 18, 2015
Page 2

Thank you again for your participation in this important project.

Very truly yours,



Charlene Shibuya
Senior Associate

CSS:yp
Attachment

cc: Paul Santo, Department of Transportation, Highways Bridge Design Section
Cody Aihara, Nagamine Okawa Engineers
Alison Chiu, Fung Associates

K:\DATA\Nagamine\HanaHwyBridgePreserv\Preservation Plan Report (75 percent)\HanaCommAss.letter.doc

EXHIBIT “A”

Comments Provided by the Nahiku Community Association and Responses to Comments

COMMENTING PARTY		QUESTIONS/CONCERNS	ACTION/RESPONSE
1	Dawn Lono (Hana Council office)	i) Car rental companies should be asked to inform customers of roadway etiquette when travelling Hana Highway	HDOT acknowledges the problem of tourists unfamiliar with the windy road drive too slow without allowing local residents to pass. There is a recommendation in the Plan in Chapter 6 ^a , <i>Related Issues Along the Hana Highway</i> regarding collaborating with rental car companies, airlines, travel experience companies and the Hawaii Tourism Authority to develop and provide travel literature to educate visitors on driving etiquette along Hana Highway. A small example is included in the <i>Maui Visitor Guide</i> magazine publication which has in their Hana coverage, “Tips for the Trip to Hana: Enjoy a relaxed pace on the road, but pull over often to wave local drivers by – they’ve seen the sights before and prefer to hurry home”.
2		ii) Confirm spelling of Kawaihapapa Bridge	There is both a Kawaihapapa Stream Bridge at Mile Point 26.60 and a Kawaipapa Stream Bridge at Mile Point 33.44. Ward Mardfin, Hana Advisory Committee member and researcher on Hana Bridges; Melody Cosma, Hawaiian Language teacher at Hana High & Elementary School; and Kauai Kanakaole, Hana High School teacher & research writer on water resources in Hana District, were all consulted with the spellings of the bridge lists included in the Plan. Additional community input to be received.
3	Carole Noel (resident member)	i) Expressed concern regarding traffic congestion at Waikani Bridge. On her way to the meeting, she observed 30 to 40 cars backed up at the bridge. This conditions creates an issue for emergency vehicles passing through this area.	HDOT acknowledges the parking problems at Waikani Bridge and has installed some NO PARKING signs and will continue to monitor if additional signage may be necessary.
<p>^a The Chapter references in Exhibit “A” are those found in the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan.</p> <p>^b Italicized responses are those provided by presenters at each meeting. Non-italicized responses are those prepared following the meeting.</p>			

COMMENTING PARTY		QUESTIONS/CONCERNS	ACTION/RESPONSE
4		ii) Inez Ashdown had compiled names of all bridges. Project team should check this reference.	MHI staff researched Inez Ashdown's writings on file at the Baily House Museum and did not find additional documentation concerning names of all the Hana Highway bridges.
5		iii) What is life expectancy of bridge?	<i>T. Moy -With proper maintenance, concrete structures can last for many years. Plan will address maintenance requirements for bridges^b.</i>
6	Paul Bodnar (Public Safety Director)	There are 52 bridges leading to Hana.	<i>T. Moy- Clarified that scope of plan is limited to DOT section of highway which includes 43 bridges. The other bridges noted fall under the County.</i>
7	Corina Kekahuna (Treasurer)	i) Is project team working with East Maui Irrigation (EMI)?	<i>T. Moy - Noted that EMI facilities will not be part of project scope but coordination will be undertaken with them.</i>
8		ii) EMI ditches run through Hanawi. She asked if water issues will be discussed with EMI?	<i>T. Moy - Noted that water issues are separate from the plan, which focuses on bridge preservation.</i>
9	Kamalu Kahookele (President)	i) Explained that Makapipi Bridge crosses Kapipiwai Stream. Origin of "Makapipi" name should be researched since it does not align with the stream name.	MHI consulted with Kauai Kanakaole and confirmed with her maps that show Makapipi Bridge crossing Makapipi Stream. Awaiting further community input on Hawaiian stream & place names, spellings and meaning.
10		ii) Since bridge signs have been stolen, vandalized, or hidden by vegetation, will signage be restored?	<i>T. Moy – Preparation of a signage program/plan will be part of Preservation Plan.</i> <i>P. Santo - This is a goal of DOT. More permanent solution needs to be identified since name plates get removed and taken.</i>
<p>^a The Chapter references in Exhibit "A" are those found in the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan.</p> <p>^b Italicized responses are those provided by presenters at each meeting. Non-italicized responses are those prepared following the meeting.</p>			

COMMENTING PARTY		QUESTIONS/CONCERNS	ACTION/RESPONSE
11		iii) Night safety is an issue at Puaa Kaa State Wayside Park. Does DOT have plans to add security lighting at the park?	<i>T. Moy - This particular issue is not part of plan work.</i>
12		iv) Waikani Bridge (aka Wailuanui) adjoining roadway approaches are eroding. Mapu Kekahuna reiterated this concern.	The Hana Highway resurfacing, vicinity of Honomanu Bridge to Waikani Bridge, Project No. 360.AB-01-11M is currently addressing pavement on the bridge and expected to be completed by summer 2015.
13	Mapu Kekahuna (Vice President)	i) EMI's water conveyance systems traverse near bridge structures, and work should ensure that water supply will not be contaminated by construction by products.	<i>P. Santo - Contractors will follow BMPs to ensure downstream waters not adversely impacted. EA will be prepared for each bridge improvement as applicable. T. Moy added that plan will consider construction methods needed to ensure best practices in future work.</i>
14		ii) Who is the project's archaeologist?	<i>T. Moy - Archaeologist is Tanya Lee-Greig of Cultural Surveys Hawaii.</i>
15		iii) Need to have weight limit signs at each bridge and weigh stations should be considered to ensure weight limits are respected.	<p><i>T. Moy responded that although truck weights are not monitored, the team recognizes the importance of respecting bridge capacities.</i></p> <p>Weigh station were discontinued due to lack of manpower and costs. Also, weigh stations were ineffective due to truckers quickly alerting fellow truckers on the presence of the weigh station.</p>
16		iv) Any bridge closure will adversely impact the East Maui community, especially for emergency vehicles. He asked that DOT consider impacts.	<p><i>T. Moy - Agreed and stated that bridge construction methods will be part of plan to ensure that disruption to the community is minimized.</i></p> <p>The Preservation Plan verifies existing traffic volumes to develop an effective Traffic Management Plan. It gives future designers of any specific bridge or culvert a general approach for phasing traffic control and detours during construction. See Chapter 5, <i>Public Safety</i>. Also, The Plan recommends temporary bypass bridges and use of detours as much as possible. Additional discussion concerning traffic routing options are included in Chapter 6, <i>Related Issues Along the Hana Highway</i>.</p>
<p>^a The Chapter references in Exhibit "A" are those found in the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan.</p> <p>^b Italicized responses are those provided by presenters at each meeting. Non-italicized responses are those prepared following the meeting.</p>			

COMMENTING PARTY		QUESTIONS/CONCERNS	ACTION/RESPONSE
17		v) Which bridges have the highest priority in terms of need for attention?	<i>A. Chiu provided DOT's initial list of priorities as follows: Makanali, Kailua, Puohokamoa, Punalau, Kopili'ula, Kapa'ula, Makapipi, Helele'ike'oha, Ula'ino, and Mokulehu</i>
18		vi) What specific issues are of concern with these bridges?	<i>T. Moy - Carrying capacity is the criteria which is being considered. DOT conducts bridge inspections every 2 years to maintain an accurate record of conditions.</i>
19		vii) Water conveyance capacities of the bridges should be recognized. During heavy rains, standing water will be found on some bridges.	Future design teams will implement specific bridge deck and approach designs to avoid ponding or standing water in the travelway.
20		viii) In addition to bridges, DOT should be aware that the roadway itself needs repair and maintenance. DOT's response times have been slow.	DOT Maui District has an annual special maintenance program (SMP) that allots funding to incrementally complete road resurfacing on the islands of Maui, Molokai, and Lanai. The cycle of resurfacing generally occurs every ten years subject to the availability of funding. In the interim, HDOT's road maintenance crews will perform routine pavement maintenance within their resource capabilities.
^a The Chapter references in Exhibit "A" are those found in the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan.			
^b Italicized responses are those provided by presenters at each meeting. Non-italicized responses are those prepared following the meeting.			

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APPENDIX 7

ATTACHMENT 7u

Department of Planning
(Warren Osako, Cultural Resources
Commission Chair)
Response Letter



MUNEKIYO HIRAGA

Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT

Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT

Mark Alexander Roy
VICE PRESIDENT

Tessa Munekiyo Ng
VICE PRESIDENT

Gwen Ohashi Hiraga
SENIOR ADVISOR

Mitsuru "Mich" Hirano
SENIOR ADVISOR

February 19, 2015

Warren Osako, Chair
c/o Annalise Kehler, Staff Planner
County of Maui
Department of Planning
One Main Plaza, Suite 619
2200 Main Street
Wailuku, Hawaii 96793

SUBJECT: Hana Highway Route 360, Bridge Preservation Plan within the
Hana Highway Historic District, Federal Aid Project No. BR-
360(012)

Dear Chair Osako:

Thank you for allowing the State Department of Transportation (DOT), Highways Division's consultant team conduct its presentation on the Hana Highway Bridge Preservation Plan's purpose, scope, and methodology. As you recall, the July 3, 2014 meeting was held in conjunction with a first round of stakeholder meetings to gather early input and respond to questions and concerns.

We would like to provide responses to those questions and concerns brought up by the Commission, which are summarized in the attached **Exhibit "A"**.

The project team will be embarking on its second cycle of stakeholder meetings. A copy of the team's meeting schedule is attached hereto as **Exhibit "B"**. Please note that the consultant team and DOT representatives will be a part of the Commission's March 5, 2015 meeting which will be held in Lahaina.

Warren Osako, Chair
February 19, 2015
Page 2

On behalf of DOT, we wish to express our appreciation for the Commission's participation in this project's public input process.

Very truly yours,



for Charlene Shibuya
Senior Associate

CSS:yp

Attachments

cc: Paul Santo, Department of Transportation, Highways Bridge Design Section
Cody Aihara, Nagamine Okawa Engineers
Alison Chiu, Fung Associates

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EXHIBIT “A”

Comments Received at the Cultural Resources Commission July 3, 2014 Meeting and Responses to Comments

COMMENTING PARTY		QUESTIONS/CONCERNS	ACTION/RESPONSE
1	Commissioner Mowat	Noted her support for the project team's efforts in meeting with community stakeholders.	No action/response required.
2	Commission Six	Noted she attended the Hana Cultural Center & Museum Board presentation and supports the objective of the Preservation Plan to ensure that public input is incorporated as part of the plan.	No action/response required.
3	Commission Chair Osako	Are limits of the Hawaii Register and National Register for the Hana Highway Historic District identical?	<i>T. Moy - Responded they are the same.</i>
4	Commissioner Ricalde-Garcia	i) What prompted the project?	<i>P. Santo - Explained that Senator Kalani English recognized the need to comprehensively consider public safety and historic preservation requirements for bridges within the Historic District. He, therefore, sought funding to implement the project. The implementation phase of the work, which is separate from The Preservation Plan, will be a lengthy process.</i>
Notes: <ul style="list-style-type: none"> The Chapter references in the above table are those found in the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan. Italicized responses are those provided by presenters at each meeting. Non-italicized responses are those prepared following the meeting. 			

COMMENTING PARTY	QUESTIONS/CONCERNS	ACTION/RESPONSE
5	ii) How will traffic issues be addressed?	<p><i>T. Moy - Explained that there have been suggestions provided as to how to better manage traffic flow along the highway. For example, suggestions have been made to have car rental companies provide educational information to customers, informing them of roadway etiquette when driving along Hana Highway. However, it should be noted that the project is to provide a plan for safe bridges.</i></p> <p>The Preservation Plan (hereafter referred to as "The Plan") verifies existing traffic volumes to develop an effective Traffic Management Plan. It gives future designers of any specific bridge or culvert, a general approach for phasing traffic control and detours during construction. See Chapter 5, <i>Public Safety</i>. Also, The Plan recommends temporary bypass bridges and use of detours as much as possible. Additional discussion concerning traffic routing options are included in Chapter 6, <i>Related Issues Along the Hana Highway</i>.</p> <p>HDOT acknowledges the problem of tourists unfamiliar with the windy road drive too slow without allowing local residents to pass. There is a recommendation in the Plan in Chapter 6, <i>Related Issues Along the Hana Highway</i> regarding collaborating with rental car companies, airlines, travel experience companies and the Hawaii Tourism Authority to develop and provide travel literature to educate visitors on driving etiquette along Hana Highway. A small example is included in the <i>Maui Visitor Guide</i> magazine publication which has in their Hana coverage, "Tips for the Trip to Hana: Enjoy a relaxed pace on the road, but pull over often to wave local drivers by – they've seen the sights before and prefer to hurry home".</p>
<p>Notes:</p> <ul style="list-style-type: none"> • The Chapter references in the above table are those found in the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan. • Italicized responses are those provided by presenters at each meeting. Non-italicized responses are those prepared following the meeting. 		

COMMENTING PARTY		QUESTIONS/CONCERNS	ACTION/RESPONSE
6		iii) Noted that traffic congestion and its effect to emergency vehicles should be considered.	Comment acknowledged.
7	Commissioner Kubota	Noted his support for the team's community outreach process	Comment acknowledged.
<ul style="list-style-type: none"> • The Chapter references in the above table are those found in the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan. • Italicized responses are those provided by presenters at each meeting. Non-italicized responses are those prepared following the meeting. 			

EXHIBIT “B”

**Meeting Schedule to Discuss 75% Draft of the Hana Highway Historic
District Bridge Preservation Plan**

Date	Place	Time	Name of Organization
Meeting No. 1: Community Organizations			
Monday, February 23, 2015	Helene Hall 150 Keawa Place Hana, Hawaii 96713	9:00 a.m.	Hana Lani Senior Citizens, Hana Cultural Center/Museum Board
		5:00 p.m.	Hana town meeting inviting the entire Hana community, Hana Community Association, Nahiku Community Association, Kipahulu Community Association, Kaupo Community Association, and Aha Moku district representatives
Meeting No. 2: Maui County Cultural Resources Commission			
Thursday, March 5, 2015	West Maui Senior Center 788 Pauoa Street Lahaina, Hawaii 96713	9:00 a.m.	Cultural Resources Commission (open to the public)
Meeting No. 3: Hana Advisory Committee			
Monday, March 9, 2015	Old Hana High School Cafeteria 5101 Uakea Road Hana, Hawaii 96713	4:00 p.m.	Hana Advisory Commission (open to the public)

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APPENDIX 7

ATTACHMENT 7v

Kipahulu Community Association
(Theodore Firestone, President)
Response Letter



MUNEKIYO HIRAGA

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Michael T. Munekiyo
PRESIDENT

Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT

Mark Alexander Roy
VICE PRESIDENT

Tessa Munekiyo Ng
VICE PRESIDENT

Gwen Ohashi Hiraga
SENIOR ADVISOR

Mitsuru "Mich" Hirano
SENIOR ADVISOR

February 18, 2015

Via mail and email: tadpole9@earthlink.net

Theodore Firestone, President
Kipahulu Community Association
c/o Kipahulu Ohana (Tweetie Lind)
P.O. Box 454
Hana, Hawaii 96713

SUBJECT: Hana Highway Route 360, Bridge Preservation Plan within the
Hana Highway Historic District, Federal Aid Project No. BR-
360(012)

Dear Mr. Firestone:

Thank you for participating last summer, in the first round of meetings with the State Department of Transportation (DOT), Highways Division's consultant team to hear about the project's purpose, scope, and methodology. As you recall, the meetings were held to gather early input and respond to questions, and concerns.

As a follow-up to the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan that was previously distributed, we would like to provide responses to those questions and concerns brought up by the Association at its August 16, 2014 meeting. See **Table 1**.

Table 1.

**Comments Provided by the Kipahului Community
Association and Responses to Comments**

COMMENTING PARTY		QUESTIONS/CONCERNS	ACTION/RESPONSE
1	K. Kanekoa	Will the Plan take care of potholes on the Waikani Bridge approaches?	<p><i>C. Shibuya responded that bridge work would probably take care of the immediate approaches but overall deteriorated road conditions would normally be handled under the routine road resurfacing and repair projects^a.</i></p> <p><i>The Hana Highway resurfacing, vicinity of Honomanu Bridge to Waikani Bridge, Project No. 360.AB-01-11M is currently addressing pavement on the bridge and expected to be completed by summer 2015.</i></p>
2	T. Lind	Questioned whether parking along Hana Highway at Waikani Bridge can be restricted?	<p><i>C. Shibuya responded that it would be difficult to get people to comply and to enforce the restriction.</i></p> <p>HDOT can nonetheless, install NO PARKING signs along problematic spots to at least discourage parking from obstructing smooth vehicular traffic flow.</p> <p>HDOT acknowledges the parking problems at Waikani Bridge and has installed some NO PARKING signs and will continue to monitor if additional signage may be necessary.</p>
3	G. Lind	What can be done about slow tourist drivers not pulling over to allow locals to pass?	<p><i>C. Shibuya stated that a suggestion has been made for State DOT to ask that the Drive Guides for rent-a-cars have information instructing them to pull over for local drivers. Another idea could be message stickers in the rent-a-cars. C. Shibuya responded that the team is looking into the best method of achieving this.</i></p> <p>HDOT acknowledges the problem of tourists unfamiliar with the windy road drive too slow without allowing local residents to pass. There is a recommendation in the Plan in Chapter 6^b, <i>Related Issues Along the Hana Highway</i> regarding collaborating with rental car companies, airlines, travel experience companies and the Hawaii Tourism Authority to develop and provide travel literature to educate visitors on driving etiquette along Hana Highway. A small example is included in the <i>Maui Visitor Guide</i> magazine publication which has in their Hana coverage, "Tips for the Trip to Hana: Enjoy a relaxed pace on the road, but pull</p>

Theodore Firestone, President
February 18, 2015
Page 3

COMMENTING PARTY		QUESTIONS/CONCERNS	ACTION/RESPONSE
			over often to wave local drivers by – they've seen the sights before and prefer to hurry home".
^a Italicized responses are those provided by presenters at each meeting. Non-italicized responses are those prepared following the meeting. ^b The Chapter references in Table 1 are those found in the 75% Draft of the Hana Highway Historic District Bridge Preservation Plan.			

We look forward to presenting our preliminary findings and receipt of your additional questions and/or comments.

Thank you again for your participation in this important project.

Very truly yours,



Charlene Shibuya
Senior Associate

CSS:yp

cc: Paul Santo, Department of Transportation, Highways Bridge Design Section
Cody Aihara, Nagamine Okawa Engineers
Alison Chiu, Fung Associates

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APPENDIX 7

ATTACHMENT 7w

Hana Lani Senior Citizens
(Annie Gilbert, President)
Response Letter



MUNEKIYO HIRAGA

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Michael T. Munekiyo
PRESIDENT

Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT

Mark Alexander Roy
VICE PRESIDENT

Tessa Munekiyo Ng
VICE PRESIDENT

Gwen Ohashi Hiraga
SENIOR ADVISOR

Mitsuru "Mich" Hirano
SENIOR ADVISOR

February 18, 2015

Via mail and email: aluanujr@hotmail.com

Annie Gilbert, President
Hana Lani Senior Citizens
P.O. Box 262
Hana, Hawaii 96713

SUBJECT: Hana Highway Route 360, Bridge Preservation Plan within the
Hana Highway Historic District, Federal Aid Project No. BR-
360(012)

Dear Ms. Gilbert:

Thank you for allowing the State Department of Transportation (DOT), Highways Division's consultant team do a presentation on the project's purpose, scope, and methodology at your August 25, 2014 meeting. As you recall, the meeting was held in conjunction with a first round of community meetings to gather early input and respond to questions and concerns.

As a follow-up to the previously distributed 75% Draft of the Hana Highway Historic District Bridge Preservation Plan, we would like to provide responses to those questions and comments provided by your organization. See the attached **Exhibit "A"**.

We look forward to presenting our preliminary findings and receipt of your additional questions and/or comments at your next meeting.

Annie Gilbert, President
February 18, 2015
Page 2

Thank you again for your participation in this important project.

Very truly yours,



 Charlene Shibuya
Senior Associate

CSS:yp
Attachment

cc: Paul Santo, Department of Transportation, Highways Bridge Design Section
Cody Aihara, Nagamine Okawa Engineers
Alison Chiu, Fung Associates

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EXHIBIT "A"

Comments Provided by Hana Lani Senior Citizens and Responses to Comments

COMMENTING PARTY		QUESTIONS/CONCERNS	ACTION/RESPONSE
1	Ulu	Requested bridge names be printed on the bridges	<p>The consultant team continues to track names, spelling and a proposed design, possibly in the CRM walls, along with community input. As the bridges are rehabilitated, appropriate means of attaching a bridge name will be devised.</p> <p><i>P. Santo - This is a goal of DOT. More permanent solution needs to be identified since name plates get removed and taken^a.</i></p>
2	A. Gilbert	Will bridges keep its look?	<p><i>C. Shibuya responded that the goal is to have repairs or rehabilitation retain its historic looks. To retain its historic appearance, replacement will complement existing bridge appearance, in terms of proportion and character-defining details, in keeping with National Preservation Standards and consultation with the SHPD.</i></p>
^a Italicized responses are those provided by presenters at each meeting. Non-italicized responses are those prepared following the meeting.			

APPENDIX 8
2nd Cycle of Community
Meetings – Preliminary
Plan Stage
(February to March 2015)

APPENDIX 8

ATTACHMENTS & INDEXES

Preliminary Plan Stage
(February to March 2015)

**HANA HIGHWAY, ROUTE 360 BRIDGE PRESERVATION PLAN
WITHIN THE HANA HIGHWAY HISTORIC DISTRICT
STAKEHOLDER LIST
MEETING TRACKING MATRIX AND 75% DRAFT REPORT DISTRIBUTION
Second Cycle of Meetings and Consultations (February to March 2015)**

Meeting No.	Meeting/Report Distribution Coordinator	Stakeholder	Category	Required Participant(s)	Action	Consultation Purpose
1	MH	Kaupo Community Association Linda Clark, President	Community Organization	NOEI, FAI, ATA, HDOT	Meeting held 11:00 a.m. at Old Kaupo Schoolyard. The 75% Draft Report findings and preliminary bridge preservation recommendations were presented for input. Transmitted 75% Draft Report (CD copy) on 1/28/15 to Alohalani Smith, outgoing President who forwarded information to Linda Clark, current President, for the Association's review and comment. Meeting held 9:30 a.m. on 2/23/15 at Old Hana School Cafeteria. The 75% Draft Report findings and preliminary bridge preservation recommendations were presented for input.	Review and comments on 75% Draft Report. See Attachment "A" , 2/21/15 meeting summary.
2	MH	Hana Lani Senior Citizens Annie Gilbert, President and Hana Cultural Center & Museum – Board of Directors Harolen Kaiwi, President	Community Organization	NOEI, FAI, MH, ATA, HDOT, SHPD	Transmitted 75% Draft Report (CD copy) on 1/28/15 to Annie Gilbert and Harolen Kaiwi, for the organizations' review and comment.	Review and comments on 75% Draft Report. See Attachment "B" , 2/23/15 meeting summary.
3	MH	Hana residents and East Maui community associations (Hana, Nahiku, Kipahulu, and Kaupo)	Community At Large	NOEI, FAI, MH, ATA, HDOT, SHPD	Meeting held 4:00 p.m. on 2/23/15 at Helene Hall. The 75% Draft Report findings and preliminary bridge preservation recommendations were presented for input. Transmitted 75% Draft Report (CD copy) to all the community association presidents on 1/28/15 to 1/30/15.	Review and comments on 75% Draft Report. See Attachment "C" , 2/23/15 meeting summary.
4	MH	Maui County Cultural Resources Commission (CRC) Warren Osako, Chair	Advisory	NOEI, FAI, MH, CSH, HDOT	Meeting held on 3/5/15 at the CRC's regularly scheduled monthly meeting date. The 75% Draft Report findings and preliminary bridge preservation recommendations were presented for input. Transmitted 75% Draft Report (CD copy) on 1/28/15 to Warren Osako for the commission's review and comment.	Review and comments on 75% Draft Report. See Attachment "D" , 3/5/15 meeting summary, Planning Department staff recommendations, and CRC meeting minutes.

ATA Austin Tsutsumi & Associates, Inc.
CSH Cultural Surveys of Hawaii
FAI Fung Associates, Inc.
FHWA Federal Highway Administration

HDOT Hawaii Department of Transportation
MH Munekiyo Hiraga
NOEI Nagamine Okawa Engineers, Inc.
SHPD State Historic Preservation Division

Meeting No.	Meeting/Report Distribution Coordinator	Stakeholder	Category	Required Participant(s)	Action	Consultation Purpose
5	MH	Maui County Hana Advisory Committee (HAC) Clayton Carvalho, Jr., Chair	Advisory	NOEI, FAI, MH, ATA, HDOT	Meeting held on 3/9/15 at the HAC's regularly scheduled meeting date. The 75% Draft Report findings and preliminary bridge preservation recommendations were presented for input. Transmitted 75% Draft Report (CD copy) on 1/28/15 to Clayton Carvalho, Jr. for the committee's review and comment.	Review and comments on 75% Draft Report. See Attachment "E" , 3/9/15 meeting summary and HAC meeting minutes.
6	NOEI/FAI	Federal and State Agencies; Federal Highway Administration; State Department of Transportation, Highways Division, Bridge Design Section, and Environmental Design Section; State Historic Preservation Division, Architecture Branch and Archaeology Branch; Outdoor Circle; Hawaii Historic Foundation	Federal and State Government, Community Organization	NOEI, FAI, FHWA, SHPD, HDOT, CSH	Meeting held on 3/24/15 to present 75% Draft Report findings and preliminary bridge preservation recommendations were presented along with a summary of community concerns for input. Transmitted 75% Draft Report (CD copy) on 1/28/15 to 1/30/15 to all parties in advance of meeting.	Review and comments on 75% Draft Report. See Attachment "F" , 3/24/15 meeting summary.
7	MH	State Historic Preservation Division, Maui Archaeologists (Morgan Davis and Jenny Pickett)	State Government	Not Applicable (N/A)	Transmitted 75% Draft Report (CD copy) on 1/28/15 for review and comment.	Review and comments on 75% Draft Report.
8	MH	Mayor Alan Arakawa	Elected Official	N/A	Transmitted 75% Draft Report (CD copy) on 1/28/15 for review and comment.	Review and comments on 75% Draft Report.
9	MH	County Department of Public Works (David Goode, Director)	Agency	N/A	Transmitted 75% Draft Report (CD copy) on 1/28/15 for review and comment.	Review and comments on 75% Draft Report.
10	MH	County Department of Public Works, Engineering Division (Cary Yamashita, Chief)	Agency	N/A	Transmitted 75% Draft Report on (CD copy) on 1/28/15 for review and comment.	Review and comments on 75% Draft Report.

Meeting No.	Meeting/Report Distribution Coordinator	Stakeholder	Category	Required Participant(s)	Action	Consultation Purpose
11	MH	County Department of Planning (William Spence, Director; Michele McLean, Deputy Director; Clayton Yoshida, Current Division Head; and Analise Kehler, Staff Planner) Senator Kalani English	Agency	N/A	Transmitted 75% Draft Report (CD copy) on 1/28/15 for review and comment.	Review and comments on 75% Draft Report.
12	MH	Representative Mele Carroll	Elected Official	N/A	Transmitted 75% Draft Report (CD copy) on 1/28/15 for review and comment.	Review and comments on 75% Draft Report.
13	MH	Councilmember Robert Carroll	Elected Official	N/A	Transmitted 75% Draft Report (CD copy) on 1/28/15 for review and comment.	Review and comments on 75% Draft Report.
14	MH		Elected Official	N/A	Transmitted 75% Draft Report (CD copy) on 1/28/15 for review and comment.	Review and comments on 75% Draft Report.
15	MH	Kyle Nakanelua, Po'o, Aha Moku Advisory Council, Maui Representative	Hawaiian Cultural Organization	N/A	Transmitted 75% Draft Report on 1/29/15 for review and comment. Additional CDs provided for relaying project information to individual moku representatives.	Review and comments on 75% Draft Report.
16	MH	Jocelyn Costa Maui Po'o-Moku O Kahekili; Hamakualoa moku	Hawaiian Cultural Organization	N/A	Transmitted 75% Draft Report (CD copy) on 1/29/15 through Kyle Nakanelua for review and comment.	Review and comments on 75% Draft Report.
17	MH	Kimo Ka'a'a Maui Po'o-Moku O Kahekili Koolau moku	Hawaiian Cultural Organization	N/A	Transmitted 75% Draft Report (CD copy) on 1/29/15 through Kyle Nakanelua for review and comment.	Review and comments on 75% Draft Report.
18	MH	Shane Senenci Maui Po'o-Moku O Kahekili Hana moku	Hawaiian Cultural Organization	N/A	Transmitted 75% Draft Report (CD copy) on 1/29/15 through Kyle Nakanelua for review and comment.	Review and comments on 75% Draft Report.
19	MH	Leona Bak Nomura Maui Po'o-Moku O Kahekili Hamakualoa moku	Hawaiian Cultural Organization	N/A	Transmitted 75% Draft Report (CD copy) on 1/29/15 through Kyle Nakanelua for review and comment.	Review and comments on 75% Draft Report.
20	MH	Hana Community Association Sol Church, President	Community Association	N/A	Transmitted 75% Draft Report (CD copy) on 1/28/15 to Sol Church for the association's review and comment.	Review and comments on 75% Draft Report.
21	MH	Nahiku Community Association (NCAMAUJ@gmail.com) Kamalu Kahookele, President	Community Association	N/A	Transmitted 75% Draft Report on 1/28/15 to Kamaku Kahookele, for the association's review and comment.	Review and comments on 75% Draft Report.

Meeting No.	Meeting/Report Distribution Coordinator	Stakeholder	Category	Required Participant(s)	Action	Consultation Purpose
22	MH	Haiku Community Association	Community Association	N/A	Transmitted 75% Draft Report on 1/28/15 to Jennifer Livingston for the association's review and comment.	Review and comments on 75% Draft Report.
23	MH	Kipahulu Community Association Theodore Firestone, President	Community Association	N/A	Transmitted 75% Draft Report (CD copy) on 1/28/15 to Theodore Firestone c/o Tweetie Lind, Board Member, for the association's review and comment.	Public review and comments on 75% Draft Report.
24	MH	Hana Cultural Center and Museum Harolen Kaiwi, President	Public Location	N/A	Transmitted 75% Draft Report (CD copy) on 1/28/15 to Harolen Kaiwi for the board members review and comment. Also, provided a hard copy the 75% Draft Report binder for public review.	Public review and comments on 75% Draft Report.
25	MH	Hana Council District Office	Public Office	N/A	Transmitted hard copy of 75% Draft Report binder for public review.	Public review and comments on 75% Draft Report.
26	MH	Hana Public & School Library	Public Location	N/A	Transmitted hard copy of 75% Draft Report binder for public review.	Public review and comments on 75% Draft Report.
27	MH	HDOT, Maui District Office	Public Office	N/A	Transmitted hard copy of 75% Draft Report binder for public review.	Public review and comments on 75% Draft Report.
28	MH	Ward Mardfin, Researcher of Hana Bridges & Hana Advisory Committee, Vice Chair	Individual	N/A	Transmitted 75% Draft Report (CD copy) on 1/28/15 for review and comment.	Public review and comments on 75% Draft Report.
29	MH	Kaui Kanakaole (Teacher/Researcher of East side water resources)	Individual	N/A	Transmitted 75% Draft Report (CD copy) on 1/28/15 for review and comment.	Public review and comments on 75% Draft Report.
30	MH	East Maui Irrigation (Garret Hew, HC&S Manager)	Private Water Resource Company	N/A	Transmitted 75% Draft Report (CD copy) on 1/28/15 for review and comment.	Public review and comments on 75% Draft Report.

APPENDIX 8

ATTACHMENT 8a

FEBRUARY 21, 2015

Kaupo Community Association
Meeting Summary



MUNEKIYO HIRAGA

Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT

Karlynn Fukuda
EXECUTIVE VICE PRESIDENT

Mark Alexander Roy
VICE PRESIDENT

Tessa Munekiyo Ng
VICE PRESIDENT

September 10, 2015

MEETING MEMORANDUM

Date of Meeting: Saturday, February 21, 2015 (10:00 a.m.)

Participants: Ferdinand Cajigal (*State Department of Transportation*)
Cody Aihara (*Nagamine Okawa Engineers, Inc.*)
Tonia Moy (*Fung Associates, Inc.*)
Alison Chiu (*Fung Associates, Inc.*)
Virginia Murison (*Fung Associates, Inc.*)
See Attached Sign-In Sheet

Subject: Kaupo Community Association Meeting Regarding Hana Highway
Historic District, State Department of Transportation Bridge
Preservation Plan (75% Draft Report)

Purpose

Present to the Kaupo community, the 75% Draft Report's findings and preliminary bridge preservation recommendations to receive public comments on the document.

1. T. Moy introduced herself, the project team, and gave a brief project background.
2. T. Moy opened the PowerPoint presentation with background information on the first round of meetings to gather early input, explained the projects' purpose, scope, methodology, project timelines, and format of the draft report. Handouts of the PowerPoint presentation were provided along with a list of bridge/stream names prepared from best available sources. She pointed out that attendees requested in the first round of meetings to have bridge names installed therefore, the team requests review and comment on the list of names for corrections if any.
3. V. Murison continued with the presentation covering bridge designations of exceptional value identifying examples of special architectural bridge features.

4. A. Chiu continued with the presentation covering a summary of proposed actions depending upon each bridge's exceptional feature.
5. C. Aihara described proposed treatment recommendations for character-defining railing, approach walls, and structural components of bridges. She also explained what hillside bridges are and what 'Found Culverts' mean. She closed the presentation by pointing out where hard copies of the 75% Draft Report can be reviewed and/or downloaded from the internet and where comments can be sent.

Community Questions and Comments

1. Comment regarding drainage/overtopping at certain bridges. C. Aihara noted that the team requested identification of these overtopping locations from community members during the first round of meetings, but no further information was received.
2. Question regarding funding sources for bridge work and maintenance. T. Moy noted that six (6) bridges have been identified as priority bridges where work will be completed first, but bridge repairs along the entire route will take several years.
3. Question regarding if bridges have been examined for safety. C. Aihara explained that inspections occur every two (2) years. This information helps the team tailor its recommendations for bridges on a case-by-case basis. Follow-up question regarding if any bridges are dangerous. C. Aihara said no, but there are the six (6) priority bridges that will be addressed first.
4. Comment from J. Starr that executive summary and report is not yet available to community. Kaupo Community Board Member replied that the report was made available to them by Charlene Shibuya via CD. Team noted that hard copies of the reports are available to community members at the Department of Transportation (DOT) Highways Maui District Office, Hana Council District Office, Hana Public School Library, and the Hana Cultural Center and Museum, as well as available for download online.
5. Comment regarding TL-2 crash rating and posted speed limit; concern that the new bridge railing is being "overdesigned." Team explained that Hawai'i DOT provided the TL-2 crash test criteria to meet current codes.
6. Request from J. Starr that no metal railings be used on the interior railings, to keep the historic look of the bridges. It should be noted that to meet the crash test criteria, replacement of the historic railing without the metal interior railings would be required. Team is attempting to maintain the historic material per Secretary of Interior Standards. However, community should comment if they prefer new railings over the historic railings.

7. Question regarding why the additional rail would be placed on the interior of the bridge instead of the exterior side. T. Moy explained that the objective is to avoid obscuring the view of the historic bridges as you are driving along the curve. C. Aihara also noted that the interior railings would help protect the existing historic rails.
8. Question about how CRM façade abutments would be replaced and concern that it would not be the same as it currently is and was originally constructed. C. Aihara explained the process of numbering and photographing all of the rocks in existing configuration. The abutments would then be taken apart and re-created to look exactly as it was originally. The main issue for this would be the cost. A follow up question was asked if this has been done before in Hawaii and if there is a bridge example? C. Aihara noted this process has been used and would follow-up with more information as to where.
9. Question regarding if the gap between interior rail and existing historic rail serves as a pedestrian walkway. C. Aihara clarified that the space is not a pedestrian walkway; the gap is necessary for deflection in a crash, but the amount of space will depend on the type of crash tested railing that is chosen. The maximum space would be approximately 18 inches which is not sufficient for pedestrian use.
10. Comment from J. Starr to take into account safe passage for bicyclists and pedestrians along the route. Community seemed open to the possibility of a separate path as a future consideration. Follow up comment from J. Starr to include/engage members of the Hawaii Bicycling League and Maui Bicycling League in community discussions.

Follow-up Information

Follow-up to Question 8: Information regarding a bridge in Hawaii where the CRM abutments were replaced as such was incorrect; but it is feasible to have the contractor do this. Again, cost will be a contributing consideration item.

Prepared from meeting notes taken by Cody Aihara (Nagamine Okawa Engineers, Inc.)



Charlene S. Shibuya
Senior Associate

CSS:yp
Attachment

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Hana Highway Route 360 Bridge Preservation Plan within the Hana Highway Historic District
Kaupo Community Association
Saturday, February 21, 2015
Attendance Sheet

PLEASE PRINT

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS OR OTHER CONTACT INFORMATION	BOARD POSITION OR GUEST
1.	SAM AINA			
2.	M. DOMEN			
3.	LI BAISA			
4.	ROBERT ALE			
5.	John Kaili Hoopai - Smith			
6.	Le'anani Domen			
7.	Kahlela Po'ohi			
8.	Aloha Aina			
9.	Kate Christa			
10.	Kauwila Hanchett			
11.	Linda Domen			

Hana Highway Route 360 Bridge Preservation Plan within the Hana Highway Historic District
Kaupo Community Association
Saturday, February 21, 2015
Attendance Sheet

PLEASE PRINT

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS OR OTHER CONTACT INFORMATION	BOARD POSITION OR GUEST
12.	Nollani (Kawai) Tolutan			
13.	Ralph Pimauna			
14.	Stan & Nanji Cohen North			
15.	Dino			
16.	Steve H. H. H.			
17.	Sharon Smith			
18.	Helen Nielsen			
19.	Jonathan Starr			
20.	Linda Clark			
21.				
22.				

APPENDIX 8

ATTACHMENT 8b

FEBRUARY 23, 2015

Hana Lani Senior Citizens & Hana
Cultural Center & Museum Board
Meeting Summary



MUNEKIYO HIRAGA

Planning. Project Management. Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT

Karlynn Fukuda
EXECUTIVE VICE PRESIDENT

Mark Alexander Roy
VICE PRESIDENT

Tessa Munekiyo Ng
VICE PRESIDENT

September 8, 2015

MEETING MEMORANDUM

Date: February 23, 2015 (9:30 a.m.)

From: Charlene Shibuya, Senior Associate

Subject: Hana Lani Senior Citizens and Hana Cultural Center & Museum Board Meeting Regarding Hana Highway Historic District, State Department of Transportation Bridge Preservation Plan (75% Draft Report)

Participants: See attached Sign-In Sheet
Paul Santo (*State Department of Transportation*)
Cody Aihara (*Nagamine Okawa Engineers, Inc.*)
George Gutierrez (*Nagamine Okawa Engineers, Inc.*)
Tonia Moy (*Fung Associates, Inc.*)
Alison Chiu (*Fung Associates, Inc.*)
Virginia Murison (*Fung Associates, Inc.*)
Katie Folio (*Cultural Surveys Hawaii*)
Adrienne Wong (*Austin Tsutsumi & Associates, Inc.*)
Matt Nakamoto (*Austin Tsutsumi & Associates, Inc.*)
Tyler Fujiwara (*Austin Tsutsumi & Associates, Inc.*)
Eric Takamine (*Austin Tsutsumi & Associates, Inc.*)
Anna Broverman (*State Historic Preservation Division – Architecture Division*)
Jessica Puff (*State Historic Preservation Division – Architecture Division*)
Charlene Shibuya (*Munekiyo Hiraga*)

PURPOSE:

Present to the Hana Lani Senior Citizens and Hana Cultural Center & Museum Board member invitees, the 75% Draft Report's findings and preliminary bridge preservation recommendations, and to receive public comments on the document.

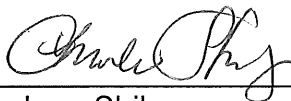
MEETING SUMMARY:

1. P. Santo introduced himself, the project team, and gave a brief project background.

2. T. Moy opened the PowerPoint presentation with some background on the first round of meetings to gather early input, explained the project's purpose, scope, methodology, timelines, and format of the draft report. Handouts of the PowerPoint presentation were provided along with a list of bridge/stream names prepared from best available sources. See **Exhibit "1"**. She pointed out that attendees requested in the first round of meetings to have bridge names installed on the bridges. For this reason, the team requests review and comment on the list of names for corrections if any.
3. V. Murison continued with the presentation covering bridge designations of exceptional value identifying examples of special architectural bridge features.
4. A. Chiu continued with the presentation covering a summary of proposed actions, which are dependent upon each bridge's exceptional feature.
5. C. Aihara described proposed treatment recommendations for character-defining railing, approach walls, and structural components of the bridges. She also explained what hillside bridges are and what 'Found Culverts' mean. She closed the presentation by pointing out where hard copies of the 75% Draft Report can be reviewed and/or downloaded from the internet and where comments can be sent.
6. J. Roggenbuck questioned the difference between a culvert and a bridge. C. Aihara responded that the culverts are structures less than twenty (20) feet wide.
7. E. Kalama asked about having to go all around Kaupo with bridge work closures. C. Aihara responded that temporary bypass bridges are being looked at.
8. J. Roggenbuck asked if the bridges are fixed, will it have to meet strict modern standards? P. Santo responded that replacements will be in-kind with a stronger capacity to carry emergency vehicles and rehabilitations will have to be brought up to standards.
9. A. Gilbert asked what "exceptional" means. V. Murison pointed out attributes making a bridge exceptional such as date panels, best example of type, unique features, oldest, etc. as noted on slide no. 12.
10. A gentleman asked if there have been any bridge failures. P. Santo said not on Maui but there was an instance in Hanalei, Kauai
11. M. Mattson was concerned that after all the bridges get reinforced, that the 10 ton weight limit postings remain. He later inquired about the damaged Lower Nahiku wooden bridge status. About four (4) months ago some work was done to restrict passage to only pedestrians but nothing has happened since. C. Shibuya responded that she will check if someone from the County could call him.

12. C. Fuhrmann mentioned that there are some bridges that have water ponding issues. She cited the solid parapet bridge with the green shack building. She was asked if specific locations could be identified. She later called P. Santos to report that all the solid railing bridges had that ponding issues. Additionally, open type railing bridges had ponding issues but she could not identify the specific bridge names.

There being no other business, the meeting was adjourned at about 11:30 a.m.



Charlene Shibuya
Senior Associate

CS:tn
Attachment

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Hana Highway Route 360 Bridge Preservation Plan within the Hana Highway Historic District

Hana Lani Senior Citizens
Hana Cultural Center & Museum

Monday, February 23, 2015 – 9:00 a.m.
Old Hana High School Cafeteria

Attendance Sheet

PLEASE PRINT

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS OR OTHER CONTACT INFORMATION	BOARD POSITION OR GUEST
1.	Annie Gilbert			
2.	MAE REVILHA			
3.	Sara Boecher			
4.	Carolyn Heel			
5.	Dwain Kamai			
6.	Russell Kanana			
7.	Lorraine Akoi			
8.	RANDY OROZCO			
9.	Myrna S. Costello			
10.	Billy Hooper Jr			
11.	Carol Lapan			

Hana Highway Route 360 Bridge Preservation Plan within the Hana Highway Historic District

Hana Lani Senior Citizens
Hana Cultural Center & Museum

Monday, February 23, 2015 – 9:00 a.m.
Old Hana High School Cafeteria
Attendance Sheet

PLEASE PRINT

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS OR OTHER CONTACT INFORMATION	BOARD POSITION OR GUEST
12.	Susan Hankins			
13.	Heather Mattson			
14.	Max Mattson			
15.	Ben Heald			
16.	Larry Law Jr			
17.	Elliot K. Kalama			
18.	George Fink			
19.	Carlyn Fink			
20.	Mary R Estrella			
21.	Ingrid A Estrella			
22.	Jette Roggenbuck			

Hana Highway Route 360 Bridge Preservation Plan within the Hana Highway Historic District

Hana Lani Senior Citizens
Hana Cultural Center & Museum

Monday, February 23, 2015 – 9:00 a.m.
Old Hana High School Cafeteria
Attendance Sheet

PLEASE PRINT

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS OR OTHER CONTACT INFORMATION	BOARD POSITION OR GUEST
23.	Joloyee KAI			
24.	Mary Hapman			
25.	Vette Samson			
26.	Roxanna Smith			
27.	Fanny P. Kahuila			
28.				
29.				
30.				
31.				
32.				
33.				

APPENDIX 8

ATTACHMENT 8c

FEBRUARY 23, 2015

Hana Town Community
Meeting Summary



MUNEKIYO HIRAGA

Planning, Project Management, Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT

Karlynn Fukuda
EXECUTIVE VICE PRESIDENT

Mark Alexander Roy
VICE PRESIDENT

Tessa Munekiyo Ng
VICE PRESIDENT

September 8, 2015

MEETING MEMORANDUM

Date: February 23, 2015 (5:00 p.m.)

From: Charlene Shibuya, Senior Associate

Subject: Hana Community Meeting Regarding Hana Highway Historic District, State Department of Transportation Bridge Preservation Plan (75% Draft Report)

Participants: See attached Sign-In Sheet
Paul Santo (*State Department of Transportation*)
Cody Aihara (*Nagamine Okawa Engineers, Inc.*)
George Gutierrez (*Nagamine Okawa Engineers, Inc.*)
Tonia Moy (*Fung Associates, Inc.*)
Alison Chiu (*Fung Associates, Inc.*)
Virginia Murison (*Fung Associates, Inc.*)
Tanya Lee-Greig (*Cultural Surveys Hawaii*)
Adrienne Wong (*Austin Tsutsumi & Associates, Inc.*)
Matt Nakamoto (*Austin Tsutsumi & Associates, Inc.*)
Tyler Fujiwara (*Austin Tsutsumi & Associates, Inc.*)
Eric Takamine (*Austin Tsutsumi & Associates, Inc.*)
Charlene Shibuya (*Munekiyo Hiraga*)

PURPOSE:

Present to the Hana community, the 75% Draft Report's findings and preliminary bridge preservation recommendations, and to receive public comments on the document.

MEETING SUMMARY:

1. P. Santo introduced himself, the project team, and gave a brief project background.

2. T. Moy opened the PowerPoint presentation with some background on the first round of meetings to gather early input, explained the project's purpose, scope, methodology, timelines, and format of the draft report. Handouts of the PowerPoint presentation were provided along with a list of bridge/stream names prepared from best available sources. See **Exhibit "1"**. She pointed out that attendees requested in the first round of meetings to have bridge names installed on the bridges. For this reason, the team requests review and comment on the list of names for corrections if any.
3. V. Murison continued with the presentation covering bridge designations of exceptional value identifying examples of special architectural bridge features.
4. A. Chiu continued with the presentation covering a summary of proposed actions which are dependent upon each bridge's exceptional feature.
5. C. Aihara described proposed treatment recommendations for character-defining railing, approach walls, and structural components of bridges. She also explained what hillside bridges are and what 'Found Culverts' mean. She closed the presentation by pointing out where hard copies of the 75% Draft Report can be reviewed and/or downloaded from the internet and where comments can be sent.
6. Returning to Slide 35, showing a crash-tested rail/parapet in front of the existing railing/parapet, A. Singer and S. Sinenci asked whether the space was for a pedestrian walkway and how wide is it? C. Aihara clarified that the space is not a walkway. Space is a buffer to protect the original railing from damage in case the inside rail is crashed into. Width ranges from 2 to 22 inches.
7. D. Atay expressed concern about replacement bridges similar to the County's, that are straight and does not follow the curve of the road, creating difficulty for emergency and larger vehicles to negotiate.
8. K. Flanders who is a postal carrier was concerned with her deliveries between Haiku to Kaupo being delayed if construction road closures are done. C. Aihara stated that the plan calls for temporary bypass bridges to maintain traffic flow during construction. M. Nakamoto stated that temporary bypass bridges will be considered or alternatives such as night construction or closing one side of a two-lane bridge. Their traffic studies have noted that there is very little traffic between 9:00 pm and 5:00 am.
9. L. Cosma questioned how the team came up with the 40 ton load limit. C. Aihara responded that current Federal codes require this design loading.

10. L. Cosma also commented that the safety rails are not visible at night and people crash into them. She noted that not all bridges have reflectors, and expressed the need for safety reflectors. She added that the "No Parking" signs installed at the bridges are not effective as visitors do not adhere to the no parking restrictions.
11. A. Singer questioned whether there is enough space at the approaches to the bridges. M. Nakamoto explained that temporary bridges will have to maintain at least one (1) lane.
12. K. Flanders complained that cars rented by visitors are impediment to traffic flow.
13. D. Atay made a suggestion to install solar cameras such as at Waikani Bridge to automatically issue citations. P. Santo explained that legislation is needed to allow that system of enforcement.
14. E. Comeaux stated that bicycle traffic has become a problem.
15. D. Atay asked what is the bridge priority list and expected schedule. P. Santo explained that funds are programmed for six (6) bridges. After this bridge preservation plan is finalized later in the year, design consultants will be selected in 2016. Within the next two (2) years, DOT is looking at a few bridges to first get them upgraded to a 15 ton capacity to help emergency vehicles. D. Atay stated to leave it at the 10 ton limit in order to better control truck cargo loads. P. Santo clarified that although some bridges will have their load limit upgraded, the route can remain posted at 10 tons per the community's desire. Also, until all the bridges are upgraded, the route will stay posted at a 10 ton limit.
16. D. Lind asked if the safety rails suggested are already accepted. C. Aihara stated that the example safety rails proposed have been used in other state Departments of Transportation, but not in Hawaii.
17. D. Lind stated that the old bridges' drainage systems are not working, resulting in ponding conditions. C. Aihara explained that paving over deck drain holes will be addressed. S. Sinenci added that bridges like Waikani, Waikamoi, and Makapipi that are close to the cliffs have a lot of water running down onto them.
18. S. Sinenci asked if asphalt can stay off the concrete decks. He is concerned with asphalt oils going into river beds. P. Santo stated that at one time, residents wanted the asphalt paving to cover the concrete surface, but concrete would be fine with HDOT. Team needs community input as to which is preferred.
19. M. Bergau noted that the road approaches to the Puakaa Stream Bridge are curve linear but the bridge is straight. This condition will need to be fixed.

There being no other business, the meeting was adjourned at about 7:00 p.m.



Charlene Shibuya
Senior Associate

CS:tn
Attachment

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Hana Highway Route 360 Bridge Preservation Plan within the Hana Highway Historic District

Hana Community Meeting

Monday, February 23, 2015 --4:00 p.m.

Helene Hall, 150 Keawa Place

Attendance Sheet

PLEASE PRINT

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS OR OTHER CONTACT INFORMATION	BOARD POSITION OR GUEST
1.	Anna-Lisa Singer			
2.	Mike Bergman			
3.	Shane Sinceri			
4.	Don Aray			
5.	SHARIE SINCERI			
6.	SPENCER HAMILTON			
7.	Linore Kalamuna			
8.	Davia Lund			
9.	Chris Gauder			
10.	Tom Bacon			
11.	Guest Ann Peacock			Nahiku

Hana Highway Route 360 Bridge Preservation Plan within the Hana Highway Historic District

Hana Community Meeting

Monday, February 23, 2015 – 5:00 p.m.

Helene Hall, 150 Keawa Place

Attendance Sheet

PLEASE PRINT

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS OR OTHER CONTACT INFORMATION	BOARD POSITION OR GUEST
12.	<i>Heavenly</i>			
13.	<i>Heavenly</i>			
14.	<i>Heavenly</i>			
15.	<i>Barbara Ann Benton</i>			
16.	<i>Kathleen Flanders</i>			
17.				
18.				
19.				
20.				
21.				
22.				

APPENDIX 8

ATTACHMENT 8d

MARCH 5, 2015

Cultural Resources Commission
Meeting Summary & Minutes

September 8, 2015

MEETING MEMORANDUM

Date of Meeting: March 5, 2015

Participants:

**Cultural Resources Commission
Members**

Warren Osako, *Chair*
Bruce U'u, *Vice Chair*
Owana Salazar
Bridget Mowat
Arlene Ricalde-Garcia
Frank Skowronski

Ferdinand Cajigal, *State Department of
Transportation – Maui District Engineer*
Cody Aihara, *Nagamine Okawa Engineers, Inc.*
George Gutierrez, *Nagamine Okawa Engineers, Inc.*
Tonia Moy, *Fung Associates, Inc.*
Alison Chiu, *Fung Associates, Inc.*
Virginia Murison, *Fung Associates, Inc.*
Kathleen Folio, *Cultural Surveys Hawaii*
Charlene Shibuya, *Munekiyo Hiraga*

County Planning Department Staff

Michele Chouteau McLean, Deputy
Director
Annalise Kehler, Staff Planner

Subject: Cultural Resources Commission Meeting Regarding the Hana Highway
Historic District, State Department of Transportation Bridge Preservation
Plan (75% Draft Report)

PURPOSE:

Present to the Maui County Cultural Resources Commission, the 75% Draft Report's findings and preliminary bridge preservation recommendations, and to answer questions and receive comments on the document.

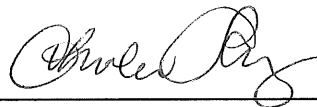
The project presentation was part of the Maui County Cultural Resources Commission, March 5, 2015 Agenda - Item F. New Business.

MEETING SUMMARY:

1. C. Shibuya introduced herself, the project team, and explained the team's presentation today being the second of three (3) rounds of presentations, with the first round presentations done last summer to the Commission and various east side community associations and organizations. Hard copies of the PowerPoint slides were provided to each member along with a Bridge/Stream Hawaiian Name list.
2. T. Moy opened the PowerPoint presentation with some background on the first round of meetings to gather early input, explained the project's purpose, scope, methodology, timelines, and format of the draft report. Handouts of the PowerPoint presentation were provided along with a list of bridge/stream names prepared from best available sources. See **Exhibit "1"**. She pointed out that attendees requested in the first round of meetings to have bridge names installed on the bridges. Therefore, the team requests review and comment on the list of names for corrections, if any.
3. V. Murison continued with the presentation covering bridge designations of exceptional value identifying examples of special architectural bridge features.
4. A. Chiu continued with the presentation covering a summary of proposed actions which are dependent upon each bridges exceptional feature.
5. C. Aihara described proposed treatment recommendations for character-defining railing, approach walls, and the fact that structural components of bridges. She also explained what hillside bridges are and what 'Found Culverts' mean. She closed the presentation by pointing out where hard copies of the 75% Draft Report can be reviewed and/or downloaded from the internet and where comments can be sent.
6. B. U'u thanked the team for the presentation and said the report looks thorough. His concern are bridge names and the fact that some are unnamed. C. Shibuya explained that the recent box culvert/bridge that was widened near the County baseyard and Hana Fire Station, did not have a name but was given the stream name that it spans.
7. B. Mowat asked if the team consulted with anyone on the list of names. She stressed the importance of Hawaiian names being correctly spelled. A misspelling may change its meaning. C. Shibuya explained that various community associations, senior citizens and individuals were consulted on the bridge/stream names. Ward Mardfin who has researched Hana bridges extensively, Kauai Kanakaole a researcher of streams, and Melody Cosma, a Hawaiian language teacher were individuals consulted.

8. B. U'u has never seen bridges hit. C. Aihara explained that there have been crashes and repairs which are structurally sound for current restrictions. Federal standards require 40 ton ratings which can accommodate emergency vehicles.
9. F. Skowronski asked which bridges will be replaced. F. Cajigal responded that Honomanu Stream Bridge will be replaced. C. Aihara further explained that its deck is not original. Prestressed concrete planks were added and asphalt was placed over the deck. A replacement would be similar to its original constructed features.
10. A. Ricalde-Garcia thought the bridges need for replacement sounds critical. C. Aihara assured her that the Honomanu Bridge is monitored on a one year inspection cycle versus the standard two (2) year cycle. Also, its replacement will look like the original bridge.
11. O. Salazar loved reading the report and got to know the road and Hana better. She expressed that the report was done with a lot of Aloha and gave a Mahalo to the team. She noted that three (3) of forty-three (43) bridges are unnamed and two (2) of the twelve (12) culverts are named. She recommends naming the bridges/culverts as noted on historical records without diacritical marks and have the name with diacritical marks documented separately on a website to avoid inaccuracies. Diacritical marks were created so people can understand how to pronounce the words. She added that other countries/places do not provide pronunciation notations.

The meeting was concluded at 2:20 p.m.



Charlene S. Shibuya
Senior Associate

CSS:yp
Attachment

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March 5, 2015

MEMORANDUM

TO: Chair Warren Osako
and Members of the Cultural Resources Commission

FROM: William Spence, Planning Director

SUBJECT: **REQUEST FOR COMMENTS ON THE DRAFT PRESERVATION PLAN FOR THE BRIDGES WITHIN THE HĀNA BELT ROAD HISTORIC DISTRICT (#01000615), FEDERAL-AID PROJECT NO. BR-0360(12), FOR STATE-OWNED BRIDGES ALONG ROUTE 360 (HĀNA HIGHWAY), HAMAKUALOA, KO'OLAU, AND HĀNA MOKU, MAUI, HAWAII'**

THE PLAN

Munekiyo and Hiraga, Inc. is requesting comments from the Cultural Resources Commission (Commission) regarding the Draft Preservation Plan for the above-referenced project prepared by Nagamine Okawa Engineers, Inc. and Fung Associates, Inc. on behalf of the Hawai'i State Department of Transportation (DOT), Highways Division. The draft plan was submitted to the Planning (Department) on January 29, 2015.

The purpose of this report is to develop a context-sensitive preservation plan for forty-three (43) historic bridges and twelve (12) historic culverts located within the Hāna Belt Road Historic District, which is listed in the National and State Registers of Historic Places.

Enclosed is a printed copy of the plan's Executive Summary as well as a CD containing a PDF of the entire draft plan.

BACKGROUND

The Hāna Belt Road Historic District was listed in the National register of Historic Places in 2001, and originally consisted of seventy-three (73) contributing bridges and one (1) non-contributing bridge. Since 2001, at least two (2) county-owned bridges along Route 330 (Pi'ilani Highway) have been replaced. Based on the information provided in the bridge matrix in the Executive Summary, it appears that none of the state-owned bridges along Route 360 have been replaced within the last fifty (50) years.

The scope of this preservation plan is defined by those forty-three (43) State-owned bridges within the historic district, along Route 360, from Hoalua Stream Bridge on the Huelo side to Kawaipapa Stream Bridge on the Hāna side. The plan also focuses on twelve (12) culverts.

The plan identifies known conditions of each bridge or culvert, as well as possible strategies the DOT could apply to each structure. Although it is a basis for the direction of future projects, the plan does not include construction or design. Conceptual drawings are included in Section B of this plan; however, the document is solely intended to aid DOT's future planning goals and objectives.

DEPARTMENT RECOMMENDATIONS

The Department provides the following comments on the Draft Preservation Plan:

1. Correct page A-9, Hoalua Stream Bridge is not on the Kipahulu side, it is on the Huelo side of Route 360.
2. Correct the discrepancy between the number of bridges mentioned in the Overview on page A-5 (43 bridges), and the number of bridges shown in the table in the Scope of Survey on page A-9 (40 bridges).
3. Although Cultural Surveys Hawai'i recently performed an Archaeological Literature Review (ALR) for Route 360, an Archaeological Inventory Survey (AIS) should be completed as well. The ALR provided a summary of cultural background and information on existing archaeological conditions. The ALR also confirmed that there are a number of known archaeological sites along Route 360, particularly along the stream drainages and gulches, which could potentially be affected by activities proposed in the plan. Based on this information, the Department concurs with Cultural Surveys Hawai'i's recommendation that an AIS should be completed prior to commencing major structural repairs. The Department also concurs with the recommendation that the scope of the AIS should be developed in consultation with the State Historic Preservation Division, Archaeology Branch.
4. Use diacritical marks for Hawaiian words and names consistently throughout the report, or do not use them at all.
5. Correct the discrepancy between the number of culverts mentioned in the Overview (12 culverts) and the Transportation Management Plan (10 culverts) on page G-125 of the appendix.
6. Clarify whether an engineer has performed a structural assessment or inspection of each bridge. It is difficult to discern what the structural treatment recommendations are based on. Are the recommendations the result of an engineering study? If so, the report or study should be included in the appendix of this preservation plan. The plan recommends demolition and reconstruction of concrete rubble masonry abutments and piers for nearly every bridge, which could negatively affect character defining features. Is it structurally necessary to do this to every bridge?

7. The plan recommends the addition of TL-2 crash-tested rails across the interior faces of some historic bridge parapets and railings. Photos of the proposed TL-2 crash-tested rails should be included. It is difficult to determine what effect these rails might potentially have on character defining features without visual examples. Additionally, aside from the lack of sufficient 16' width for some single lane bridges, it is unclear why some historic bridge railings are recommended to be removed and rebuilt and others are recommended to be retrofitted with the addition of the crash-tested rails.
8. Although the bridge matrix in the Executive Summary identifies the general features of each structure, it is crucial that the plan identifies the character defining features of each resource. Character defining features are the features that are to be protected if possible as they contribute to the significance of a structure. Identification of character defining features should be a top priority as the treatment recommendations need to take these particular features into consideration. Standard No. 2 and No. 6 of the Secretary of the Interior's Standards for the Treatment of Historic Properties - Adapted for Historic Bridges state the following regarding character defining features:
 2. The original character defining qualities or elements of a bridge, its site, and its environment should be respected. The removal, concealment, or alteration of any historic material or distinctive engineering or architectural feature should be avoided.
 6. Deteriorated structural members and architectural features shall be retained and repaired, rather than replaced. Where the severity of deterioration requires replacement of a distinctive element, the new element should match the old in design, texture, and other visual qualities and where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.
9. A copy of the draft plan should be transmitted to the State Historic Preservation Division, Architecture Branch for review and comment.
10. The Oregon Department of Transportation (ODOT) has produced a Historic Bridge Preservation Plan and a Historic Bridge Field Guide, which provide helpful information and strategies that could be applied to this plan. Both documents are available on ODOT's website.
11. The plan would benefit from the development of a routine maintenance program that includes clearing bridges of biological growth and debris, ensuring bridges are draining properly, and repairing crumbling or missing sections of parapets and railings. Information contained in Preservation Briefs 1, 15, and 47 could be adapted for use in the development of a routine bridge maintenance program. Additionally, removal of excessive asphalt overlay should seriously be considered for as many structures as possible. Excessive asphalt overlay decreases historic railing heights and adds considerably to the bridges' loads.

Chair Warren Osako
and Members of the Cultural Resources Commission
March 5, 2015
Page 4

Attachments

xc: Suzette Esmeralda, Secretary to Boards and Commission (PDF)
Annalise Kehler, Cultural Resources Planner (PDF)
CRC File
General File
LRD Correspondence File

WRS:AAK:jlj

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**CULTURAL RESOURCES COMMISSION
REGULAR MEETING
MARCH 5, 2015**

*** All documents, including written testimony, that was submitted for or at this meeting are filed in the minutes file and are available for public viewing at the Maui County Department of Planning, One Main Plaza, 2200 Main Street, Suite 315, Wailuku, Maui, Hawai'i. ***

A. CALL TO ORDER

The regular meeting of the Cultural Resources Commission (Commission) was called to order by Chairperson Warren Osako, at approximately 10:45 a.m., Thursday, March 5, 2015, in the Lahaina Civic Center, Social Hall, 1840 Honoapiilani Highway, Lahaina, Island of Maui.

A quorum of the Commission was present (see Record of Attendance).

Chair Warren Osako: The March 5, 2015 meeting of the Maui County Cultural Resources Commission is now called to order.

B. PUBLIC TESTIMONY

Chair Osako: At this time, if there is anyone that wishes to testify on any agenda item, you may do so at this time, however, please be aware that if you do testify now, I would suggest that you wait till the agenda item is called, if you can spend the time, otherwise, if you stay through the meeting and want to testify again, there might not be any time left at that time. So is there anyone at this time who would like to testify on any agenda item? If not, we'll move on to the next --

Unidentified Speaker: ...(inaudible - not speaking into the microphone) --

Chair Osako: Any item on the agenda. You want to testify now? Okay.

Ms. Yvette Hill: Hello. My name's Yvette Hill, and I own Atomic Tattoo on Prison Street, and we're an upstairs location, and we had to take our -- we had a small neon open sign in the window because our business looks like it's closed if we don't have an open sign 'cause it's, the way the sun hits the building, it's very dark, so we've been told we can't have any kind of open sign whatsoever because it goes against the rules, and our business has lost revenue because we don't have an open sign and it looks like it's closed. And also, we're not allowed to have any, you know, pictures of the services that we offer, and businesses that have store fronts, you can see in the window, you can see all the things they sell, you can see jewelry, you can see clothes, you can see all the things that they offer, but we offer tattoos, and piercings, and Henna, but we can't have any pictures so we can't show what we offer, and so it's kind of, in a way, unfair for our kind of business with such strict rules of what we can have and what's considered a sign, and what's, you know, allowable, so, you know, our sign right now just has our Atomic -- Maui Atomic Tattoo on it, and we also offer other things, and we can't really afford to make another \$1800 to have, you know, kind

VOTED: ***to approve the Amendment to Section 12-531-7(11), Standards and Criteria Relating to the Duties and Authority of the Maui County Cultural Resources Commission, to replace the existing Lahaina Historic Districts sign guidelines in their entirety with the "Lahaina Historic Districts Design Guidelines, Sign Guidelines," dated March 2015.***

Chair Osako: Motion carried. Okay, at this time we'll break for lunch and, if everyone concurs, we'll have them do their presentation while we're having lunch. Yeah, five-minute recess while they set up.

(A recess was called at 1:00 p.m., and the meeting reconvened at 1:08 p.m.)

Chair Osako: The meeting is back in session while we're eating, and they're going to do their presentation.

F. NEW BUSINESS

Munekiyo & Hiraga, Inc on behalf of the Hawai'i Department of Transportation requesting comments on the Draft Preservation Plan for Bridges within the Hāna Belt Road Historic District, Federal-Aid Project No. BR-0360(12), for state-owned bridges along Route 360 (Hāna Highway), Hamakualoa, Ko'olau, and Hāna moku, Maui, Hawai'i.

The Commission may provide comments on the draft preservation plan.

Ms. Kehler: So, really quickly, I just wanted to go over a few points of the staff report. This is a preservation plan for the bridges that are within in the Hana Highway Historic District, but it's only those state-owned bridges along Route 360, and, let's see, okay, so it starts with Hoalua Stream Bridge, in Huelo, and then it goes to the Kawaipapa Bridge on the Hana side, and there's 43 bridges and 12 culverts that are part of this plan. And then there's a number of comments from staff, but the main ones are just kind of about doing AISs in the beginning of the project, before construction or implementation of the plan happens, just to make sure that there aren't problems later on down the road, and then minor things like diacriticals. One question staff had was regarding structural treatment recommendations, it's unclear in the plan whether or not the recommendations are the result of an engineering study. And then another recommendation was to include photos of proposed crash-tested rails so we could see what sort of visual impact these would have on the bridges. And then the other thing was the routine maintenance program. There's little things that can be done to bridges that don't affect -- they don't have a negative effect on the historic integrity, like clearing them of biological growth and debris, and then also,

another consideration would be the removal of excessive asphalt overlay on the bridges, exploring that option to the fullest extent possible would be good because not only does the asphalt add -- or decrease the railing height of the bridges, it also adds to the load of the bridges, and so that was a major consideration that should be considered. Okay, and that's -- that's it.

Mr. Hopper: I just wanted to clarify the Commission's role. They're being asked for comments here. Is there any permit or anything that the department has to grant, no SMAs, anything like that? Just curious.

Ms. Kehler: No. This plan is not a construction plan, it's just a plan, and then we're not granting permits, no. This is not. So it's a comment on a plan.

Mr. Hopper: Okay.

Ms. Kehler: Yeah.

Mr. Hopper: So basically comments to the state. They're seeking comments as part of their due diligence and --

Ms. Kehler: Yes.

Mr. Hopper: And so your comments will be forwarded as a body to them in addition to the staff comments? Right?

Ms. Kehler: Yes.

Mr. Hopper: Okay.

Ms. Kehler: They have the staff comments.

Mr. Hopper: So the staff comments where the department made, and then you guys can separately make comments - you can echo them, or I suppose you can add additional comments if you'd like.

Ms. Kehler: Yes.

Mr. Hopper: Okay.

Ms. Charlene Shibuya: Thank you, Chair and Commissioners. We appreciate you allowing us to present while you're eating lunch, and we promise not to give you indigestion. My name is Charlene Shibuya, I'm with the planning firm of Munekiyo &

Hiraga, and on behalf of the State Department of Transportation, I'm here with a team, to present this draft preservation plan, as Annalise said, it's a preservation plan and not construction plan at this point. And with here I have Historic Architectural Specialist, Tonia Moi, Virginia Murison and Alison Chiu, and then I have a structural engineer, Mody Aihara, from Nagamine Okawa Engineers, Inc., and then we have Katie Folio, she's the archaeologist from Cultural Surveys Hawaii, and of course, we had to bring Ferdinand Cajigal, the Maui District Engineer. And to kinda not to speed up things, but I'm going to just turn it over to Tonia, and I think some of you remember that we came in -- came before you last summer to -- on the onset of the project to get early input and now this is the second phase where we're trying to get comments for the 75% draft report. Okay, so, Tonia, I turn it over to you.

Ms. Tonia Moy: Thank you, and sorry we have to do this during your lunch, but so we handed out to everybody our slide presentation, which is not a slide presentation, but now a handout, so if you can kinda take a look at it, I'll just let you know how it's laid out so you can kinda following along, if possible, and this is the slide presentation that we gave to community groups, so we've been out to Hana, we've been out to Kaupo, we've been out to Hana many times. But anyway, so this is the same presentation that we've been giving for the past month or so. So if you look at it, it's four slides on one sheet, and there's tiny page numbers in the bottom right corner, I don't know if you can see it, but so it goes left right, left right, left right, then down to the bottom left right, and then flip the page, it'll be left right, left right, just so you know, 'cause this is what I'll be following. Yeah, that's one. Correct.

So I'm going to just give kind of an overview of the project, and I'm going to, you know, to help speed things up because I know you guys are familiar with the project, and Annalise did a summary for you and all, so I'm going to give an overview of the project, and after I'm done, Virginia's going to talk about -- she's going to describe the features of the bridges, and Alison will recommend -- Alison will go over our recommended treatments that we've developed over the past half-a-year or little over half-a-year, and Cody, the structural engineer, will talk about the structural issues and how we're handling that, trying to keep the historic preservation aspects and keeping in mind the whole time we're talking about public safety.

So I know you guys have been given the executive summary, which is the, you know, actually that's the key to everything. The whole report is like, you know, 500 pages, and we don't really expect people to read everything, but if you look at the executive summary, we have a chart and that one goes through every single bridge, and the recommendations for every single bridge, and that's just the summary, you know, the whole report will have much more than that, but just if we could get your comments on that, that's kind of the crucial part for us, and once we get everybody's input as to how we treat each bridge, then

we can go back and populate everything. So yeah, I think that's it. Yeah. It looks like that big, but, yeah, that's it.

So I'll skip the next slide, which is talking about who the project team is, but as you can see, we have civil engineers, traffic engineers on the team too so they can -- they helped us with how to handle the approach and, you know, water issues, and traffic issues, and all that stuff. Slide no. 3 is just telling the overall project purpose, and mostly, I'll just summarize it by saying that DOT has to go through federal funds to get their bridges done, federal funds means Section 106, Section 106 leads to historic consultation, so they are just wanting to make that goal smoother as they continue on, so with this as a plan, if we have everybody's kind of buy-in early in their plan, then the next construction step to go easier, to go faster, should go cleaner, you know, the community will have had some buy-in already, so that's the whole idea behind this plan. And again, it's not a construction plan. It is, you know, a preservation plan.

So the purpose of this meeting that was, you know, we talked to the communities 'cause it's important to get the community feedback; Hana, it's important to like how does the traffic affect them, so we went, you know, early on, and we went back again to go over what our recommendations are.

So the schedule on the next page shows that, like last summer, we did go around to the communities, we met with you guys, some have changed since we came, but, anyway, and I guess the two things that came to mind that they really were very adamant about is keeping it one land, keeping it -- keeping it very rural, no big highway, no, you know, no straightening out of the road, and that kind of thing, and the other thing that they were kind of keen on is to put back the Hawaiian names or put back the names for every bridge. So also, we gave you a handout that have the -- you know, we've done some research, we tried to get the names of most of the bridges, or from people we knew or contacts that like Charlene had, local contacts, but and so we've been handing out to the community too to get their feedback on that 'cause we feel the local community would be the best ones to give us, you know, if we have it right, basically. So if any of you know also, we would love feedback on that sheet that has all the Hawaiian names.

So, currently, of course we're going through the concept and drawings, and you folks have the summary so that's -- and we're going to come back next summer around -- with the final report and, hopefully, we'll have addressed all the concerns that everybody had.

And then I'm going to skip the next slide because it just talks about where the district is, and you guys know that, Annalise went through that, and then there's a big sheet which just has the names of all the bridges, I'm going to skip that. So we're going to go onto slide no. 10, and, you know, it was -- this is the specific project objectives, and this is more for

like people who haven't been -- who haven't known what the project is before, but just to -- a really quick summary is we're trying to make it acceptable for both public safety and for historic preservation, and that was the goal of this whole preservation plan. We had to weigh both for each bridge.

And here's the next slide, page 11. It kinda gives you an idea of how -- a summary on how to use the report, so the whole report, which is really big, it's basically two parts. The first part kinda tells you the why, like the regulatory, the, you know, Secretary of Interior guidelines, what we're following, and then some of the structural guidelines. And then the other chapter 6 we have in there, it's called "Related Issues," because the other really key thing that was bothering most of the Hana residents is the traffic, or the tourists, so, you know, actually they came up with some really good ideas on how to handle that, like putting a note in the tourist driving manual, like having a brochure go in there that would say, you know, like courtesy and etiquette, driving etiquette, and actually SHPD talked about having funding it through CRC to do a brochure for it, but anyway, so a lot of people are, you know, kind of really interested in that, but that's a related issue, it's not really a bridge issue, but it's something that came up over and over again, so we developed this extra little chapter that just kind of brings all the community concerns into one spot.

And then the second section will be where each bridge is going to have like the -- what the recommended treatment is of it, how, you know, it'll say get an AIS before you do anything; it'll say, you know, like this particular bridge is too narrow, it might have to be widened on one side; this is the design you should do for it, etcetera. So that's going to be more for like the designers so that they can each, you know, when they do a construction project, they can grab a section and, hopefully, kind of run with it.

So now I'm going to turn it over to Virginia, and she's going to kinda give you an overview on how we were sort of thinking on each of the bridges and the features.

Ms. Virginia Murison: As we approach the analysis of each of the bridges, we were finding that there are certain bridges that are just exceptional, they're exceptional because of character defining features that are unique to that bridge that they're particularly in tact, or they're ...(inaudible)... example of a type of bridge, so of the 43 state bridge and 12 culverts that are recognized in the historic district nomination, we have -- we have created 17 -- we designated 17 bridges and 1 culvert as exceptional, and I'll be going over and summarizing just the types of exceptional bridges we're talking about. All of the remaining 26 bridges and 11 culverts are designated as contributing, which they are in the historic district. And then there's a point of clarification, the 12 historic culverts that we continually refer too are really just short bridges. Federal Highways defines the bridge as a span of 20 feet or more, and there are 12 historic culverts that are shorter than 20 feet, but they look just like

miniature bridges so -- there are other culverts that Cody will be addressing that are more modern structures.

We also were -- I'm now on slide no. 13, page no. 13. As we evaluated each bridge for condition and safety, we were guided by some recommendations and principles. One is to maintain a 16-foot minimum width to allow, in event of a really difficult situation, to allow for two vehicles to squeak by each other, it's not intended to make it a two-lane bridge, but we felt that the recommendation from DOT was 16 feet would be the safest minimum. Our railing and approach guardrails are required by code to be 27 inches; actually, the historic ones, and you mentioned the asphalt removal, which is definitely a key component in our recommendation, the original railings are actually 42 inches, but some of them net out at 30 inches or less because of some there's so many layers. And also, as a bridge is rehabilitated, DOT wants to strengthen it to carry a load limit of 40 tons. It won't be posted. The highway won't be posted for that. But the intent is not to post it for that to not encourage giant cement trucks and so on, but to make it feasible and safe for emergency vehicles and other vehicles.

Of the 43 bridges, there are 31 that represent open picket design, and there are 5 culverts that are open picket. All of the open picket designs are 16 feet or wider, and we're going to get to some specific recommendations about railings, but -- and that will relate to the 16-foot width. Four of the five culverts will require widening because -- and the details will be addressed in a later slide. None of the historic railings meet safety standards for crash testing, and Cody will go into a little more detail about crash testing. So of the open picket exceptional bridges, we have a non-slide 15, and each slide, each of the subsequent slides here has a very short summary of the, on the far right column, the bridge number and name, and then the -- a summary of the proposed action, it's not all the details of it, and on the left, it indicates the quantity. So there are four curved bridges. Each bridge, again, exceeds 16 feet. Bridge no. 14, I'm sorry, I have to go back to the chart, and my ...(inaudible)... is not very good, Palauhulu Bridge is currently striped for two lanes but we're -- one of our recommendations is that that will be re-striped as a one-lane bridge, it's currently used as a one-lane bridge.

Then there are three of the exceptional bridges, there are three that are arched bridges. The most longest and most extensive of which is the Waikani Stream Bridge, and that is an exceptional single stand bridge. That actually connected the two halves of the road when it was finally completed in 1926. It is the only picket railing bridge where we are requesting a width exception. It is 18 feet wide. What we are trying to do is to preserve as many of the historic railings as possible, and so a recommended approach for doing that is to install a crash tested metal rail, simple and open as possible, we're still working on that, that will protect the historic railing, allow it to remain in place, and allow the roadway width to be 16 feet. In the case of the Waikani Bridge, it would be slightly less

than 16 feet, so that's the only open picket bridge where we're requesting a width exception.

There are two open pick distinctive -- bridges with distinctive piers. Kapaulu Stream Bridge rest on this amazing lava rock outcropping mid-span, and Honomaele Bridge, no. 42, rest on a solid concrete pier wall, which dates back to a 1906 bridge. The bridges we're looking at in this were constructed between the years 1908 and, basically, 1930. Both bridges are just barely wider than 16 feet, so to place this crash railing inside would significantly reduce the clear driving width, so this is beginning where we're going to be recommending that if they're 16 feet or wider, but not wide enough for the crash rail, that a, not a matching, the closest match that we can get to, open picket railing, that meets crash testing criteria would be used on these bridges, and there are a number of those.

Page no. 18, the Waiokamilo Bridge, Stream Bridge, and an adjacent culvert, which just again looks like a mini bridge, are the only bridges on the Hana Highway with a Greek Cross design. They were actually built earlier, and then widened in 1937. And in 1937, DOT was using this Greek Cross design, so there are other examples in Hawaii, but no other examples on the Hana Highway.

And the final exceptional bridge with the open railing is the last bridge, which is -- we're calling "a Post World War II Bridge." It's the only Post World War II Bridge on the highway. It was constructed in 1947. And culverts, which you can see barely to the right, there's two added culverts, were added in 1991. Interestingly enough, because of the added culverts, the National Register Nomination considers that a loss of integrity and, thus, they're designating this bridge as a non-contributing structure, and that may be something that the community and CRC wants to consider revisiting.

Then of the 31 open picket bridges, the remaining 20 area designated contributing. And the chart on page 20 goes over some of the features of the bridges. Most of them will have the railing replaced; 4 bridges are wide enough, again, to allow the protective crash railing; and then there are 4 culverts. The details are summarized in these charts. And again, all of these are further detailed in your executive summary, which will be greatly expanded on a per-chapter basis once we have all the input and do the final report.

The second category of bridges are solid parapet bridges, and I'm on page 20, well, 24 is just a title. There 12 solid parapet bridges and 7 culverts; of these, 6 bridges are exceptional for the reasons that are going to be described. According to the historic drawings, these were all designed between 1908 and 1914, and at that time, the road was actually a wagon trail, so most of these are right around 12 feet, or slightly wider, which means that they don't come anywhere near meeting the 16 foot width. And as with the open picket railing, these solid railings do not meet current safety standards for crash. The

3 of the 6 exceptional solid panel bridges are exceptional particularly because they have a date panel, and it's visible as you approach the bridge from the makai -- driving from the makai direction. In order to preserve that date panel, we're proposing, and there'll be a little more detail in the next section, that the upstream side, which is not visible as you approach it, be the widened side, thus preserving the date panel on the downstream side, the historic panel.

Bridge no. 19, we're calling "The EMI Bridge." It's the Kopiliula Bridge, and it's the one that has the East Maui Irrigation cranks for the ...(inaudible)... and the foundations are interwoven with the dams for the EMI systems, and this bridge is currently 14.5 feet wide. It has significantly stout structure of the railings. It's a unique bridge in that regard. And this will be the only solid parapet bridge where we're requesting a width, and in order to satisfy the safety requirements, the speed limit of that bridge will be posted down -- down posted another step and the exception for the width.

Another solid, I'm on page 27, the Mokulehua Bridge is the oldest bridge on Maui, and it's the third oldest bridge in the islands. It's the first reinforced concrete bridge, which was built on Hana Highway, and the piers actually date, you can kind of see when you see it in a larger picture, they're slightly short of the deck of the bridge, and they were built for a wooden trust bridge even earlier, we don't have the exact date of that. So this is the only triple span solid parapet bridge on the highway, and the recommendation is to widen it to the least visible side, preserving the visible side and the piers.

There's one solid parapet distinctive pier bridge, and the intermediate support is the CRM, concrete rubble masonry, wall, it's the only concrete masonry pure wall along the highway. And again, the recommendation, now the photograph you see here is the upstream photograph, this would be the one case where the upstream parapet and the pier are intact; the downstream side has been altered, it's actually next to a state park rest area, and so the, in this one case, we're recommending that the downstream side be the widened side.

Again, of the solid parapet, of the 12 solid parapet, there are 6 contributing, in other words, non-exceptional but contributing bridges, and 7 contributing culverts. Four of the six bridges will require widening. One bridge, Nuaailua, I'm sorry, is a hybrid. The upstream parapet is a older parapet, and the bridge was widened in the '30s, and the downstream parapet is an open picket. We're referring that as bridge no. 12. There's nothing particularly distinctive or intact about that bridge, so we're recommending that railings be replaced.

And then there's one bridge, Honomanu Bridge, which is bridge no. 11, this one is structurally indetermined. The deck and superstructure are in poor condition. The damage

to the parapet has been recorded. And it was rehabilitated in 1978, but the calculations are indeterminate. So that is the only bridge on the Hana Highway where we're recommending to replace, basically, replace in-kind.

And with that, I will turn it over to Alison for a more detailed description of the treatment recommendations.

Ms. Alison Chiu: Hi, okay, as Tonia mentioned earlier, you guys have the executive summary, which has all of the team's recommendations along with the photos of each bridge, and short description and significance statement. Each bridge will later have a detailed chapter where it will have all the existing conditions and the more detailed team's recommendations and the character-defining features for each bridge will also be detailed in that section. So I'm just going to go over a couple of the team's approaches to these recommendations and kind of our reasoning behind them so that you can understand how we were looking at things.

So I'm looking at page 34, which is labeled "Treatment of Character-Defining Features, Railings, Preserve historic railing in place." Wherever possible, we hope to retain the existing historic parapets. We do feel that these bridges are a really important part of the Hana Highway character and that the historic parapets, which is what everyone of course sees as they drive along the road to Hana, are very important character-defining features. DOT has requested railings that meet current safety code, so we're looking at a couple of different options. In order to retain the existing parapets, we can add the interior crash-tested rail that meets code, as Virginia mentioned. The interior rail will also provide protection to the historic railings so they won't be damaged in the event of a crash. And we also wanted to avoid altering the view of the historic bridges. So by adding the crash-tested rails to the interior side of the bridge, we hope to keep the same view plane of the historic parapets as people drive along the winding road. Our team is still researching inappropriate interior rail that would meet the code but is also as compatible as possible within the historic district.

On the next slide, page 35, some of the bridges, as you know, are very narrow. With the addition of an interior crash-tested rail for protection, we would need a set amount of spacing between the original railing and the crash-tested railing on each side to account for deflection of the railing in the event of a crash, and we need to meet the 16-foot minimum width criteria for a one-lane bridge, which means that some of these narrow bridges may need to be widened slightly to accommodate the required dimensions.

So for the bridges that have the original dates inset into the concrete parapet, they say like 1911 or 1912, the top-right diagram illustrates the recommendations for these bridges. So if you're looking from left to right, on the upper right-hand corner, we have the original

makai parapet, which remains in place, and then there is the required deflection space, according to code, and the drawing isn't to scale, so just for clarification, it's not a walkway. And then we have the interior crash-tested rail, which is shaded on that sheet, it says "Crash-tested Rail/Parapet," and then the one-lane road portion, which measures 16 feet wide, from the crash-tested parapet to the mauka parapet, which is shaded, which would be replaced in-kind with a solid crash-tested parapet.

On the bottom right example shows a situation where both historic railings are kept and the interior rails are added with a slight widening to accommodate for the cars. So this is our team's proposed option for the historic culverts, which are relatively short, they're less than 20 feet long, and which we believe can be widened slightly without any damage to the historic rails. This way we can keep the historic parapets and we can ensure that the structures are safe for everyone traveling along the road.

For the next slide, which is the replacement of picket rails with a compatible design. This is the second option that we're looking at where the railings would need to be replaced to meet code. We would like to use a similar design compatible with the rest of the bridges within the historic district.

So this diagram in the photos show the location of the existing rail and an example known as the T-411 railing, which has a similar profile. It's slightly more rounded at the top of the openings, but it's very similar to the open picket rails in both size and proportion. Some of the bridges are currently at or near the 16-foot width as they are right now, so if we add the interior rail, it will make the lane narrower, so the benefit of using the replacement in-kind option is that it eliminates the need for the road widening.

And, similarly, for the solid parapet bridges, which could be replaced in-kind with a solid vertical railing to match the existing.

And then on the following page, the approach wall. The current approach walls also, which abut the ends of the bridges with the lava rock, these also need to be strengthened for safety, but we want to do it in a sensitive manner, and we'd like to retain the look and the feel of the lava rock cladding because it's a very -- it's a character-defining feature of the historic Hana Highway. So shown here are a couple of examples of the approach walls that meet the safety code, they measure 27 inches high, and they're adaptable to the Hana studding by cladding them in lava rock, it would be very similar to what's current there now. And the options that we've shown in your handout, so far for the railings and the approach walls are all just potential options that, based on our team's visits to Hana and our research, can both meet the safety criteria as well as compatibility with the historic setting. So this is definitely like one area where we want to encourage public and professional feedback to help us refine these recommendations for the community.

And I will turn this over now to Cody, who will discuss and conclude with some of team's structural considerations.

Ms. Cody Aihara: Starting on slide 39, we have an example of a bridge section in which, one, we're recommending for bridges with the excess amount of asphalt, to have that removed back to the original as-built conditions, and then a lot of the bridges currently are either between 10 tons to I think we have one that's kinda close to 20, but all in all, we're trying to achieve a 40-ton capacity so a lot of the structural components of bridge will need to be upgraded. One example we're showing here is we would input new girders between the existing ones, and when we do this, we would like the future consulting team to keep in mind the depth of beams so when the cars are driving from the exterior, you don't see it protruding below the existing ones. We would like to keep the look of the bridge as much as possible intact. So one option is this new concrete girders being installed between the existing ones to help with the additional load increase capacity.

On the next slide is one option we're proposing for bridges with exceptional CRM abutments. A lot of the CRM rocks have either no mortar between them or, over the years, they have dissolved, and because of that, it has no structural integrity in terms of forces, and because a lot of these bridges in Hana are exceptional in terms of status because if anything should happen, emergency vehicles will not be able to travel over there so, therefore, design criteria ends up being kinda extreme, on the extreme end for these bridges, so, therefore, in order to keep the historic characteristic of these abutments, we will stress that the future construction team, in the construction documents, have the contractors record, number, photograph the rocks as they are disassembling them, rebuild the concrete, the actual structure abutment behind it, and then reconstruct the historic -- I mean historic craftsmanship rock wall in front so, therefore, when you look at it, it will still have the historic character as it originally was. So that is something we understand can be done, but, of course, the cost issue comes into play, so again, this is a plan, this is not a construction document, so it's just something we can suggest and try to infer that the future team does consider when they prepare the construction documents.

The next section is hillside bridges. In addition to the historic bridges along Hana Highway, the following slide shows a rough vicinity map. There are 7 hillside bridges. What the DOT mentions -- means by hillside is that these bridges were cantilevered off of the mountain side to widen the roadway, and when they did this, in these 7 areas, you can't really see them when you're on the roadway, on the following slide, I have a picture of the approach to hillside bridge no. 4, it still maintains that guardrail look as you're driving across it, but on the other side, you'll see that there's a protruding thicken slab and, in some places, piers that they drove in to just support the additional loads. Since these bridges were built between 2001 and 2004, they were built for the current code standards and, therefore, no

added -- additional construction needs to be added to these bridges so they're just in the report for the completeness of the highway.

Additionally to these hillsides and the historic, we were given as-builts for the entire historic highway and there were these smaller culverts. The total culvert count that we were able to find were 45. There are hundred out there, it's just, unfortunately, we could not find them, so that's why we have called the "Found Culverts." Of the Found Culverts, there were 19 reinforced concrete pipes, 20 reinforced concrete or rock box culverts, 5 corrugated metal pipes, and 1 that we have -- we do not know what the inlet structure is, so that's kinda what that picture on the bottom shows is where the pipe inlet is supposed to have been, but when we went there, we only found the rock parapet walls. So for these structures to be in compliance with the safety code, we'll be also reconstructing the approach walls with the lava rock cladding so it'll still meet safety codes.

The following slide shows some examples. The top two are examples of box culverts that we found the MP numbers, means mile point, so as you're driving from the 0 Mile Marker, as you enter Hana from the Kahului, and you will be able to find these structures, or if you jump off the side of the road, you'll find these structures; if not, you'll just see the parapet wall above the top.

With that, the following slides, no. 47, so we presented a 75% draft report, I'm not sure if everyone was able to see the CD that contains this executive summary. We do have 4 copies that are printed out so if for some reason you were unable to download it from our FTP site, or unable to read it from the CD, the 4 areas are the Maui District Office, the Hana Council District Office, the Hana Public and School Library, and the Hana Cultural Center and Museum.

The following slide, as Tonia mentioned and everyone's been reiterating, we really need the comments from your community feedback 'cause, you know, us, who are so intent to, you know, look at our computer screens and totals of these, we don't really know how it functions in everyone's daily lives and how it impacts the communities that they're set in, and so we've provided Paul Santo's and Charlene's information. If everyone could, send your information by April 6, I believe that's a Monday, we'd really appreciate it. We are preparing the pre-final report right now so we would like to ensure that we get all of your comments and everything incorporated. When that pre-final report is submitted to DOT, we will also submit the report again to everyone for your review, and we'll be coming back for a third round so we can make sure that anything we may have missed or maybe misinterpreted, we can go back and address before the final is issued again ...(inaudible)... and with that, thank you for having us here. Any comments or questions at this moment?

Mr. U`u: By the way, thank you guys for giving the presentation. I thought it was a very thorough job you guys did on what was presented to us. I not going lie, I never read 'em all, I glanced at it all, but the only -- the only concerns I would have, and I will state it, is the names, and how do you find some of the names that were not given? You know, I noticed some, I think to my knowledge that, there are no names. If there were no names, you know, what do we do? Do we rename it, you know, or is there a name that's lost over the years or -- and my, for me, the spelling will be key in pronunciation of the word. We don't want to lose the history of what's there so --

Ms. Shibuya: Did you get this sheet with your handout? Yeah, and can I just add that, you know, we, I say "we" because I used to work for DOT but I don't work for DOT anymore, but I worked on a project that they just widened a box culvert near the baseyard, and that one actually only had the date, and didn't have a name, but Ward Mardfin, you know Ward, yeah? He gave us the stream name and what we did was we added the stream name on top of the bridge parapet.

Mr. U`u: That's awesome. And I'll pass the mic, but I think you guys did an incredible job, and I know the help of Fred, it'll get done fast.

Ms. Mowat: My question was also with the names, and I'm just trying to read the chart, so on the top, you know where they have the titles, yeah, they have 1990 Hawaiian Heritage Censor Report, that, I'm assuming, is research of material that has -- and then FAI research?

Ms. Moy: Oh, that's the name of our company.

Ms. Mowat: Oh, okay. Okay. Okay, and then the Cultural Surveys research, that would be going to community and asking kupuna and for --

Ms. Katie Folio: We're just doing the literature review, contacts, which is our contribution to this document, whatever we could find during that process we contributed to that.

Ms. Mowat: Was there any consultation with the community?

Ms. Folio: Not for the literature review at this point but we'll be ...(inaudible)...

Ms. Shibuya: Sorry. Our company was handling the community outreach but what we did was, you know, in the first round of meetings, we actually met with like Hanalani senior citizens, Nahiku Community Association, Kaupo, Kipahulu, as well as the Hana Cultural Center and Museum board people, and we also -- I met with this gal that was flagged out as, you know, an expert on stream names, so we've given them this material to look at and

then -- and, of course, Ward Mardfin too 'cause he's done a lot of research, so we've been consulting them throughout and, hopefully, this list, you know, if they have any comments, they can refine it, so it's kinda -- we've been taking all the input and we've been documenting every meeting summary, extracting issues and concerns, and it's going to be part of the report as far as responses.

Ms. Mowat: I'm really -- I'm thrilled that you considered putting the names of the bridge and the year, so you're putting the year that it was built? But I remember -- huh? Not the year that it was built?

Ms. Murison: ...(inaudible)... or its been rehabilitated.

Ms. Mowat: Oh, okay. The reason why I ask is I think we went through a hearing one time where for years and years the street name was spelled wrong, so when you spell the Hawaiian -- when you spell it wrong, it could mean whole different meaning, so it really is important and so but I'm really happy with this and thank you for the presentation.

Mr. U`u: One more question since the mic's here. The structural integrity of the bridges, of the bridges current, you said it doesn't meet the crash-test dummy test or something, what have you. I don't see any damages to it, so is it nobody hitting it or am I mistaken?

Ms. Aihara: There are some that have been replaced and patched over the years, but if anything, most of it just falling, you know, the reinforcing is starting to corrode and when it corrodes, it tends to expand, and that's when you see a lot of pickets and, you know, losing the side of it, so that being said, you know, there is some kind of water infiltration and cracks, so again, for those bridges that we are retaining the historic railings, we're going to bring it back to as-built conditions and then put the crash-test in front of it.

Mr. U`u: Okay, one last question. The structural integrity of the girders and I guess the structure coming out of the ground, how was the integrity, being it's old, is it still structurally sound for the most part?

Ms. Aihara: It's structurally sound for what it's being currently used for. And again, that's with all the restrictions and everything that DOT has to place on it. So the concern right now, especially when you ask for federal funds, is that you need to bring it to current standards, you know, so one standard being for a bridge that is not posted is 40 tons, according to current code, so the issue that Hana has is that 10-ton restriction restricts like fire trucks, certain ambulances and such from going to Hana, so that's the biggest thing on DOT's side is to increase the load capacity, not only to be for code, but mainly so emergency vehicles can get into Hana, and so that's where the thing where if Hana community, which they've already voiced it, says that they don't want to see the posting

increased from 10, DOT has not problem as long as it's on record that the community wanted to keep it at 10 posting and still have it within the DOT records that, okay, 40 tons is long the highway so, therefore, variances can be issued in the event that, for some reason, a truck does need to get in there with a higher load capacity.

Ms. Moy: Also, DOT actually inspects the bridges every two years, right, every two years they go through an inspection to make sure that it's structurally sound for what it's being use. And I also wanted to make sure everybody knew that this is not going to happen, the construction's not going to happen in even the next -- how long you think, Fred? Like this is just like a plan so it's going to -- it's not going to happen for a long time and by the time we get through the whole road where it's all 40 tons, it's going to be, I don't know, like 40, 20, 30, 40 years, some decades, decades.

Mr. U'u: So we just hope the codes no change then, correct?

Ms. Moy: Right, more stringent, right. But, yeah, so that also, you know, we're trying to ensure that the future team does have the ability to have the flexibility of changing, if necessary, yeah.

Mr. Skowronski: Which bridge is being replaced?

Ms. Aihara: Bridge no. 11, Honomanu.

Mr. Skowronski: Before 40 years?

Ms. Aihara: That bridge is not going to fall down like in the next, you know, year or two. We are inspecting it regularly. But the reason for that bridge being replaced is that its historic integrity has been compromised. When they did the rehab, I'm not sure what year Virginia mentioned, if you were to take off the asphalt, you would actually see pre-stressed concrete planks, it's not -- no longer being supported by the original concrete slab and girders, so what happened was instead of ripping out the original bridge, they just span between the piers and abutments these pre-stressed concrete planks and then asphalted over it. So, okay, that's one issue. Another issue, because you can't see it, you can't inspect it, so we don't know the structural integrity of how those planks are; we just know they exist as built. And if you were to look under the bridge right now, you can see that water is going through, so you that water infiltration has been going through it so that's another concern, so instead of trying to, you know, do core testing and doing all these things to hodge-podge to death to save it, you know, especially when it's not the original bridge, we've decided that this bridge probably may be better suited for replacement.

Ms. Ricalde-Garcia: That sounds a little concerning. Shouldn't that be a priority?

Ms. Aihara: The DOT is aware of this, and it is still in a good -- like Tonia mentioned, there are bridges that, federally, you're required every two years to inspect, but bridges that are like that, critical and crucial, there are shorter spans, so I believe the bridge is actually on a 12-month cycle versus a 2-year cycle, so the DOT is on it, is aware, is watching and monitoring, and nothing has, I guess, increased or, you know, it hasn't deteriorated anymore than it has for the past several years, so it's still in the same condition, it's just that this being a preservation plan, you know, and we're going through and looking into great detail at each of these bridges, it would benefit the bridge to be back to its original condition. So when this bridge is replaced, it will be replaced according to the original design, which is the concrete slab with the four girders, it's just going to be strengthened for the current code, but it will still look original to how it is, yeah.

Ms. Salazar: Well, thank you so much because I gotta say, I really loved reading this. I got to know Hana better. I got to know the roadway better. And I got to enjoy the color photos that shows so much, and I just really want to commend the work that you folks have done. I can tell you've done it with a lot of aloha in your hearts and in your hands. I do have -- so mahalo for that. We enjoyed your presentation. It's pretty -- was fun listening. What a nice way to move on with our day. So if these are state bridges, are there any county bridges?

Ms. Moy: Yes, past Hana Town, there's county bridges, but they actually already have a preservation plan.

Ms. Salazar: Okay. Thank you. And --

Ms. Moy: It would need updating.

Ms. Salazar: I just had a couple of notes that I wrote because I noticed that some of the -- because of the names, some of the names, two places, I believe it was, had no name, the two bridges that are unnamed, and then the conduits are not named -- the culverts are not named so -- two of the culverts are named?

Ms. Murison: Two of culverts are named, and 2 of the 12 culverts, and 3 of 43 bridges are unknown: Unknown 1, Unknown 2, and Unknown 3. The historic drawings actually have names on them.

Ms. Salazar: Then why don't -- I'd like to comment and recommend that you take those names that are on the historic records and name the bridges with those names so that they have a name -- so they will have a name. And I also want to recommend that the names remain with no diacritical markers on the bridges. If there want to be any reference or study done with diacritical markers, that it's in a separate brochure, on a website, what

have you, because I've been really witnessed many times when diacritical markers are used incorrectly, and it does change the meaning, and so perhaps that's what would be in the reference material about the name that people can think what different things or different meanings a name has as it is so because we have kauna, we have different ways of pronouncing, like even this one, Waiakamo`i, I looked at the diacritical, the correct way, if I was to put the diacritical markers for mo`i, you have the line or the kahako over the o and the i, the mo`i, because that is how you say that's the king, otherwise, the way it looks right now it's going to be pronounced Waiakamo`i, not mō`i. So I really support that there be no diacritical markers on the name and on the bridges because, one, it's going to be literally carved in stone, it's not where you're going to be able to, oh, click, take that off, it's not -- so on your website, on research material that'll be accessible by the public can do things like that, but there's always going to be another discussion, well, they shouldn't have put that there 'cause I know I say that. I see diacritical marker kahako over the letter "a," the letter "a" in English was a in Hawaiian, a e i o u, and it doesn't belong there, I know that, so it's just, oh, here we go again. So because I call those people "diacritical happy." You know, they just mark it up anyway. So that's my recommendation I'd like to share.

Ms. Shibuya: And I just kinda wanted to add a comment. It's interesting that you mention that because when I spoke to Kau`i Kanakaole, she's like a researchest in all the stream names and stuff, and I had point, yeah, I asked her, hey, can you take a look at this list and, you know, check if these diacritical markers -- she said a lot of the old Hawaiian maps or the old maps don't actually have diacritical markers.

Ms. Salazar: Because they knew their language. When the first printing came to Hawaii, let's remember that the first printing, the first newspapers contained mo`olelo, history, and genealogies, and there were no need for diacritical markers - why? Because everyone spoke the language, everyone knew what they were talking about, and in the context that the words were being used, you knew how to pronounce it so --

Ms. Moy: You see it in English, right?

Ms. Salazar: And one more point why, I want to add because this occurred to me, you know when we go to a country, they don't make their language suit us as the visitors. They make it how it is and we can read it or not. And if we need help, we go ask. When I've gone to Japan, they don't change that kanji for me, you know, I'm going to have to figure it out, learn what it is, and, you know, hopefully know how to pronounce it right. But that's how I feel about it. Thank you.

Ms. McLean: The agenda indicates that the Commission may provide comments, and so it's your folks' call whether you want to give specific comments or just let your discussion stand as your comments to be state.

Mr. Hopper: If there's a -- to distinguish comments from the body versus individual comments, you could have the chair say if there's no objection, then those will be forwarded to the I guess consultant as the comments of the CRC, and then if there's no objections, they can all be forwarded. Now how that's done, I don't know if a planner's going to be writing down all the comments that were made, or if you just want to look in the minutes and see what was made as comments, but normally if they're from the body, there needs to be consensus from the body that the chair ask for and that's indicated by no objections from any of the members.

Chair Osako: Are there any additional comments? No? Shall we accept the comments made by the individuals on the Commission as from the body? Do I hear a motion?

Mr. Skowronski: So moved.

Mr. U`u: Second.

Chair Osako: It has been moved and seconded that we accept the comments made by the individual Commissioners as from the body itself.

It has been moved by Commissioner Skowronski, seconded by Commissioner U`u, then unanimously

VOTED: to accepts the comments made by the individual Commissioners as comments from the CRC.

Chair Osako: Motion carries.

Ms. Moy: So we will always do formal answers to all the comments so we'll do one for the staff comments and we'll do one for -- and Charlene is like an extremely great note-taker so I'm sure she has every single one of your comments written down. Thank you very much.

G. NEXT MEETING DATE: April 2, 2015

Chair Osako: Okay, after that, item G is next meeting date, April 2, 2015, except for us. I guess need --

Ms. Salazar: So is it at this time that we can bring items up for a future agenda? Okay. I would like us to look at two areas or to begin the process for inclusion in historic -- as historic districts, the expansion of Lahaina Historic District to take in, for example, The Outlets, to actually look at how we can expand the Lahaina Historic District, and also,

number two, to look at, because we discussed this at our CAMP, is Paia Town a historic district? Okay, I'd like to look at, as a body, to look at promoting that we include the plantation era in the Paia -- for Paia District to become a historic district. So those two matters.

Ms. McLean: That probably won't be on the next agenda. It'll take some time, but -- okay.

H. ADJOURNMENT

Chair Osako: Is there anything else? Okay, I guess the meeting is adjourned.

There being no further business brought before the Commission, the meeting was adjourned at 2:12 p.m.

Respectfully submitted by,

SUZETTE L. ESMERALDA
Secretary to Boards & Commissions

RECORD OF ATTENDANCE

Present

Warren Osako, Chairperson
Bruce U'u, Vice-Chairperson
Bridget Mowat
Arleen Ricalde-Garcia
Owana Salazar
Frank Skowronski

Excused

Kristy Kajiwarra-Gusman
Janet Six

Others

Michele McLean, Deputy Planning Director
Annalise Kehler, Cultural Resources Planning

APPENDIX 8

ATTACHMENT 8e

MARCH 9, 2015

Hana Advisory Committee
Meeting Summary



MUNEKIYO HIRAGA

Planning, Project Management, Sustainable Solutions.

MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

TESSA MUNEKIYO NG
VICE PRESIDENT

September 8, 2015

MEETING MEMORANDUM

Date of Meeting: March 9, 2015

Participants:

Hana Advisory Committee Members:

Clayton Carvalho, *Chair*

Ward Mardfin, *Vice Chair*

John Blummer-Buell (was not present
during the project presentation)

Ian Ballantyne

Scott Crawford

Edward Cashman

Anjoleen Hoopai-Waikoloa (was not
present during the project presentation)

Ferdinand Cajigal, *State Department of
Transportation – Maui District Engineer*

Cody Aihara, *Nagamine Okawa Engineers, Inc.*

Tonia Moy, *Fung Associates, Inc.*

Alison Chiu, *Fung Associates, Inc.*

Virginia Murison, *Fung Associates, Inc.*

Tyler Fujiwara, *Austin, Tsutsui & Associates, Inc.*

Eric Takamine, *Austin, Tsutsui & Associates, Inc.*

Charlene Shibuya, *Munekiyo Hiraga*

County Planning Department Staff

Clayton Yoshida, *Current Division*

Administrator

Cybill Lopez, *Staff Planner*

Subject: Hana Advisory Committee Meeting Regarding the Hana Highway Historic District, State Department of Transportation Bridge Preservation Plan (75% Draft Report)

PURPOSE:

Present to the Hana Advisory Committee, the 75% Draft Report's findings and preliminary bridge preservation recommendations to answer questions and receive comments on the document.

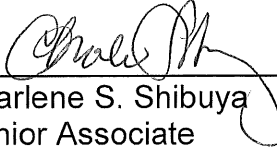
The project presentation was part of the Hana Advisory Committee March 9, 2015 Agenda Item F. Communications.

MEETING SUMMARY:

1. C. Shibuya introduced herself, the project team, and explained the team's presentation today being the second of three (3) rounds of presentations. Also that during the first round project introduction presentations done last summer, the Hana Advisory Committee were not scheduling meetings. However, the team proceeded to make presentations and consult with various east side community associations and organizations. Ward Mardfin allowed the team to consult with him directly with his special knowledge of Hana bridges. Hard copies of the PowerPoint slides were provided to each member along with a Bridge/Stream Hawaiian Name list.
2. T. Moy opened the PowerPoint presentation with some background on the first round of meetings to gather early input, explained the project's purpose, scope, methodology, timelines, and format of the draft report. Handouts of the PowerPoint presentation were provided along with a list of bridge/stream names prepared from best available sources. See **Exhibit "1"**. She pointed out that attendees requested in the first round of meetings to have bridge names installed on the bridges. Therefore, the team requests review and comment on the list of names for corrections, if any.
3. V. Murison continued with the presentation covering bridge designations of exceptional value identifying examples of special architectural bridge features.
4. A. Chiu continued with the presentation covering a summary of proposed actions, which are dependent upon each bridges exceptional feature.
5. C. Aihara described proposed treatment recommendations for character-defining railing, approach walls, and structural components of bridges. She also explained what hillside bridges are and what 'Found Culverts' mean. She closed the presentation by pointing out where hard copies of the 75% Draft Report can be reviewed and/or downloaded from the internet and where comments can be sent.
6. W. Mardfin pointed out that two (2) bridge names require correction in the draft report relative to the photo reference to the bridge. He needs to verify in the field and will contact C. Shibuya later. Also, Waianapanapa is misspelled in the report.
7. T. Hoeffken (Tom's Backhoe & Excavation) who was present at the meeting for the Public Hearing agenda item, offered comments from a trucker's perspective. He stated that widening towards the mountain does not help truckers that need to negotiate curves clear of the banks. C. Aihara explained that the team is working with the traffic engineer on approach alignments to bridges to be widened. T. Moy added that the community desires some traffic calming.

8. T. Moy explained to the advisory committee members that at the March 5, 2015 Cultural Resources Commission meeting, member O. Salazar recommended that the okinas be left out of the bridge names. W. Mardfin stated that the community may be divided on this matter so we will have to check with them. He also mentioned someone saying that if you are not sure on whether the okinas or diacritical marks are correct, it is better to leave them out.

The meeting was concluded at about 7:20 pm.



Charlene S. Shibuya
Senior Associate

CSS:yp
Attachment

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**HANA ADVISORY COMMITTEE TO THE
MAUI PLANNING COMMISSION
MEETING OF MARCH 9, 2015**

** All documents, including written testimony, that was submitted for or at this meeting are filed in the minutes file and are available for public viewing at the Maui County Department of Planning, 2200 Main St., Suite 315, Wailuku, Maui, Hawai'i. ***

A. CALL TO ORDER

The meeting of the Hana Advisory Committee (Committee) was called to order by Chairperson, Clayton Carvalho, at approximately 4:16 p.m., Monday, March 9, 2015, at the Old Hana School Cafeteria, 5091 Uakea Road, Hana, Island of Maui.

A quorum of the Committee was present (see Record of Attendance).

Chair Clayton Carvalho: Alright, good afternoon and aloha. Welcome to the hearing for the Hana Advisory Committee to the Maui Planning Commission for March 9, 2015, Monday. My apologies for the late start. Before I'd like to continue, we can introduce everyone on the board. To my far left, we have Anjoleen Hoopai-Waikoloa; next, we have Board Member, Ed Cashman; Board Member, Ward Mardfin; our Deputy Corporation Counsel, Jenninfer Oana; to my right, we have Board Member, Ian Ballantyne; Board Member, Scott Crawford; Board Member, John Blumer-Buell; and our Secretary, Suzette Esmeralda. Directly in front of us, we have Planning Program Administrator, Clayton Yoshida.

Before we'd like to start, you have an announcement to make, Clayton?

C. RESOLUTIONS THANKING OUTGOING MEMBERS - IAN BALLANTYNE and EDWARD CASHMAN

Mr. Clayton Yoshida: Good afternoon, Chair Chair and Members of the Hana Advisory Committee. Again, with me from the Planning Department, we have your Secretary to Boards and Commission, Suzie Esmeralda, and the Staff Planner, Sybil Lopez, from Kalamaula, Molokai. So with that, we have -- this is the last meeting for two of the members and we'd like to say thank you to them, there's a letter from the Mayor congratulating them, that's Board Members Ian Ballantyne and Ed Cashman. From the Mayor states:

Congratulations on a job well done. On behalf of the people of the County of Maui, please accept my deepest appreciation and gratitude for your dedication and service on the Hana Advisory Committee. Your efforts and contributions have made a positive difference in our community. I truly believe that it is important for citizens to play an active role in government.

Chair Carvalho: Alright, none opposed, so the motion to designate that committee passes unanimously. Before we move on to the next agenda item, I'd just like to have a short recess, in regards to time, to be sensitive to time as well. John?

Mr. Blumer-Buell: Yeah, because of my lower back strain, I'm going to have to take off now, and so you'll still have a quorum.

Chair Carvalho: Yeah.

Mr. Blumer-Buell: but I just wanted to say, beforehand, I will be -- I am watching the bridge issues very carefully. I worked on this decades ago and will be submitting some, hopefully, helpful information to the state, so I appreciate the fact that you're doing this. Thank you.

Chair Carvalho: Thank you. So we will have a quorum, and I would just live to present a five-minute recess, if we could. Thank you.

(A recess was called at 6:36 p.m., and the meeting reconvened at 6:44 p.m.)

Chair Carvalho: Okay, we can move on. We can move on to agenda item F, if you'd like to come forward? Oh, Clayton, go ahead.

Mr. Yoshida read the following agenda item into the record:

F. COMMUNICATIONS

- 1. MS. CHARLENE SHIBUYA, of MUNEKIYO HIRAGA. consultant for the STATE DEPARTMENT OF TRANSPORTATION, requesting comments on the Hana Highway. Route 360, Bridge Preservation Plan within the Hana Highway Historic District, Federal Aid Project No. BR-0360 (012) - 75% Draft.**

The Committee may provide its comments on the draft.

Mr. Yoshida: Again, we'd probably have to end about 7:30 because they're going to close the highway at 9:00, and we gotta be pass that before they close the road, so I'll turn it over to Charlene.

Ms. Charlene Shibuya: Yeah, as Clayton said, my name is Charlene Shibuya. I'm with the planning firm of Munekiyo & Hiraga, and we've been the community outreach consultants on behalf of State DOT, and with me, I have a huge team of consultants that'll walk you through this 75% draft report, which is over 500 pages, so I think you'll appreciate the

summary. But with me, I have the historic architectural specialist from Fung Associates, Inc., I got Tonia Moy, Alison Chiu, and Virginia Murison, and then we have a structural engineer from Nagamine Okawa Engineers, Cody Aihara, and then we have a civil engineer and, I guess, Tyler Fujiwara and Eric Takamine, they're the civil and traffic engineers from Austin Tsutsumi & Associates, and, of course, we have Ferdinand Cajigal, from the Maui District, State DOT office, that we're acting on behalf.

And just to give you a brief summary. This is a second round of meetings and the reason why we couldn't go before the Hana Advisory Committee last summer, at the onset of the project when we introduced this project to all the community associations, the four Aha Moku Districts across the Hana Highway Historic District Highway, was because you guys weren't meeting for that time, but Ward has been gracious enough to allow us to consult with him all this time, because as everybody knows, Ward is, you know, he's a great researchest for these Hana bridges, and with this, I'll turn it over to Tonia, who will start the presentation.

Ms. Tonia Moy: Hi. Thank so much for having us, and I will try and make it really fast. I know you guys all have the powerpoint presentation in front of you, so I'm going to skip a lot of slides because what we're doing right now is we're asking for comments, so, you know, you can go back and you can give us comments later. I understand everybody has to get out of here in like 45 minutes so -- and it's a 45-minute presentation, but we'll make it fast.

So, basically, I'm going to give kind of the overview of the project, and then after I'm done, Virginia's going to kind of give a little description of the project but you'll have to probably supplement that with what's in your handout and also what's in the report, and then Alison is going to give our kind of overview of our recommendations, and then Cody's going to give our structural, kind of a more of a structural analysis of what goes on under the bridges.

So, briefly, this is our team. So you introduced most of us, but we also have electrical engineer, and then we have an archaeologist onboard too, and so they gave some basic recommendations on how to treat the bridges. So the overall project purpose is a preservation plan. This is, you know, for HDOT project, this is the state portion. I want to emphasize it's the state portion of bridges. That it's a preservation plan, so because DOT gets federal funding, they have to always have Section 106 consultation, which is the National Historic Preservation Act, so our job was sort of to get like context sensitive design in there, we're trying to get like preservation issues worked out. And so, just as a reminder, this is not an actual construction project. This is just a preservation plan. So if they were to have a construction project, they would come back to the community and go through it in much more detail. This is just an overall guidance.

So the reason why we're here is, I'll just kind of highlight our second one, which is to get the community feedback. It's very easy for us to sit in our offices and sort of like dream up what we think should be done, but it won't do any good without getting the community feedback since you -- since the community is the one who has to actually use the highway, right?

And so just to go over this really fast, like Charlene said, the beginning, we went through like a summer -- like last summer, we went to all the many different communities and we go their -- it was just to get the feedback. We had nothing in mind. Now we have a 75% plan, and we want to get the feedback from the community for what we have so far. So I know you guys weren't -- we didn't meet with you guys last time, but just to let you know that the initial -- the first meeting, overwhelmingly, the community wanted basically one lane, keep one lane, keep it very rural, don't straighten the highway, and then the other thing was they really wanted to have the Hawaiian names put back onto the bridges, and so this is going to be, you know, one of the things that we want your guys' feedback on especially.

So I'm not going to go over this. I think you guys are probably familiar with where the Hana Highway District is, the historic district. This just shows you that we're just doing the state portion. The county already has a preservation plan. Just a closeup. This one is just -- you can, you know, it's just to name all the bridges. You have it in your handout. And then this is just to -- we are basically trying to find a plan that meets historic preservation rules, or the Secretary of Interior Standards, while still maintaining public safety. So that'll just wrap up that whole thing right there.

And I'll just go over this one a little bit because since you guys haven't been through the first meeting, or some of you have I think, but anyway, how to use the report. So the report's basically in two parts. The first part, Section A, is sort of the why. Why, you know, the regulatory reasons, goes through the Secretary of Interior Standards, what they mean, the guidelines we're following, kind of how we were thinking about, you know, doing overall guidelines, and then while we do have a -- we do have another section that we added, this Chapter 6, because, overwhelmingly, the community kept talking about traffic issues, or, you know, like other issues, like rock fall mitigation, and all that stuff, which really didn't have anything to do with the bridges themselves, but there were overwhelming community concerns every time we went to a different community, so we added that chapter to sort of put all the community's concerns, noted, you know, like have driving etiquette put in to something, you know, and all that kinda thing, so that's where Chapter 6. And then the B and C chapters are going to be where the chunk of information, every single bridge is going to have the recommendations, it's going to say something about archaeological inventory survey should be taken before you undergo, you know, you have to get the potential effect, the area noted, and, you know, it's going to list everything so that the designer can take

that chapter and go on to the next step, you know, just kind of start working with some planning, basic planning in mind.

So next, Virginia will whip through those.

Ms. Virginia Murison: Thank you. Just to focus you on the report, because it is 700 pages, there's an executive summary, and you have a copy of that, I believe, as a handout today. This is the gist of where our recommendations are. We would very much like your feedback on this. This covers every single bridge, and the 12 historic culverts that are identified in the National Register Nomination. What I'm going to present to you is a very quick overview of what's in this executive summary.

The purpose of evaluating the bridges, we ended up identifying 17 bridges and 1 culvert, which have exceptional characteristics, and we designated them as exceptional. The other -- the remainder of the 43 bridges and 12 culverts on the state portion of the highway are considered contributing although all of them are contributing to the historic district. The exceptional ones, you can see in this chart, and I'm on page 12 of your handout, they're exceptional because they have historic date panels, they have unique features that's the oldest example of its type and so on.

We also were guided by some minimum requirements as we evaluated each bridge, which was a recommendation that the pre-passive travel be no narrower than 16 feet, and by federal highway code, approach guardrails and bridge railings need to be 27 inches in height. The -- and then we were also asked to bring the structural strength of the bridges up to accommodate 40 tons, and Cody will get into that.

We further divided the bridges into two categories of rail types because that's the most visible portion of the bridge. There are 31 open picket railings and 5 culverts. All of the open picket bridges, bridges with open picket railings, equal or exceed 16 feet in width, so none of the open picket railings would need to have the bridges widened. Within that, we have 11 exceptional bridges. There are 4 curved bridges, and there's a chart which will show you what they are, and you'll also see, when you get to the executive summary, we've broken it down into these categories. There are 3 arched bridges, the longest of which, of course, is the Waikani Stream Bridge, and then the closed span arched bridges. There are 2 bridges with exceptional -- of the open picket design with exceptional piers. Bridge 25, I'm sorry, my Hawaiian is not as good as it could be, is resting on a mid-span pier of a phenomenal lava rock formation, and Honomaele Stream Bridge, Bridge no. 40, has the oldest concrete pier on the highway, it dates back to 1906 wooden truss bridge, and you can even see in the detail -- well -- the Waikamilo Stream Bridge and its adjacent culvert were built in the early part of the highway, I don't have the exact date, I believe it was 1920. In 1937, several bridges and culverts were widened, and at the time, this one,

the solid panel railings, were replaced with this Greek cross railing, that is unique on Hana Highway, it's not unique in the state. In the mid-1930s, it was a popular railing design, but it's unique to the Hana Highway. And then the last bridge in the exception category of the open picket is the post World War II bridge, which is at the end of the Hana -- the Hana end of the highway.

Unidentified Speaker: ...(inaudible - not speaking into the microphone)...

Mr. Murison: Yeah, you can help me with the names, yeah. Yes, we heard that name tonight. Then of the 31 open picket railing bridge types, 20 are contributing, not that they're not great bridges, but they don't have some of the exceptional characteristics or are not representative of one of a kind, like the ones we just looked at. And there are summaries in your handout.

The solid parapet bridges, there are 12 bridges and 7 culverts with the solid panel. An interesting part of the solid panels is they were all designed between 1908 and 1914, and at that time, the road was essentially wagon trail, it was not a automobile highway; therefore, the widths of these bridges are 12 feet, a little bit wider than 12 feet. These will all have -- require some form of adjustment either in widening in one direction or another in order to achieve the 16-foot clearance with one exception. So we have 3 bridges with distinct date panels, there is a fourth one, but it's been so heavily damaged, you can't even read the date anymore. So the 3 historic bridges with the date -- with the visible date panel, which is visible on the makai side or the downstream side, would be widened on the upstream side, and Alison will get to some specifics, but the scheme we've come up with is to provide a protective guardrail to protect the historic railing, which won't meet a crash test, but the protective rail within that railing would meet the crash test. So in the case of the 3 date bridges, we would install the protective crash rail inside the downstream parapet, protecting that parapet, and allowing the historic railing to remain, and then to widen the bridges to meet the 16 feet clear on the upstream side. This bridge is the one bridge that is the exception to just about everything. It is only 14.5 feet wide, therefore, we can't even install the crash rail on the inside of this one. It has -- the East Maui Irrigation, what we call the EMI, equipment attached to it that opens this loose gate and adjust the water flow, and we will be requesting an exemption on width for this bridge; also, it's a very unique railing design, it doesn't meet the crash level test that we need to meet for the road capacity and speed, so we're going to request that the speed limit at this bridge be dropped down and that the railing be then equated to the lowest level of crash test, that will allow the originally unique structure to stay in tact without any alteration. Bridge Mokulehua Stream Bridge, Bridge no. 40, is the oldest concrete bridge on the highway. It's 1 of only 3 bridges -- of only 3 bridges in the entire state. It's the first reinforced concrete bridge built on the Hana Highway, and the piers date from an even earlier wooden truss bridge, the only triple span solid parapet bridge, and it also features some exceptional concrete masonry work on the

abutments. The recommendation is to widen this bridge on the side that is the least visible from the highway, and we're verifying that.

Then we also have one distinctive pier bridge in the solid parapet railing design, and this one happens to be that distinctive railing is on the upstream side as is the pointed feature of the masonry pier wall, it's the only masonry pier wall along the highway. So in this one case, we're actually recommending that the downstream parapet be replaced, the bridge widened in the downstream direction; that parapet is not original anyway and it will help the curve coming around. It's near a park.

Then there are typical solid parapet railings, there are 6 contributing bridges, and 7 contributing culverts, and I should have mentioned this at the beginning, when we talk about the 12 historic culverts, we're basically talking about short bridges. Federal highway defines a bridge as 20 feet or longer, these culverts are -- they just look like mini bridges, and you've seen some, some of them are really cute. So of the solid parapets, there are 6 contributing bridges parapets, and 7 contributing culverts, and they will require a variety of widening, for example, you'll see the bridge on the left, the great unknown no. 1, which has already had its parapets replaced, so it's not a big historic issue with us. And Bridge no. 9 on the right is the one that actually had a date panel but it's been so badly damaged that it's no longer evident.

And there are summaries and your powerpoint. Again, strongly urge that you look through our executive summary and respond to our recommendation. We're looking forward to your input.

Ms. Alison Chiu: So as Tonia and Virginia both mentioned, for each bridge, there are recommendations in the executive summary table, and the recommendations for each bridge are different because we wanted to look at each bridge in a unique site specific context but then, also, comprehensively since they're all part of the historic district. So I'm going to talk a little bit about the treatment approaches that are team came up with, and tell you a little bit about our reasoning behind these treatment recommendations.

Wherever possible, we hope to retain the existing historic parapets, which are a very important character defining feature of the historic Hana Highway district. DOT has requested railings that meet the current safety codes, so we're looking at a couple of different options here. First, in order to retain the existing parapets, as Virginia mentioned, we could add the protective interior crash tested railing that meets the code, and beyond meeting the code of the interior rail, it also provides protection for the historic railings so they would not be damaged in the event of a crash, and we also wanted to avoid altering the view of the historic bridges, so by adding the crash tested rails to the interior side of the bridge, we would hope to keep the same view plane of the historic parapets as people drive

along the winding road on the way to Hana. And our team is still researching inappropriate interior rail that would both meet the code and also be as compatible as possible within the historic districts.

Some of the bridges, as you know, are very narrow. With the addition of an interior crash tested rail for protection, we would need to set aside a -- we would need a set amount of space between the original railing and the crash tested railing on each side, which accounts for deflection of the railing in the event of a crash. Since we need to meet the 16-foot minimum width criteria for a one-lane bridge, that would mean that some of these narrow bridges may need to be widened slightly to accommodate these required dimensions. So for the bridges that have the original dates inside -- into the makai parapet, that's the 1911 or even 1912, the top right diagram right here illustrates the recommendations for these bridges. So from the left to right, we have the original makai parapet, which would remain in place, and then we have the required deflection space right here, which would be dependent on which interior crash tested rail is chosen. And just for clarification that this drawing is not to scale so the space right here is not a walkway and it's not a bicycle way. And then the interior crash tested rail would be added for safety, and then we would have the 16-foot minimum width between the crash tested rail and then the new mauka parapet, in blue that you see here, that would be replace in-kind with a solid crash tested parapet. And then the bottom right example that you see here shows a situation where both of the historic railings are kept, and the interior crash tested rails are added with a slight widening to accommodate the cars, and this would be the proposed option for the historic culverts, which are less than 20 feet long, and which we believe can be widened -- can be moved for the roadway to be widened without damage; this way, we would be able to retain the historic rails, and we can also ensure that the structures are safe for everyone traveling along the road.

The second option that we're looking at is where railings need to be replaced to meet code. We would like to use a similar design compatible with the rest of the bridges within the historic district. So this diagram that you see here shows the location of the existing rail and an example known as the T-411 railing, which has a similar profile, which is slightly more rounded at the top of the opening, but it's very similar to the open picket historic rails on both size and proportion. And some of the bridges are currently at or near the 16-foot width right now so if we were to add the interior rails, it would make the lanes for the cars even narrower, so the benefit of using a replacement in-kind option, like this, is that it eliminates the need for widening the road. Similarly, for the typical solid parapet bridges, which could be replaced in-kind with a solid vertical railing to match the existing. And then for the current approach walls, which are the short walls with the lava rock cladding that abut the ends of the bridges, those also need to be strengthened for safety, but we want to do this in a sensitive manner, and so we would like to retain the look and feel of the lava rock cladding as a character defining feature of the historic Hana Highway.

So shown here are a couple of examples that meet the safety code. They would be 27 inches high, and we can adapt them to the Hana setting by cladding them in lava rock, so it would be very similar to what's currently here now. And the options that we've just discussed here, for the railings and the approach walls, are all just potential options that based on our team's extensive visits to Hana and our research, can meet both the safety criteria and the compatibility with the historic bridges. So this is just a really good opportunity for us to ask you and encourage public and professional feedback to help us refine the recommendations that will affect the entire community. And I'll turn it over to Cody who will discuss our structural.

Ms. Cody Aihara: Shown here is one of the options that we are proposing for increasing the capacity for load carrying for the bridges. Right now, we do have some bridges in which the -- in which the girders are currently unable to carry the increase in capacity, so we are looking at a proposal of, one, removing bridges with the excessive asphalt build-up from years of over-pavement, topping, and in addition to installing new concrete girders between the existing, and we are mindful that we do not want to go -- protrude below the existing girders so, therefore, keeping in context with the driving around the bridges that they will still have the same outer appearance and character.

Another proposed improvement for the bridges are a lot of the CRM abutments, the mortar has either disappeared or was not in existence in its current construction, so to keep and retain the historic craftsmanship of the CRM facade, we are proposing to right actions of the future team that they are to document, both by recording the rock placement and photographic records, and removing the facade, rebuilding the actual structural to code abutment behind it, and then restoring the facade to match the original condition before it was disassembled.

In addition to the historic bridges that were listed in the HAER report, the DOT asked us to research the hillside bridges. There are a total of seven hillside bridges along Hana Highway. These seven bridges were built between 2001 and 2004, therefore, they meet all current load criteria and, therefore, don't need to be widened or strengthened. The reason they're called "hillside bridges" is because the slab is actually being cantilevered off of the highway, so when you're on the highway, you actually don't see any part of this extension, but on the other side of the guardrail, you can see that there is a thickened slab and, in some cases, there are piles for these bridges.

Found culverts. With the addition of the hillside bridges, we were also provided the as-built drawings for the entire Hana Highway, and we were asked to find as many of these culverts as we could along the highway and upgrade the railings or any portions of it that protrude above the highway to meet current code. So there were a total of 45 culverts that we were able to find along Hana Highway, as we were driving. A total of 19 were reinforced

concrete pipes; 20 were reinforced concrete or rock box culverts; 5 were corrugated metal pipes; and 1 we had to categorize as unknown, we were told that there were supposed to be a pipe inlet here but, as you can see, when we got over to the other side of the wall, there was no inlet for the structure, so what we are proposing is, as Alison mentioned, to bring these current rock walls up to T-02 standard and clad them with the lava rock so the appearance is still maintained along the highway.

These are just examples of some of the culverts, so these top two are reinforced box culverts, this one on the bottom is rock box culvert, and a corrugated pipe box culvert along the highway.

So even before we presented ...(inaudible)... for your review, hard copies were provided at these locations, and if you were unable to reach the four locations to look at the hard copies, we do have an FTP site available for download that you can review the report at your leisure.

Contacts, for your comments, that we really appreciate on the report or any additional information that you can provide to help us elaborate on the information we did have, you can write or call Paul Santo or Charlene Shibuya and they will get the information to us so we can incorporate it into the pre-final draft. And again, when we do the pre-final draft, it will be issued again to the communities and we will have a third round of these meetings to get more feedback from your before the final is actually completed. And with that, are there any questions?

Chair Carvalho: Ward?

Mr. Mardfin: I mentioned to Charlene a couple minutes ago, when I went through here, through the thing that got sent out to us last week, that we got last Friday, I could be wrong, but I think some of the bridges are misnamed. I've done quite a study of the bridges myself, I helped put together this little --

Ms. Moy: And, actually, that's great. If you can -- we've passing this out to all the communities and through like several other contacts that Charlene had to try and make sure that everything is correct. If you have that sheet, we have a sheet, a separate sheet that has all the names --

Mr. Mardfin: This one?

Ms. Moy: So if you can just even just mark it up, that would be great. We're going to try and have to work with, you know, if there's anything conflicting where, you know, we might -- but --

Mr. Mardfin: What I did was I, and I talked to Charlene, I'm going to email here about it, but I looked at some pictures, the picture that you had and the name you had below it, and I -- most of them were right, but I think there are three or four or five of them that are wrong.

Ms. Moy: Yeah, and, yeah, that I'm sure that at 75% draft, we probably have quite a number of -- so we're working on --

Mr. Mardfin: Okay. So I'm going to get together with other people because I only know what I know and I have photographs of lots of them, and so I'll meet with some -- probably Melody and Kau'i, and we'll work them out.

Ms. Moy: And another thing that actually was just brought up, we went to the CRC, the Maui Cultural Resources Commission just the other week, last week Thursday, and one of the things they brought up, and this is the first time it was brought up to us, and so we're going to start putting it out to the community, is Ms. Salazar highly recommended that we don't put the 'okina and kahako. She said because the original language didn't have it and that, as Hawaiians, you're supposed to know -- I mean Hawaiians know how to pronounce it, that they don't really need it, and like when you go to a foreign country, when you go to Japan, they don't tell you how to read their language. But I mean so this is something that, you know, it's the first time anybody ever mentioned that to us so, you know, and we've been to all the communities, so we just -- we are kinda concerned that that's going to be an issue, so we wanna kinda bring that up with you guys now, so you guys are the first community group we've seen since that meeting with CRC so --

Mr. Crawford: Owana? Owana Salazar?

Ms. Shibuya: She's a member of the Cultural Resources Commission.

Mr. Mardfin: They recommended that you not use 'okina and kahako?

Ms. Moy: Well, her. She's, yeah, she was the one who recommended --

Mr. Mardfin: I -- when I was putting this poster together, I got different views. I asked Kau'i first, 'cause she lives right across from me, and she said if you're not sure you got them all right, don't put any of them on. And then I went and saw Melody Cosma-Gonsalves, and she and I worked together, and we got as best we could, and found some mistakes, like Waioapai is misspelled, out past Kaupo, and stuff like that, but I think the community can be split on this. We ought to find out what the community wants.

Ms. Moy: Yeah.

Ms. Murison: ...(inaudible - not speaking into the microphone)... the research we've done and, in some cases, there are three different ways to spell that stream name. So, again, circle the one that you think is right or that you have some historic evidence of or that you have oral history of that you know is the correct one.

Mr. Mardfin: Well, I could start off with one, on page -- the thing that got sent out to us, somebody referred to Wainapanapa instead of Waianapanapa.

Ms. Murison: Okay.

Mr. Mardfin: It sounds like the same thing to you maybe, but it isn't.

Ms. Murison: No. We're trying to be very careful. There have --

Mr. Mardfin: It's on your executive summary, the fourth line down.

Ms. Murison: Oh, okay. Alright, we'll note that.

Mr. Tom Hoeffken: ...(inaudible - not speaking into the microphone)...

Ms. Aihara: Yeah, we are working with our traffic consultant on the approaches as well, so that is also going to be considered, but our limits, I guess, of the project scope is not to do the whole highway, but we're just at the bridges.

Mr. Tom Hoeffken: I understand ...(inaudible - not speaking into the microphone)...

Ms. Aihara: Right. Yeah, we talked to DOT and, in some cases, it will be a private property issue; in some cases, it's a DLNR issue for land acquisition, but we are trying to fix some of those that we noticed there's a lot of scrapes on the downstream parapets because it's very narrow on the turns, we understand, and so those are some of the bridges that they don't meet the 16, we are, you know, considering which side, you know, we're going to widen, especially with the railings, and then also the approach and such.

Ms. Moy: Yeah, and the community is very strongly wanting to keep kinda the traffic calming that happens because the skinny bridges, so they actually like that, so they don't, you know, they -- we are very mindful about widening, but not too much, and, you know, so make it -- they like that it's difficult for the traffic and the tour buses that come in so just a little bit of our -- oh, and the other thing that I don't think we talked about is that we are going to make it -- the requirement, whenever they rehabilitate, this is going to be like a long, long project, I mean they're not going to be rehabilitating all the bridges at one time, this is going to take like decades, so but when they do rehabilitate it, they want it to be a

40-ton capacity bridge, but the whole time and I think community has expressed desire to keep it posted as 10-ton so that you don't have the fully loaded concrete trucks coming, you don't have, you know, big, big -- except emergency vehicles who will know, they'll have to get a permit to cross.

Mr. Mardfin: Until the last one is built --

Ms. Moy: It will be at that --

Mr. Mardfin: The lowest capacity bridge rules.

Ms. Moy: That's right. That's right.

Ms. Aihara: But if you have any additional comments that you think of afterwards, please, please, please, you know, call or write to either Charlene or Paul, and it will get to us.

Ms. Shibuya: It's on the last page of --

Ms. Aihara: Yeah, your handout.

Ms. Moy: Who has to leave? Nobody? Oh, okay.

Mr. Crawford: I just wanted to thank you all for coming out, for having so many of you here to present to us and coming all the way out to Hana because it is important, you know, important work and I appreciate it, and also for being able to adjust your presentation to fit into the time window and still make it clear and understandable, so I appreciate it.

Chair Carvalho: Thank you so much. On behalf of this board, thank you. Actually, we have to --

Mr. Mardfin: We need to set the time for -- we're not adjourning, we're --

Chair Carvalho: No. Let's move on to agenda item G.

Mr. Mardfin: Oh.

Chair Carvalho: And, with Clayton, and we can work through that. Go ahead.

G. DIRECTOR'S REPORT

1. Scheduling of other Hana Region Applications

H. ADJOURNMENT

Mr. Crawford: I move the adjourn this meeting.

Chair Carvalho: Do I hear a second?

Mr. Ballantyne: Second.

Mr. Crawford: I move to recess this meeting, excuse me. I move to recess this meeting until Tuesday, March 17, at 4 p.m.

Mr. Ballantyne: Second.

Chair Carvalho: Seconded by Ian. Let's put that motion to a vote.

There being no further discussion, the motion was put to a vote.

It has been moved by Committee Member Crawford, seconded by Committee Member Ballantyne, then unanimously

VOTED: to RECESS the meeting at 7:41 p.m. until Tuesday, March 17, 2015, at 4:00 p.m.

Respectfully submitted by,

SUZETTE L. ESMERALDA
Secretary to Boards & Commissions

RECORD OF ATTENDANCE

Present

Clayton Carvalho, Jr., Chairperson
Ward Mardfin, Vice-Chairperson
Ian Ballantyne
John Blumer-Buell
Ed Cashman
Scott Crawford
Anjoleen Hoopai-Waikoloa

Hana Advisory Committee to the
Maui Planning Commission
Minutes - 03/09/15
Page 64

OTHERS

Clayton Yoshida, Planning Program Administrator
Sybil Lopez, Staff Planner
Jennifer Oana, Deputy Corporation Counsel

APPENDIX 8

ATTACHMENT 8f

MARCH 24, 2015

Federal & State Agency
Meeting Summary



FUNG ASSOCIATES INC.

architecture ■ preservation ■ planning ■ interiors

MEETING MINUTES **FINAL**

By: Alison Chiu
April 09, 2015

Project: Hana Highway Bridge Preservation Plan

Meeting Date: March 24, 2015

Time: 10:30 AM

Location: DOT Office Conference Room 611, Kapolei

Attendees:

HDOT	Paul Santo, Neil Hasegawa, Deona Naboa, Pua Aiu
FHWA	Domingo Galicinao, Meesa Otani
SHPD Architecture	Jessica Puff
SHPD Archaeology	Morgan Davis, Jenny Picket
HHF	Tanya Gumpac-McGuire
Outdoor Circle	Steve Mechler
MHI	Charlene Shibuya
NOEI	George Gutierrez, Cody Aihara
FAI	Tonia Moy, Virginia Murison, Alison Chiu

I. Project Presentation

- a. Overview of the project's purpose, scope, methodology, timeline and format for the draft report
- b. Re-cap of Phase 1 meetings and the team's efforts to gather early input from community
 - i. Main community concerns to-date:
 - Traffic/re-routing during construction
 - Emergency vehicle access into Hana
 - Keep rural character of Hana
 - Would like to have Hawaiian names on the bridges
 - Do not want to widen road to 2 lanes and do not want higher load posting
 - Choice of interior railing; avoid freeway look



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- c. Description of the project's code requirements and bridge designations of exceptional value, identifying examples of special architectural bridge features
- d. Explanation of proposed actions depending upon each bridge's exceptional features
- e. Description of structural considerations and terminology such as hillside bridges and found culverts

II. Hawaiian Names

- a. Team currently seeking feedback from community sources on correct spellings and meanings, to be used for future bridge identification
- b. Community preference regarding use of diacritical marks is not confirmed at this time
 - i. A bill proposed by OHA may help guide state projects regarding use of diacritical marks (outcome expected in May); uncertain if proposed guidelines will also be applied to federal projects

III. Integrity of CRM Façades

- a. Proposed action at bridges with exceptional CRM façade abutments
 - i. Dismantle CRM façade, strengthen structural conditions behind façade, rebuild CRM façade in order to maintain the original workmanship. This process involves numbering each stones and extensively documenting existing configuration in order to re-build it in the same configuration and same outward appearance.
 - ii. Proposed method will affect integrity of this character-defining feature, but only minimally so, and it is necessary to retain the structure. SHPD agreed this method will have the least amount of impact and is considered the best compatible method to address modern load capacity needs.
 - 1. Community expressed desire to retain current 10-ton load posting, although bridges will all eventually be upgraded to meet the 40-ton load capacity requested by HDOT.

IV. Archaeological

- a. Sites
 - i. Possible burial mounds identified at *mauka* vicinity of Wailuanui Culvert near Keanae Lookout
 - 1. Outstanding documentation will be provided by CSH, following CSH/SHPD site visit to confirm and document conditions
 - 2. SHPD Archaeology to provide mile marker for team's reference
- b. Draft Assessment & Recommendations
 - i. To clarify Hwy-DE's comment regarding reasoning for archaeological assessment/recommendations, SHPD Archaeologists noted they are working closely with CSH to identify additional historic sites that may be affected by future bridge work



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- ii. SHPD confirmed there is new information; CSH recommendations to be further refined by bridge to include information (ex. whether a monitor is needed on site during construction)
 - 1. Information will help to identify suitable locations for staging areas (unknown at this time)

V. Programmatic Agreement

- a. Since SHPD is commenting on the draft report, which includes a bridge survey and recommendations, this review and concurrence is a good basis upon which to form the Programmatic Agreement (PA)
- b. Preferred option is to arrange PA by bridge type (vs. by phase), or individual bridges if scope can be finalized
- c. PA can include identifying location of proposed staging areas, which will still require Section 106 review process
- d. PA can also include vegetation plan/recommended tree interface since adjacent boundary will be affected; improved sightlines and widening of corridor
- e. Suggestion to add mention of the PA into Chapter 6 Related Issues; Integrating lessons learned over a 10-year period can be incorporated into the PA

VI. Bridge Railings

- a. FHWA confirmed that incorporating the panel design on the exterior face of new solid parapets is acceptable and will not affect crash-test ratings

VII. ACTION ITEMS

- a. SHPD Archaeology to provide mile marker for team's reference
- b. SHPD Architecture/Archaeology offered to reach out to additional sources regarding Hawaiian names/meanings
- c. HDOT to send team information on recent asphalt removal dimensions (completed 3/25/2015)



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SIGN IN SHEET

Project: Hana Highway Preservation Plan
Meeting Date: March 24, 2015
Time: 10:30 AM
Location: DOT Office Conference Room 611, Kapolei
Attendees:

NAME	COMPANY	PHONE	EMAIL
Paul Santo <i>PS</i>	Hwy-DB		
Neil Hasegawa <i>NH</i>	Hwy-DB		
Deona Naboa	Hwy-DE, Historic Preservation Specialist		
Domingo Galicinao <i>DG</i>	FHWA, Hawaii Division		
Meesa Otani <i>MO</i>	FHWA, Hawaii Division		
X Anna Broverman	SHPD Architecture Branch		
Jessica Puff <i>JP</i>	SHPD Architecture Branch		
via phone Morgan Davis	SHPD Archaeology Branch		
via phone Jenny Pickett	SHPD Archaeology Branch		
X Kiersten Faulkner	Historic Hawaii Foundation		
via phone Tanya Gumapac-McGuire	Historic Hawaii Foundation		
<i>Steve Moller</i>	Outdoor Circle		



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X	David Zegenbergen	Hawaii Scenic Byways Coordinator, State of Hawaii Department of Transportation, Highways Division, Advanced Planning Section	
via phone	Charlene Shibuya	Munekiyo & Hiraga (MHI)	
X	Katie Folio	Cultural Surveys Hawaii (CSH)	
	George Gutierrez <i>aga</i>	NOEI	
	Cody Aihara <i>GA</i>	NOEI	
	Tonia Moy <i>tm</i>	FAI	
	Virginia Murison <i>Von</i>	FAI	
	Alison Chiu <i>acc</i>	FAI	
X	Mayu Ohama	FAI	
X	Michelle Cheang	FAI	

via phone pua Aiu DOT/DLNR 587-1497 pua.aiu@hawaii.gov

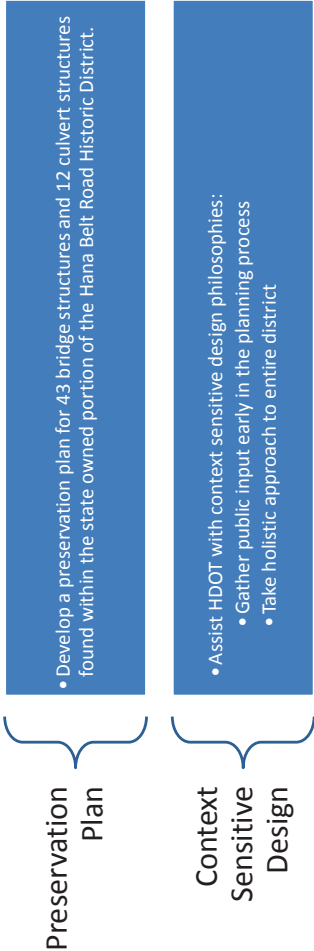
APPENDIX 8

INDEX 1

(Exhibit “1”) PowerPoint Handout with
List of Bridge & Stream Names

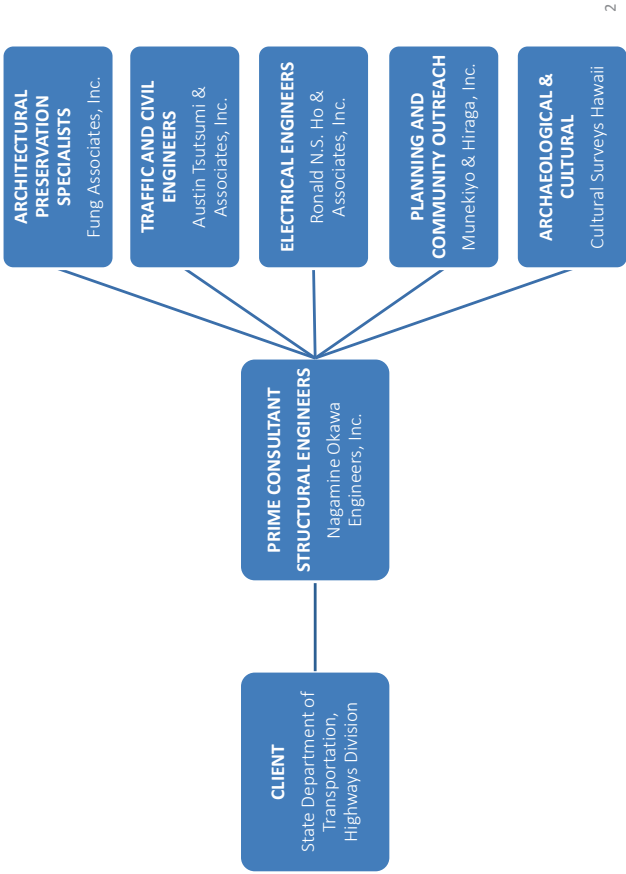


Overall Project Purpose

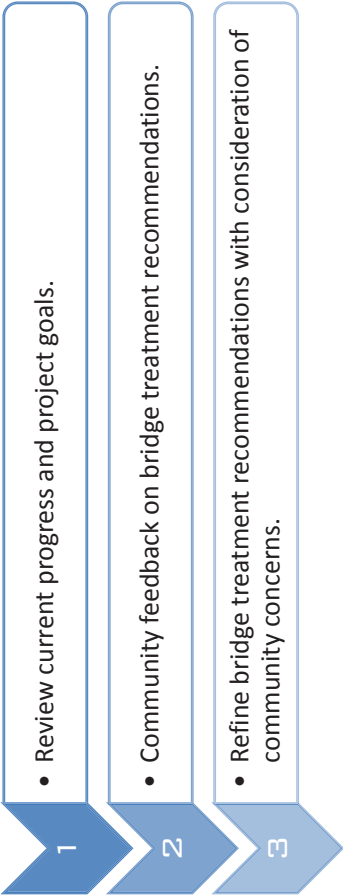


*Project is not a construction project but a preservation plan.

The Project Team



Purpose of this Meeting



The Hana Belt Road Historic District

MAY - SEPTEMBER

- OCTOBER - MARCH

- MARCH - JULY

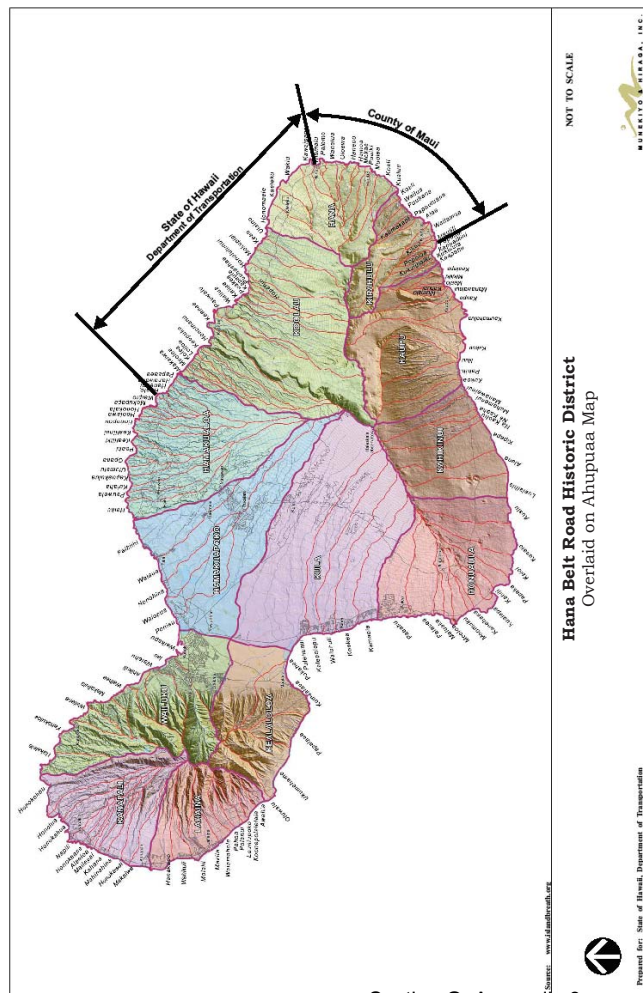
- 5

Note: Culverts and Hillside Bridges have been omitted at this scale for clarity.

Please see next page for list of bridges and their corresponding numbers.



CC



Section G, Appendix 8

7

No.	Bridge Name	Mile Point	Year Constructed	No.	Bridge Name	Mile Point	Year Constructed
01	Hoalua Stream Bridge	5.09	1929	23	Unknown Stream No. 2 Bridge	23.00	1920
02	Kailua Stream Bridge	5.86	1929	24	Unknown Stream No. 3 (Paakea) Bridge	23.01	1920
03	Nailiilihaele Stream Bridge	6.22	1930	25	Kapaula Bridge	23.39	1926
---	Culvert No. 1	7.05	unknown	26	Hanawi Stream Bridge	23.99	1926
04	Oopuola Stream Bridge	7.94	1925	27	East Hanawi Stream Bridge	24.16	1926
05	Makanali Stream Bridge	8.24	1928	---	East Hanawi Culvert	24.20	unknown
06	Kaaiea Stream Bridge	8.57	1928	28	Makapipi Stream Bridge	24.98	1926
07	Waikamoi Stream Bridge	9.88	1911	29	Kuhiwa Stream Bridge	25.20	1926
08	Puohokamoa Stream Bridge	10.97	1912	30	Kupukoi Stream Bridge	25.42	1926
09	Haipuaena Stream Bridge	11.44	1912	31	Unnamed Stream (Kahalaowaka) Bridge	25.95	1926
10	Punalau Stream (Kolea) Bridge	13.16	1911	32	Pupape (Manawaikae) Stream Bridge	26.48	1926
11	Honomanu Stream Bridge	13.71	1911	33	Kahawaihapapa Stream Bridge	26.60	1922
12	Nuaailua Stream Bridge	15.39	1911	34	Keaiki Stream Bridge	26.77	1921
13	Piinaau Stream Bridge	16.60	1916	35	West Waioni Stream	26.94	1920
14	Palauhulu Stream bridge	16.77	1916	36	Waioni Stream Bridge	27.01	1920
---	Culvert No. 2	17.48	circa 1937-1940	37	Lanikele Stream Bridge	27.76	1917
---	Culvert No. 3	17.53	circa 1937-1940	38	Heleleikeoha Stream Bridge	27.92	1917
---	Culvert No. 4	17.55	circa 1937-1940	39	Ulaino Stream Bridge	27.98	1914
---	Waiokamilo Culvert	18.00	unknown	40	Mokulehua Stream Bridge	28.31	1908
15	Waiokamilo Stream Bridge	18.07	1921	41	Oilowai Stream Bridge	29.18	1914
16	Waikani Stream Bridge	19.39	1926	42	Honomaele Stream Bridge	29.54	1924
17	West Wailuaiki Stream Bridge	20.83	1937	---	Culvert No. 5	29.85	unknown
18	East Wailuaiki Stream Bridge	21.30	1926	43	Kawaiapapa Stream Bridge	33.44	1947
19	Kopiliula Stream Bridge	21.81	1926	---	Culvert No. 6	30.09	unknown
20	Puaakaa Stream Bridge	22.31	1926	---	Culvert No. 8	30.57	unknown
21	Waiohue Stream Bridge	22.47	1937	---	Culvert No. 9	33.74	1915
22	Unknown Stream No. 1 Bridge	22.95	1920	---	Culvert No. 10	34.00	1915

Specific Project Objectives

- 1
 - Study the affected bridges to document each bridge's historic character.
- 2
 - Evaluate each bridge with respect to condition and public safety considerations.
- 3
 - Conduct a community and agency consultation process to ensure that input is received regarding the bridge evaluation and preservation process.
- 4
 - Prepare recommendations for historic preservation for each bridge considering historic qualities, public safety, funding options, and community/agency input.

10

Bridge Designations

Why “exceptional” and “contributing”?

Bridges are divided into 2 categories of significance for the purpose of recognizing those that have exceptional value and merit special treatment efforts.

Exceptional

- Historic date panels
- Best example of type
- Unique features
- Oldest example of type
- Intact condition
- Integrity of original design
- Related to EMI system
- Advanced technological innovation of its time

Contributing

- Contributing structure to the historic district
- Many examples of a certain type
- Poor condition/integrity
- Heavily altered

12

How to Use This Report

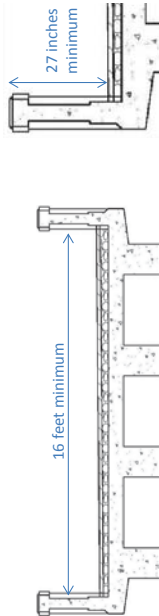
Section A: Chapter 1 General + Chapter 2 Methodology	<ul style="list-style-type: none"> • Regulatory information and literature review of known, long-range community plans are presented first, to provide a foundation for the team's methodology and community outreach.
Section A: Chapter 3 Summary of Identification Guidelines & Evaluation Methods	<ul style="list-style-type: none"> • Identification of bridge components and evaluation methods per historic guidelines follow the informational foundation, in order to ensure consistency within the team's approach.
Section A: Chapter 4 Design Guidelines + Chapter 5 Public Safety	<ul style="list-style-type: none"> • Design guidelines and public safety issues form the crux of this preservation plan, balancing present day safety priorities with sensitivity to historic and cultural context.
Section A: Chapter 6 Related Issues Along the Hana Highway	<ul style="list-style-type: none"> • This portion addresses several concerns and topics that the team identified while preparing the <i>Hana Highway, Route 360 Bridge Preservation Plan</i> (2015). Due to the limited scope of this project, these concerns were not directly addressed, but it is strongly encouraged that these concerns are taken into consideration when planning for future projects.
Section A: Chapter 7 Hana Highway Historic Bridge District: State Bridges	<ul style="list-style-type: none"> • A detailed overview of the development of East Maui and the Hana Belt Road can be found in this chapter, with additional historic and cultural context provided in the individual bridge and culvert chapters, and appendices.
Section B Bridges + Section C Culverts	<ul style="list-style-type: none"> • Included in the individual chapters for each particular bridge is relevant cultural, historical, and technical information along with recommended treatment for each bridge presented in Sections B and C of this report.

11

Minimum Requirements & Recommendations for Bridges

Current Bridge Code Requirements & Recommendations by DOT

- Recommendation: Minimum width of a single lane bridge = 16 feet
- Requirement: Minimum height of railings/parapets (including interior rail) = 27 inches
- Requirement: Current code load of 40 tons (existing highway is 10 tons)
- Requirement: Railings/Parapets = TL-2 crash tested (for roadways less than 45 mph)
- Requirement: Approach Wall = TL-2 crash tested, minimum height 27 inches



Recommendation: Minimum Lane Width
The minimum recommended width for a one lane bridge is 16 feet.

Requirement: Minimum Railing/Parapet + Approach Wall Height
The minimum required height for railing/parapet and approach wall along the highway is 27 inches.

13

Curved Bridges



Bridge 03 Naillihale Stream Bridge



Bridge 14 Palauhulu Stream Bridge

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Curved Bridges	4	0	<ul style="list-style-type: none">Retain railingsAdd crash-rail inside (wide enough)Convert #14 from 2 lanes to 1	<ul style="list-style-type: none">3 Naillihale (Also Exceptional CRM Abutments)4 Opuola (Also Exceptional CRM Abutments and Natural Rock Foundation)14 Palauhulu (Also Exceptional Natural Rock Foundation)17 West Walluaki

Arched Bridges



Bridge 16 Waikani Stream Bridge



Bridge 26 Hanawi Stream Bridge

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Arched Bridges	2	0	<ul style="list-style-type: none">Retain railingsAdd crash-rail inside (#26 wide enough)Exemption on width for #16Alternative: add 2-lane bridge for #16 (TBD following discussion with community)	<ul style="list-style-type: none">*16 Waikani (17'-9" wide)26 Hanawi (20'-9" wide)
	1	0	<ul style="list-style-type: none">Replace deck and railings with best match TL-2 crash tested railings	<ul style="list-style-type: none">29 Kuhuwa (16'-6" wide) (Also Exceptional Natural Rock Foundation)

*Requesting Exceptions

Distinctive Pier Bridges



Bridge 25 Kapaula Stream Bridge



Bridge 42 Honomalee Stream Bridge

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Distinctive Pier	2	0	<ul style="list-style-type: none">Replace railings with best match TL-2 crash tested railingsReinforce deck to support new railings	<ul style="list-style-type: none">25 Kapaula (Also Exceptional Natural Rock Foundation)42 Honomalee (Also Exceptional Natural Rock Foundation)

Distinctive Greek Cross Railing Bridges



Bridge 15: Waioakamilo Stream Bridge



Culvert 25C: Waioakamilo Culvert

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Distinctive Parapet/Railing: Greek Cross Design	1	1	<ul style="list-style-type: none">Retain railingsAdd crash-rail inside (wide enough)	<ul style="list-style-type: none">15 WaioakamiloWaioakamilo Culvert

Typical Open Picket Bridges



Bridge 1: Hoalua Stream Bridge



Bridge 39: Uiaho Stream Bridge

Contributing	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
	16	0	<ul style="list-style-type: none">Replace railings with best match TL-2 crash tested railingsReinforce deck to support new railings	<ul style="list-style-type: none">1 Hoalua, 5 Makemaki, 6 Kaalea, 27 East Hanawi, 28 Makapipi, 30 Kupukoi, 31 Unnamed Stream, 34 Keaiki, 35 West Waioli, 36 Waioli, 37 Lanikele, 38 Helelelekeha, 39 Uiaho, 41 Ollowai33 Kahawahapapa (Exceptional CRM Abutments)32 Pupape (Exceptional Natural Rock Foundations)
Typical Open Picket Railings	4	0	<ul style="list-style-type: none">Retain railingsAdd crash-rail inside (wide enough)	<ul style="list-style-type: none">20 Puakaala2 Kailua, 18 East Wailuaki (Exceptional CRM Abutments)13 Pihiaau (Exceptional Natural Rock Foundations)
	0	4	<ul style="list-style-type: none">Widen culvert (verify upstream or downstream)Retain railings and relocate to meet width criteriaAdd crash-rail inside	<ul style="list-style-type: none">Culvert 5, 6, 7, 8

Post WWII Bridges



Bridge 43: Kawaiapapa Stream Bridge

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Post WWII Type	1	0	<ul style="list-style-type: none">Reinforce deck to support new railings vs. Retain railingsAdd crash-rail inside (wide enough)	<ul style="list-style-type: none">43 Kawaiapapa

Summary of Recommendations
Open Picket Railing

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Curved Bridges	4	0	<ul style="list-style-type: none">Retain railingsAdd crash-rail inside (wide enough)Convert #1,4 from 2 lanes to 1	<ul style="list-style-type: none">3 (Also Exceptional CRM Abutments)4 (Also Exceptional CRM Abutments and Natural Rock Foundation)14 (Also Exceptional Natural Rock Foundation)17
Arched Bridges	2	0	<ul style="list-style-type: none">Retain railingsAdd crash-rail inside (#26 wide enough)Exemption on width for #16Alternative: add 2-lane bridge for #16 (TBD following discussion with community)	<ul style="list-style-type: none">*16 (17'-9" wide)26 (20'-9" wide)
	1	0	<ul style="list-style-type: none">Replace deck and railings with best match TL-2 crash tested railings	<ul style="list-style-type: none">29 (16'-6" wide) (Also Exceptional Natural Rock Foundation)
Distinctive Pier	2	0	<ul style="list-style-type: none">Replace railings with best match TL-2 crash tested railings	<ul style="list-style-type: none">25 (Also Exceptional Natural Rock Foundation)42 (Also Exceptional Natural Rock Foundation)
Distinctive Parapet/Railing: Greek Cross Design	1	1	<ul style="list-style-type: none">Retain railingsAdd crash-rail inside (wide enough)	<ul style="list-style-type: none">15Waioakamilo Culvert
Post WWII Type	1	0	<ul style="list-style-type: none">Reinforce deck to support new railings vs. Retain railingsAdd crash-rail inside (wide enough)	<ul style="list-style-type: none">43
Total Exceptional	11	1		

*Requesting Exceptions

Summary of Recommendations

Open Picket Railing

Contributing	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
	16	0	<ul style="list-style-type: none">Replace railings with best match TL-2 crash tested railingsReinforce deck to support new railingsRetain railingsAdd crash-rail inside (wide enough)	<ul style="list-style-type: none">1, 5, 6, 27, 28, 30, 31, 34, 35, 36, 37, 38, 39, 4133 (Exceptional CRM Abutments)32 (Exceptional Natural Rock Foundations)
Typical Open Picket Railings	4	0	<ul style="list-style-type: none">Retain railingsAdd crash-rail inside (wide enough)	<ul style="list-style-type: none">202, 18 (Exceptional CRM Abutments)13 (Exceptional Natural Rock Foundations)
	0	4	<ul style="list-style-type: none">Widen culvert (verify upstream or downstream)Retain railings and relocate to meet width criteriaAdd crash-rail inside	<ul style="list-style-type: none">Culvert 5, 6, 7, 8
Total Contributing	20	4		

Solid Parapets

Open Picket Railing Summary

Bridge Quantity	Culvert Quantity	Bridge Quantity	Culvert Quantity	Bridge Types
Total Exceptional	11	1		<ul style="list-style-type: none">4 Curved Bridges (Exceptional)3 Arched Bridges (Exceptional)1 Greek Cross Bridge (Exceptional)1 WW II Bridge (Exceptional)4 Typical Bridges (Contributing)4 Typical Culverts (Contributing)1 Greek Cross Culvert (Exceptional)
Total Contributing	20	4		
Rehabilitate / Retain Existing Railings				
Rehabilitate / Replace Existing Railings				
Replace				
Total Widen (of Rehabilitate)				
Total Overall	31	5		<ul style="list-style-type: none">2 Distinctive Piers (Exceptional)16 Typical Bridges (Contributing)
Total Widen (of Rehabilitate)				
0				
4				
4 Typical Culverts (Contributing)				

Historic Date Panel Parapet Bridges



Bridge 7 Walkamoi Stream Bridge



Bridge 10 Punalau Stream Bridge (Kolea)

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Distinctive Parapet/Railing: Historic Date Panel	3	0	<ul style="list-style-type: none">Retain downstream parapetAdd crash-rail inside downstream parapetWiden upstream sideReplace upstream side parapet with best match TL-2 crash tested railings	<ul style="list-style-type: none">7 Walkamoi, 8 Puoholamao, 10 Hunaiau

EMI Bridges

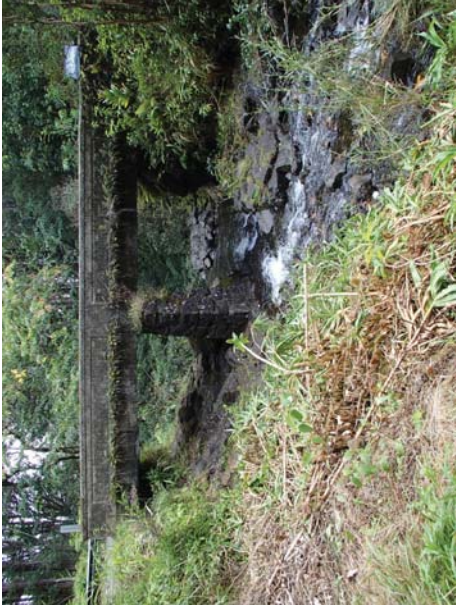


Bridge 19 Kopillia Stream Bridge

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
EMI	1	0	<ul style="list-style-type: none">Retain parapetsExemption on width, and crash testing to meet TL-1 criteria	<ul style="list-style-type: none">*19 Kopillia

*Requesting Exceptions

Distinctive Pier Bridges



Bridge 21 Waiohue Stream Bridge

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Distinctive Pier	1	0	<ul style="list-style-type: none">Retain upstream parapetAdd crash-rail inside upstream parapetWiden downstream side with new best match TL-2 crash tested railing	<ul style="list-style-type: none">21 Waiohue

Oldest Bridge



Bridge 40 Mokulehua Stream Bridge

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Oldest Concrete Bridge on Maui	1	0	<ul style="list-style-type: none">Retain downstream parapetAdd crash-rail inside downstream parapetWiden upstream sideReplace upstream side parapet with best match TL-2 crash tested railings	<ul style="list-style-type: none">40 Mokulehua (Also Exceptional CRM Foundation)

Typical Solid Parapet Bridges



Bridge 22 Unknown Stream No. 1



Bridge 9 Halpuaena Stream Bridge

Contributing	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Typical Solid Parapet	4	0	<ul style="list-style-type: none">WidenReplace parapets with best match TL-2 crash tested railingsReinforce deck to support new railingsRetain railings	<ul style="list-style-type: none">9 Halpuaena, 22 Unknown Stream no. 1, 23 Unknown Stream no. 2, 24 Unknown stream no. 3
	0	4	<ul style="list-style-type: none">Add crash-rail insideWiden (verify upstream or downstream side)Retain parapets and relocate to meet width criteria	<ul style="list-style-type: none">Culvert 1, 2, 3, 4East Hanawi CulvertCulvert 10
	0	2	<ul style="list-style-type: none">Add crash-rail inside both parapetsUpstream side is original solid parapetDownstream side is replacement (date?) open picket railing	<ul style="list-style-type: none">12 Nuaulua
Hybrid Parapet	1	0	<ul style="list-style-type: none">Replace both railings with best match TL-2 solid crash tested railingsReplace entire bridge structure (girders, deck & parapets)	<ul style="list-style-type: none">11 Honomanu
Unknown Deck	1	0	(Note: Structurally deficient)	
Altered Culvert	0	1	<ul style="list-style-type: none">Install crash-rail inside original upstream parapet (Note: Downstream parapet was replaced and deck was widened in 2014)	<ul style="list-style-type: none">Culvert 9

Summary of Recommendations Solid Parapet

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Distinctive Parapet/Railing: Historic Date Panel	3	0	<ul style="list-style-type: none">Retain downstream parapetAdd crash-rail inside downstream parapetWiden upstream sideReplace upstream side parapet with best match TL-2 crash tested railings	• 7, 8, 10
EMI	1	0	<ul style="list-style-type: none">Retain parapetsExemption on width, and crash testing to meet TL-1 criteria	• *19
Oldest Concrete Bridge on Maui	1	0	<ul style="list-style-type: none">Retain downstream parapetAdd crash-rail inside downstream parapetWiden upstream sideReplace upstream side parapet with best match TL-2 crash tested railings	• 40 (Also Exceptional GRM Foundation)
Distinctive Pier	1	0	<ul style="list-style-type: none">Retain upstream parapetAdd crash-rail inside upstream parapetWiden downstream side with new best match TL-2 crash tested railing	• 21
Total Exceptional	6	0		

*Requesting Exceptions

Solid Parapet Summary

	Bridge Quantity	Culvert Quantity	Bridge Types
Total Exceptional	6	0	<ul style="list-style-type: none">1 EMI Bridge (Exceptional)6 Typical Culverts (Contributing)1 Altered Culvert (Contributing)
Total Contributing	6	7	<ul style="list-style-type: none">3 Historic Date Panels (Exceptional)1 Oldest Concrete Bridge on Maui (Exceptional)1 Distinctive Pier Bridge (Exceptional)1 Hybrid Parapet Bridge (Contributing)4 Typical Solid Parapet Bridges (Contributing)
Total Overall	12	7	<ul style="list-style-type: none">1 Unknown Deck (Contributing)
Total Widen (of Rehabilitate)			<ul style="list-style-type: none">3 Historic Date Panel Bridges (Exceptional)1 Oldest Concrete Bridge on Maui (Exceptional)1 Distinctive Pier Bridge (Exceptional)4 Typical Bridges (Contributing)2 Typical Culverts (Contributing)

Summary of Recommendations Solid Parapet

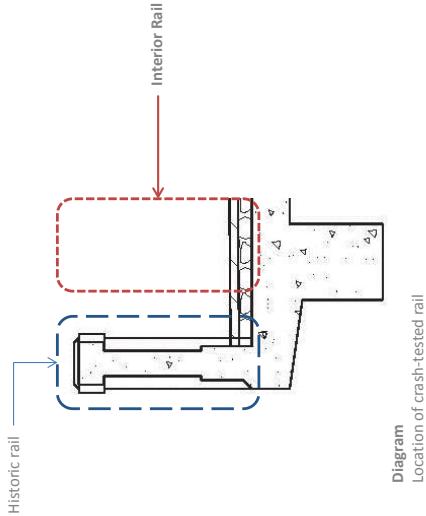
Contributing	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Typical Solid Parapet	4	0	<ul style="list-style-type: none">WidenReplace parapets with best match TL-2 crash tested railingsReinforce deck to support new railingsRetain railingsAdd crash-rail inside	• 9, 22, 23, 24
	0	4	<ul style="list-style-type: none">Widen (verify upstream or downstream side)Retain parapets and relocate to meet width criteriaAdd crash-rail inside both parapets	• Culvert 1, 2, 3, 4
	0	2	<ul style="list-style-type: none">Widen (verify upstream or downstream side)Retain parapets and relocate to meet width criteriaAdd crash-rail inside both parapets	• East Hanawi Culvert
Hybrid Parapet	1	0	<ul style="list-style-type: none">Upstream side is original solid parapetDownstream side is replacement (date?) open picket railingReplace both railings with best match TL-2 solid crash tested railings	• 12
Unknown Deck	1	0	<ul style="list-style-type: none">Replace entire bridge structure (girders, deck & parapets)(Note: Structurally deficient)	• 11
Altered Culvert	0	1	<ul style="list-style-type: none">Install crash-rail inside original upstream parapet (Note: Downstream parapet was replaced and deck was widened in 2014)	• Culvert 9
Total Contributing	6	7		

Treatment Recommendations

Treatment of Character-Defining Features

Railings

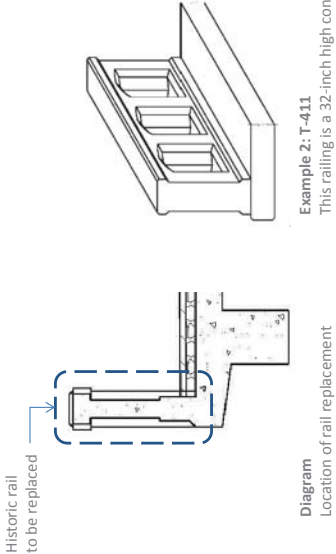
Preserve historic railing in place.



Treatment of Character-Defining Features

Railings

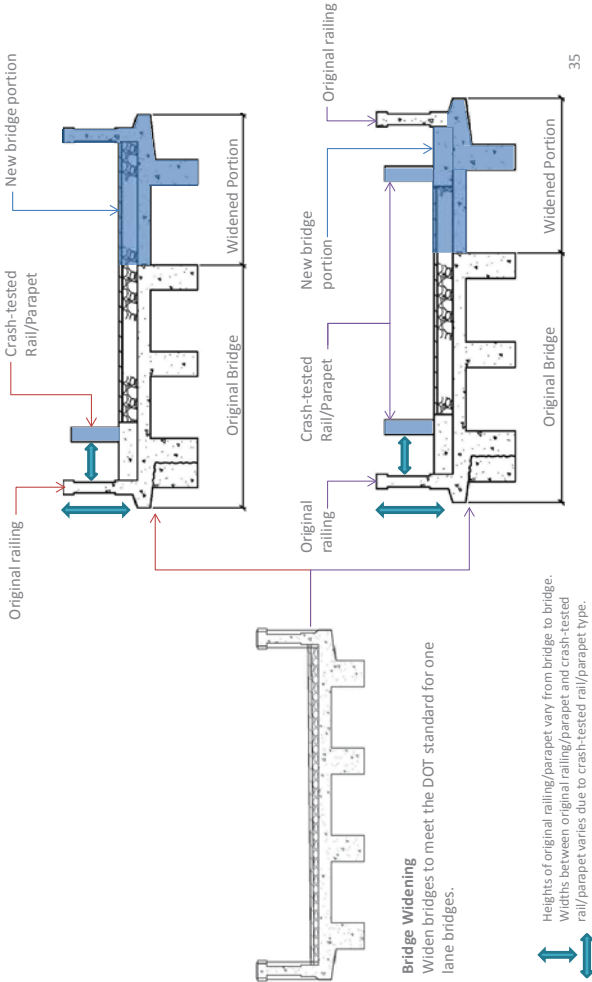
Replacement of open picket rails with compatible design.



Treatment of Character-Defining Features

Railings

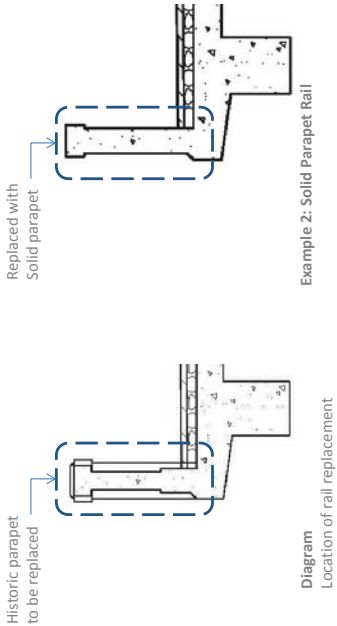
Bridge widening.



Treatment of Character-Defining Features

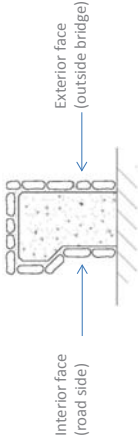
Railings

Replacement of solid parapet with compatible design.



Treatment of Character-Defining Features Approach Walls

Replacement of approach walls.



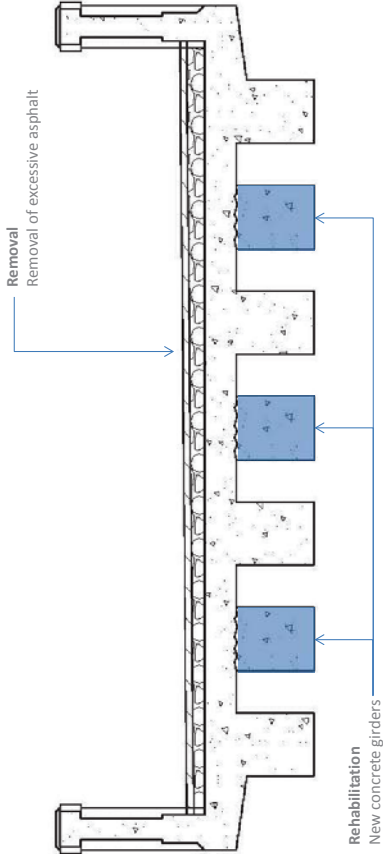
Example 1: TL-2 Rated Approach Wall
Reinforced concrete wall with and without CRM façade



Example 2: TL-2 Rated Approach Wall
Baltimore-Washington Parkway Railing (SBO03b)

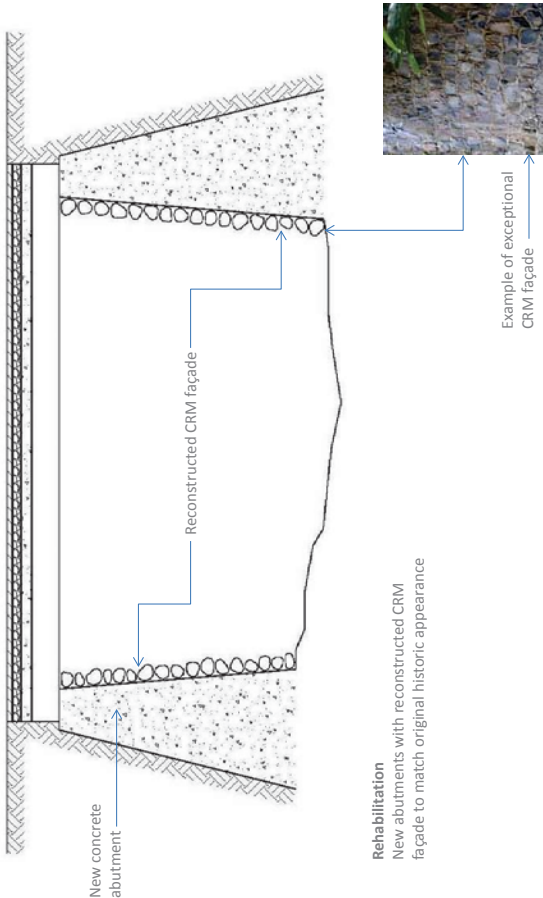
Treatment of Character-Defining Features Structure

Structural reinforcement of bridge, deck, and/or beams.



Treatment of Character-Defining Features Structure

Structural reinforcement of bridge components.



Hillside Bridges

- Total of 7 bridges included in this project
- Cantilever off the side of the mountain
- Built between 2001 and 2004



Hillside Bridge #4



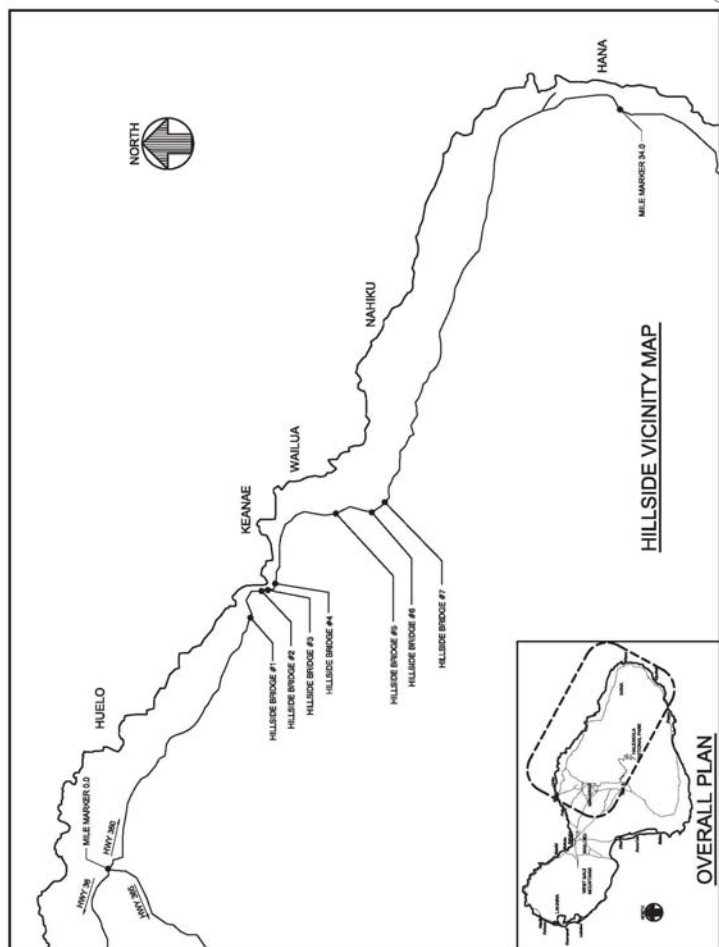
Hillside Bridge #7

Found Culverts

- 45 Found Culverts
 - Reinforced concrete pipe (19)
 - Reinforced concrete and rock box culverts (20)
 - Corrugated metal pipe (5)
 - Unknown - found through records (1)



Unknown Culvert
At MP 14.91



Found Culverts

Found Culverts



MP 10.18



MP 10.48



MP 16.06



MP 20.05

Contacts

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75% Draft

Hana Highway, Route 360 Bridge Preservation Plan 75% Draft can be reviewed by contacting:

- DOT Highways Maui District Office 873-3535
- Hana Council District Office 248-7513
- Hana Public and School Library 248-4848
- Hana Cultural Center and Museum 248-8622

Hana Highway, Route 360 Bridge Preservation Plan 75% Draft available to download from the internet via:

- <ftp://public@ftp.nagamineokawa.com>
- Username: Public
- Password: Hana2015

Questions?

Comments?



APPENDIX 8

ISSUES MANAGEMENT MATRIX

Preliminary Plan Stage
(February to March 2015)

Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District
ISSUES MANAGEMENT MATRIX
Second Cycle of Community Meetings (February to March 2015)

No.	Origin	Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
1	KAUPO COMMUNITY ASSOCIATION (Presentation at regular monthly meeting)							
1(a)		2/21/15	Member	Drainage/overtopping at certain bridges.	Other	HDOT, ATA	C. Aihara noted that the team requested identification of overtopping locations from community member during the first round of meeting, but no further information was received.	2/21/15
1(b)			Member	Are there funding sources for bridge work and maintenance?	Other	HDOT, FAI	T. Moy noted that 6 bridges are identified as priority bridges where work will be completed first. Bridge repairs along entire route will take several years.	2/21/15
1(c)			Member	Has bridges been examined for safety? Any bridges dangerous?	Other	NOEI	C. Aihara said inspections occur every two years. Information helps the team tailor recommendations for bridges on a case by case basis. No bridges are considered dangerous but there are 6 priority bridges being addressed first.	2/21/15
1(d)			Jonathan Starr	i) Commented that executive summary and report is not yet available to the community.	Other	MH, NOEL, FAI	A board member responded that the report was made available via CD copy by Charlene Shibuya (MH). The team noted that hard copies of the reports are available to community members at the HDOT Highways Maui District Office, Hana Council District Office, Hana Public School Library, and the Hana Cultural Center and Museum, and available for online download.	2/21/15
1(e)				ii) Requests that no metal railings be used on the interior railings to keep the historic look. Crash test criteria should require replacement of historic railing without the metal interior railings.	Historic, Architectural	NOEL, FAI	The team is attempting to maintain the historic material standards per Secretary of Interior standards. However, the community should comment if the preference is to use a crash tested rail in front or replace the existing historic rail with a new one that closely resembles the historic railings appearance.	2/21/15

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

Second Cycle of Community Meetings (February to March 2015)

No.	Origin	Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
1(f)				iii) Need to take into account safe passage for bicyclists and pedestrians along the route. The community seemed open to the possibility of a separate path as a future consideration.	Traffic Safety	HDOT, NOEI, FAI, ATA	In the context of the entire route of Hana Highway, from Huelo to Hana, that this bridge preservation plan spans, provisions will be made to the extent practicable to address bicycle and pedestrian safety. The terrain and road right-of-way constraints along this route presents many challenges which are not conducive to typical urban designs that most cyclists may be accustomed with. Refer to further discussions in the Plan in <i>Chapter 6, Related Issues Along the Hana Highway</i> ; paragraph <i>iii.b. Alternative Transportation Concerns</i> , which suggests detailing safety concerns for bicyclists and pedestrians in creating the driving etiquette brochure.	See Attachment "A", 7/23/15 letter response
1(g)				iv) Requested to include/engage members of the Hawaii Bicycling League and Maui Bicycling League in community discussions	Traffic Safety	HDOT, MH	MH will communicate/correspond with the Maui Bicycling League and Hawaii Bicycling League to distribute a CD of Pre-Final Preservation Plan for their review and comment and invite them to attend any of the 3 rd round of public meetings.	Refer to Attachment "A", 7/23/15 letter response
1(h)			Rob Zverina	With the TL-2 crash rating and posted speed limit, he was concerned that the new bridge railing is being "overdesigned".	Traffic Safety	HDOT, NOEI, FAI	The team explained that HDOT provided the TL-2 crash test criteria to meet current codes.	2/21/15
1(i)			Member	Why is the additional rail placed on the interior of the bridge instead of on the exterior?	Historic, Aesthetic	NOEI, FAI	T. Moy explained that the interior design allows view of historic bridge as you are approaching along the curve. C. Aihara also noted that the interior railings are to protect the existing historic rails.	2/21/15
1(j)			Member	How will CRM façade abutments be replaced to look the same as originally constructed?	Historic, Aesthetic	NOEI, FAI	C. Aihara explained the process of numbering and photographing rocks to reinstall them to its original configuration.	2/21/15
1(k)			Member	Will the gap between the interior rail and existing historic rail serve as a pedestrian walkway?	Other	NOEI	C. Aihara clarified that the space is not a pedestrian walkway but a gap necessary for deflection in a crash. Amount of space will depend on the type of crash tested railing selected. The maximum space would be approximately 18 inches which is not wide enough for pedestrians.	2/21/15

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District
ISSUES MANAGEMENT MATRIX
Second Cycle of Community Meetings (February to March 2015)

No.	Origin	Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
2	HANA LANI SENIOR CITIZENS AND HANA CULTURAL CENTER & MUSEUM BOARD (Presentation at regular monthly meeting)							
2(a)		2/23/15	Jotte Roggenbuck	i) Questioned the difference between a culvert and a bridge.	Other	NOEI	C. Aihara responded that the culverts are structures less than twenty (20) feet wide; a bridge exceeds that dimension.	2/23/15
2(b)				ii) If bridges are repaired, will it have to comply with current design standards?	Other	HDOT	P. Santo responded that replacements will be in-kind with a stronger capacity to carry emergency vehicles and rehabilitation designs will have to be brought up to standards.	2/23/15
2(c)			Elliot Kalama	Concerned with having to go all around Kaupo with bridge work closures.	Traffic Safety	NOEI, ATA	C. Aihara responded that temporary bypass bridges are being looked at to avoid routing traffic through Kaupo.	2/23/15
2(d)			Annie Gilbert	What does "exceptional" mean?	Historic	FAI	V. Marison pointed out attributes making a bridge exceptional, such as date panels, best example of type, unique features, age, etc., as noted on slide #12.	2/23/15
2(e)			Unidentified Gentlemen	Has there been a bridge failure?	Other	HDOT	P. Santo stated not on Maui but there was an instance in Hanalei, Kauai.	2/23/15
2(f)			Max Mattson	Concerned that after all the bridges get reinforced, that the 10 ton weight limit postings remain.	Other	HDOT	HDOT acknowledges that although some bridges will have their load limits upgraded, the route can remain posted at 10 tons per the community's desire. Also, until all the bridges are upgraded, the route will remain posted at a 10 ton limit. HDOT will re-look into this matter as the bridges are upgraded.	See Attachment "B", 7/23/15 letter response

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

Second Cycle of Community Meetings (February to March 2015)

No.	Origin	Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
2(g)			Carolyn Fuhrmann	There are bridges where ponding occurs; cited the solid parapet bridge with the green shack building. She later contacted P. Santos to report that the solid railing bridges had ponding issues and that the open type railing bridges had ponding issues as well.	Other	HDOT, ATA	As each bridge's design is undertaken, proper bridge deck drainage features will be implemented to effectively keep storm runoff and ponding off the deck and approach pavements. HDOT will relook into this matter as the bridges are upgraded.	See Attachment "C", 7/23/15 letter response
3	HANA COMMUNITY MEETING (Invitation provided to the Hana Community Association, Nahiku Community Association, Kipahulu Community Association, and general/public)							
3(a)	Community meeting open to general public	2/23/15	Anna-Lisa Singer and Shane Sinenci	On Slide 35 showing a crash-tested rail/parapet, questioned whether the space is for a pedestrian walkway and its appropriate width?	Other	NOEI	C. Aihara clarified that the space is not a walkway but a buffer to protect the original railing from damage in case the inside rail is subject to a crash. The width ranges from 2 to 22 inches	2/23/15
3(b)			Anna-Lisa Singer	Questioned whether there is enough space at the approaches to the bridges.	Traffic Safety	ATA	M. Nakamoto explained that temporary bridges will have to maintain at least one (1) open lane.	2/23/15
3(c)			Don Atay	i) Expressed concern that replacement bridges have designs which allow emergency vehicles and larger vehicles to negotiate.	Traffic Safety	NOEI, ATA	The project team is working with the traffic engineer on approach alignments on bridges to be widened to appropriately accommodate various types and sizes of vehicles that are expected to traverse this route.	See Attachment "D", 7/30/15 meeting handout
3(d)				ii) Made a suggestion to install solar cameras such as at Waikani Bridge to automatically issue citations.	Other	HDOT	P. Santo explained that legislation is needed to allow that system of enforcement.	2/23/15
3(e)				iii) What is on the priority list and expected schedule.	Other	HDOT	P. Santo explained that funds are programmed for six (6) bridges. After the bridge preservation plan is finalized later this year, design consultants will be selected in 2016. Within the next two (2) years, HDOT is looking at a few bridges to first be upgraded to a 15 ton capacity to help emergency vehicles.	2/23/15

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ISSUES MANAGEMENT MATRIX

Second Cycle of Community Meetings (February to March 2015)

No.	Origin	Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
3(f)				iv) He asked that the 10 ton limit remain unchanged.	Other	HDOT	P. Santos clarified that although some bridges will have their load limit upgraded, the route can remain posted at 10 tons per the community's desire. Also, until all the bridges are upgraded, the route will stay posted at a 10 ton limit. HDOT will relook into this matter as the bridges are upgraded.	2/23/15
3(g)			Kathleen Flanders	i) As a postal carrier that delivers between Haiku and Kaupo, she is concerned with delays from construction road closures.	Traffic Safety	ATA	C. Aihara state that the plan calls for temporary bypass bridges to maintain traffic flow during construction. M. Nakamoto further stated that temporary bypass bridges will be considered or alternatives such as night construction and closing one side of a two-lane bridge. Traffic studies show very little traffic between 9:00 p.m. and 5:00 a.m.	2/23/15
3(h)				ii) She complained that cars rented by tourist impede traffic.	Traffic Safety	ATA	There is a recommendation in the Plan in Chapter 6, <i>Related Issues Along the Hana Highway</i> regarding collaborating with rental car companies, airlines, travel experience companies and the Hawaii Tourism Authority to develop and provide travel literature to educate visitors on driving etiquette along Hana Highway. A small example is included in the <i>Mau Visitor Guide</i> magazine publication which has in their Hana coverage, " <i>Tip for the Trip to Hana: Enjoy a relaxed pace on the road, but pull over often to wave local drivers by – they've seen the sights before and prefer to hurry home</i> ".	Refer to Attachment "D", 7/30/15 meeting handout
3(i)			Lehua Cosma	i) How was the 40 ton load limit determined?	Other	NOEI	C. Aihara responded that current federal codes require this design loading.	2/23/15

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

Second Cycle of Community Meetings (February to March 2015)

No.	Origin	Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
3(j)				ii) Commented that safety rails are not visible at night and people crash into them. Not all bridges have reflectors; this should be a part of the project.	Traffic Safety	HDOT, ATA	Bridges which will undergo preservation work will appropriately incorporate necessary delineation features for its safety rails. For existing bridges that are under a maintenance program, HDOT conducts inspections every 2-years to identify deficiencies. Missing reflectors along bridge rails and approach guardrails are replaced by the road maintenance crew. Residents may also alert the Department of Transportation, Maui District Office and make direct requests for new or replacement reflectors.	Refer to Attachment "D", 7/30/15 meeting handout
3(k)				iii) Tourists do not pay attention to NO PARKING signs installed at bridges.	Traffic Safety	HDOT, ATA	Unfortunately, regular enforcement of NO PARKING restrictions at these remote bridge locations may not be practical for the distant Hana Police Department. Nonetheless, if a long term violation occurs, the police department would have to be dispatched.	Refer to Attachment "D", 7/30/15 meeting handout
3(l)			Eileen Comeaux	Stated that bicycle traffic has become a problem.	Traffic Safety	HDOT, ATA	HDOT has to reasonably accommodate all modes of transportation which also include bicyclists. There are challenges to comfortably accommodate cyclists due to the narrow, windy, and steep road inclines. See discussion in Chapter 6, <i>Related Issues Along the Hana Highway</i> ; paragraph iii.b. <i>Alternative Transportation Concerns</i> . The Plan is limited to the bridges/culverts and does not include the entire Hana Highway. However, as road improvement projects are undertaken along the route such as resurfacing, HDOT has been paving the shoulders where space is available. This will allow cyclists, as well as, slow driving tourists to pull over and allow other drivers to pass.	Refer to Attachment "D", 7/30/15 meeting handout
3(m)			Doria Lind	i) Asked if the safety rails suggested are already accepted.	Other	NOEI	C. Aihara stated that <i>example safety rails proposed have been used in other states nationally, but not in Hawaii.</i>	2/23/15

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Second Cycle of Community Meetings (February to March 2015)

No.	Origin	Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
3(n)				ii) Described old bridge's drainage systems that are not working; bridges are ponding. S. Sinenci added that bridges like Waikani, Waikamoi, and Makapipi that are close to the cliffs have a lot of water running down onto them.	Other	NOEI, ATA	C. Aihara explained that paving over deck drain holes will be addressed.	2/23/15
3(o)			Shane Sinenci	Can the use of asphalt on decks be avoided?	Aesthetic	HDOT, FAI	P. Santo stated that at one time, residents wanted the asphalt paving to cover the concrete surface, but concrete would be fine with HDOT. The team needs more community input as to which is preferred.	2/23/15
3(p)			Moke Bergau	He noted that road approaches to the Puaakaa Stream Bridge is curvilinear but the bridge is straight and will need to be addressed.	Traffic Safety	NOEI, ATA	The project team is working with the traffic engineer on approach alignments on bridges to be widened to appropriately accommodate various types and sizes of vehicles that are expected to traverse this route.	Refer to Attachment "D". 7/30/15 meeting handout
4 CULTURAL RESOURCES COMMISSION (Presentation at regular monthly meeting)								
4(a)		3/5/15	Bruce U'u (Vice Chair)	i) Was concerned with bridge names; noted that some are unnamed.	Other	HDOT	C. Shibuya explained that the recent box culvert/bridge that was widened near the County base yard and Hana Fire Station did not have a name but was given the stream name that it spans. Bridge names are a significant part of the project.	3/5/15
4 (b)				ii) He has never seen automobile crashes on bridges.	Traffic Safety	NOEI	C. Aihara explained that there have been crashes, and repairs made which are structurally sound for current restrictions.	

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Second Cycle of Community Meetings (February to March 2015)

No.	Origin	Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
4(c)			Bridget Mowat	She asked if the team consulted with anyone on the list of names and stressed the importance of Hawaiian names being correctly spelled. A misspelling could change its meaning.	Historic	FAI	C. Shibuya explained that various community associations, senior citizens and individuals were consulted on the bridge/stream names. Ward Mardfin who has researched Hana bridges extensively, Kawi Kanakaole a researcher of streams, and Melody Cosma, a Hawaiian language teacher were individuals consulted. During meetings in Round 2, the team provided the list found in Appendix 13 with the project team's research to all attendees, and requested feedback regarding various discrepancies in names/meanings. No additional information from the public (other than those identified) was submitted to the team.	3/5/15
4(d)			Frank Skowronski	Asked which bridges will be replaced?	Other	HDOT, NOEI	F. Cajigal responded that Honomanu Stream Bridge will be replaced. C. Athara further explained that its deck is not original. Prestressed concrete planks were added and asphalt was placed over. A replacement would be similar to its original constructed features.	3/5/15
4(e)			Arlene Ricalde-Garcia	She thinks the Honomau Bridge replacement is a critical priority.	Other	NOEI	C. Athara explained that the Honomanu Bridge is monitored on a one (1) year inspection cycle versus the standard two (2) year cycle.	3/5/15

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ISSUES MANAGEMENT MATRIX

Second Cycle of Community Meetings (February to March 2015)

No.	Origin	Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
4(f)			Owana Salazar	She recommends naming the bridges/culverts as noted on historical records without diacritical marks and have the name with diacritical marks documented separately on a website to avoid inaccuracies. Diacritical marks were created so people can understand how to pronounce the words.	Historic	FAI	See Chapter 6, <i>Related Issues Along the Hana Highway</i> ; paragraph viii. <i>Signage: Hawaiian Bridge Names</i> . Based on comments solicited from various individuals and organizations, there was no consensus on whether to include or omit Hawaiian punctuation and diacritical marks in the bridge names. Therefore, names should be confirmed by project teams prior to future work on any of these historic bridges. The project team's compiled information regarding names and meanings is listed in Appendix 13, <i>Hawaiian Place Names Research</i> .	See Attachment "F", 7/28/15 letter response and 3/5/15 memo
5	HANA ADVISORY COMMITTEE (Presentation at regular scheduled meeting)							
5(a)		3/9/15	Ward Mardfin (Vice Chair)	i) He pointed out that two (2) bridge names Puakaa Stream Bridge (MM 22.31) and Waiohue Stream Bridge (MM 22.47) are incorrectly cited in the draft report, as it relates to photographs referenced.	Other	HDOT, NOEI, FAI	The project team conducted further research with USGS maps, Google Maps, HDOT's Structure Inventory & Appraisal Sheets, HDOT's as-built paving plans, and Historic American Engineering Record documents on file with U.S. Department of the Interior – National Park Service. HDOT believes the straight line maps and as-built paving plans are incorrect and will have the Plan corrected to reflect Puakaa Stream Bridge at MM 22.31 and Waiohue Stream Bridge at MM 22.47.	See Attachment "F", 7/23/15 letter response
5(b)				ii) After T. Moy explained one of the Cultural Resources Commission members recommended that diacritical marks be left out of the bridge names, he responded that the community may be divided on this matter so will have to check with them.	Cultural, Historic		See response for Issue No. 4(e).	Refer to Attachment "F", 7/23/15 letter response
5(c)				iii) He emailed C. Shibuya on 3/12/15 requesting that report Section 3.3 Settlement Pattern and Predictive Model to be updated with more recent research.	Other		CSH did an initial revision to Section 3.3 to address the updates and references for W. Marfin's review. On 8/20/15 a Pre-final update of the Archaeological Literature Research was sent to W. Marfin to further address his comments.	4/8/15

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ISSUES MANAGEMENT MATRIX

Second Cycle of Community Meetings (February to March 2015)

No.	Origin	Date	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
5(d)				iv) He emailed C. Shibuya on 4/3/15 a list of errors found in the plan.	Other		On 9/3/15 the project team emailed a list of responses to each item.	See Attachment "G", Aug 2015 team responses
5(e)			Tom Hoeffken (meeting attendee)	He offered comments from a trucker's perspective. He stated that widening towards the mountain does not help truckers that need to negotiate curves clear of the banks.	Traffic Safety		C. Aihara explained that the team is working with the traffic engineer on approach alignments to bridges to be widened. T. Moy added that the community desires some degree of traffic calming as well.	3/9/15
6	FEDERAL HIGHWAY ADMINISTRATION, STATE HISTORIC PRESERVATION DIVISION, HAWAII HISTORIC FOUNDATION, AND OUTDOOR CIRCLE							
6(a)	Scheduled meeting	4/9/15	SHPD	There are possible burial mounds identified at mauka vicinity of Wailuanui Culvert near Keanae Lookout.	Archaeological		Outstanding documentation will be provided by CSH, following CSH/SHPD site visit to confirm and document conditions. SHPD Archaeology to provide mile marker for team's reference.	4/9/15
6(b)				Requests CSH recommendations be further refined by bridge to include information such as whether a monitor is need on site during construction. Information will help to identify suitable locations for staging areas (unknown at this time)	Archaeological		In the Archaeological Literature Review section of the Plan, an Archaeological Inventory Survey is recommended as each project is undertaken.	See Attachment "H", 7/23/15 email response
6(c)				Since SHPD is commenting on the draft report, this review and concurrence is a good basis upon which to form the Programmatic Agreement (PA). Suggest add mention of the PA into Chapter 6 Related Issues. Integrating lessons learned over a 10-year period can be incorporated into the PA.	Archaeological		A Section ii Programmatic Agreement section has been added to Chapter 6 Related Issues Along the Hana Highway which covers the suggestions made.	Refer to Attachment "H", 7/23/15 email response

* Categories: Archaeological, Historic, Cultural, Architectural, Traffic, Aesthetic, Environmental, Legislative, Other
 ** Responsible Teams: ATA Austin Tsutsumi & Associates, Inc. MH Munkio Hiraga
 CSH Cultural Surveys of Hawaii NOEI Nagamine Okawa Engineers, Inc.
 FAI Fung Associates Inc. RNSH Ronald N.S. Ho & Associates, Inc.
 HDOT Hawaii Department of Transportation

Note: Italicized verbiage are responses provided by the presenters at each meeting. Verbiage noted in regular red text are responses/actions developed after further evaluation of bridge sites and preliminary recommendations were formulated.

APPENDIX 8

ATTACHMENT 8g

Kaupo Community Association
(Linda Clark, President)
Response Letter

July 23, 2015

Via mail and email: Kaupocommunityassociation2015@gmail.com

Linda Clark, President
Kaupo Community Association
244 Lauie Drive
Kula, Hawaii 96790

SUBJECT: Hana Highway Route 360, Bridge Preservation Plan within the Hana
Highway Historic District, Federal Aid Project No. BR-360(012)

Dear Ms. Clark:

Thank you for allowing the State Department of Transportation (DOT), Highways Division's consultant team to present on the 75% draft report at your February 21, 2015 meeting. A Pre-Final Plan has now been developed, considering all input received by your organization and the rest of the community. A CD copy of the Pre-Final plan was recently mailed to you along with internet instructions for report downloads.

In addition, we would like to provide responses to those questions and comments expressed at the February meeting. See the attached **Exhibit "A"**.

On behalf of the project team, we would like to express our sincere appreciation for your organization's continued participation in the development of the plan.

Linda Clark, President
July 23, 2015
Page 2

If you or any of your members have further concerns or questions on the responses provided, please call me at 244-2015.

Very truly yours,



Charlene S. Shibuya
Senior Associate

CSS:yp

Enclosure

cc: Paul Santo, Department of Transportation (HWY-DB)
Cody Aihara, Nagamine Okawa Engineers
Alison Chiu, Fung Associates, Inc.
Tonia Moy, Fung Associates, Inc.
Virginia Murison, Fung Associates, Inc.

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EXHIBIT “A”

COMMENTS PROVIDED BY KAUPU COMMUNITY ASSOCIATION AT FEBRUARY 21, 2015 MEETING AND RESPONSES TO COMMENTS

No.	Person	Issue Description	Action/Response
1	Member	Drainage/overtopping at certain bridges.	<i>C. Aihara noted that the team requested identification of overtopping locations from community member during the first round of meeting, but no further information was received.</i>
2	Member	Are there funding sources for bridge work and maintenance?	<i>T. Moy noted that 6 bridges are identified as priority bridges where work will be completed first. Bridge repairs along entire route will take several years.</i>
3	Member	Has bridges been examined for safety? Any bridges dangerous?	<i>C. Aihara said inspections occur every two years. Information helps the team tailor recommendations for bridges on a case by case basis. No bridges are considered dangerous but there are 6 priority bridges being addressed first.</i>
4	Jonathan Starr	i) Commented that executive summary and report is not yet available to the community.	<i>A board member responded that the report was made available via CD copy by Charlene Shibuya (MH). The team noted that hard copies of the reports are available to community members at the HDOT Highways Maui District Office, Hana Council District Office, Hana Public School Library, and the Hana Cultural Center and Museum, and available for online download.</i>
5	Jonathan Starr	ii) Requests that no metal railings be used on the interior railings to keep the historic look. Crash test criteria should require replacement of historic railing without the metal interior railings.	<i>The team is attempting to maintain the historic material standards per Secretary of Interior standards. However, the community should comment if the preference is to use a crash tested rail in front or replace the existing historic rail with a new one that closely resembles the historic railings appearance.</i>
6	Jonathan Starr	iii) Need to take into account safe passage for bicyclists and pedestrians along the route. The community seemed open to the possibility of a separate path as a future consideration.	In the context of the entire route of Hana Highway, from Huelo to Hana, that this bridge preservation plan spans, provisions will be made to the extent practicable to address bicycle and pedestrian safety. The terrain and road right-of-way constraints along this route presents many challenges which are not conducive to typical urban designs that most cyclists may be accustomed with. Refer to further discussions in the Plan in Chapter 6, Related Issues Along the Hana Highway; paragraph iii.b. Alternative Transportation Concerns, which suggests detailing safety concerns for bicyclists and pedestrians in creating the driving etiquette brochure.

Note: Italicized verbiage are responses provided by the presenters at each meeting. Verbiage noted in regular red text are responses/actions developed after further evaluation of bridge sites and preliminary recommendations were formulated.

No.	Person	Issue Description	Action/Response
7	Jonathan Starr	iv) Requested to include/engage members of the Hawaii Bicycling League and Maui Bicycling League in community discussions	MH will communicate/correspond with the Maui Bicycling League and Hawaii Bicycling League to distribute a CD of Pre-Final Preservation Plan for their review and comment and invite them to attend any of the 3 rd round of public meetings.
8	Rob Zverina	With the TL-2 crash rating and posted speed limit, he was concerned that the new bridge railing is being "overdesigned".	The team explained that HDOT provided the TL-2 crash test criteria to meet current codes.
9	Member	Why is the additional rail placed on the interior of the bridge instead of on the exterior?	T. Moy explained that the interior design allows view of historic bridge as you are approaching along the curve. C. Aihara also noted that the interior railings are to protect the existing historic rails.
10	Member	How will CRM façade abutments be replaced to look the same as originally constructed?	C. Aihara explained the process of numbering and photographing rocks to reinstall them to its original configuration.
11	Member	Will the gap between the interior rail and existing historic rail serve as a pedestrian walkway?	C. Aihara clarified that the space is not a pedestrian walkway but a gap necessary for deflection in a crash. Amount of space will depend on the type of crash tested railing selected. The maximum space would be approximately 18 inches which is not wide enough for pedestrians.

APPENDIX 8

ATTACHMENT 8h

Hana Lani Senior Citizens
(Annie Gilbert, President)
Response Letter

July 23, 2015

Via mail and email: alanujr@hotmail.com

Annie Gilbert, President
Hana Lani Senior Citizens
P.O. Box 262
Hana, Hawaii 96713

SUBJECT: Hana Highway Route 360, Bridge Preservation Plan within the Hana
Highway Historic District, Federal Aid Project No. BR-360(012)

Dear Ms. Gilbert:

Thank you for allowing the State Department of Transportation (DOT), Highways Division's consultant team to present on the 75% draft report at your February 23, 2015 meeting. A Pre-Final Plan has now been developed, considering all input received by your organization and the rest of the community. A CD copy of the Pre-Final plan was recently mailed to you along with internet instructions for report downloads.

In addition, we would like to provide responses to those questions and comments expressed at the February meeting. See the attached **Exhibit "A"**.

On behalf of the project team, we would like to express our sincere appreciation for your organization's continued participation in development of the plan.

Annie Gilbert, President
July 23, 2015
Page 2

If you or any of your members have further concerns or questions on the responses provided, please call me at 244-2015.

Very truly yours,



Charlene S. Shibuya
Senior Associate

CSS:yp

Enclosure

cc: Paul Santo, Department of Transportation (HWY-DB)
Cody Aihara, Nagamine Okawa Engineers
Alison Chiu, Fung Associates, Inc.
Tonia Moy, Fung Associates, Inc.
Virginia Murison, Fung Associates, Inc.

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EXHIBIT “A”

COMMENTS PROVIDED BY HANA LANI SENIOR CITIZENS AT FEBRUARY 23, 2015 MEETING AND RESPONSES TO COMMENTS

No.	Person	Issue Description	Action/Response
1	Jotte Roggenbuck	i) Questioned the difference between a culvert and a bridge.	<i>C. Aihara responded that the culverts are structures less than twenty (20) feet wide; a bridge exceeds that dimension.</i>
2	Jotte Roggenbuck	ii) If bridges are repaired, will it have to comply with current design standards?	<i>P. Santo responded that replacements will be in-kind with a stronger capacity to carry emergency vehicles and rehabilitation designs will have to be brought up to standards.</i>
3	Elliot Kalama	Concerned with having to go all around Kaupo with bridge work closures.	<i>C. Aihara responded that temporary bypass bridges are being looked at to avoid routing traffic through Kaupo.</i>
4	Annie Gilbert	What does “exceptional” mean?	<i>V. Murison pointed out attributes making a bridge exceptional, such as date panels, best example of type, unique features, age, etc., as noted on slide #12.</i>
5	Unidentified Gentlemen	Has there been a bridge failure?	<i>P. Santo stated not on Maui but there was an instance in Hanalei, Kauai.</i>
6	Max Mattson	Concerned that after all the bridges get reinforced, that the 10 ton weight limit postings remain.	HDOT acknowledges that although some bridges will have their load limits upgraded, the route can remain posted at 10 tons per the community's desire. Also, until all the bridges are upgraded, the route will remain posted at a 10 ton limit. HDOT will relook into this matter as the bridges are upgraded.
7	Carolyn Fuhrmann	There are bridges where ponding occurs; cited the solid parapet bridge with the green shack building. She later contacted P. Santos to report that the solid railing bridges had ponding issues and that the open type railing bridges had ponding issues as well.	As each bridge's design is undertaken, proper bridge deck drainage features will be implemented to effectively keep storm runoff and ponding off the deck and approach pavements.

APPENDIX 8

ATTACHMENT 8i

Hana Cultural Center & Museum Board
(Harolen Kaiwi, Board President)
Response Letter

July 23, 2015

Via mail and email: hkaiwi@aol.com

Harolen Kaiwi, Board President
Hana Cultural Center & Museum
4974 Uakea Road
Hana, Hawaii 96713

SUBJECT: Hana Highway Route 360, Bridge Preservation Plan within the Hana
Highway Historic District, Federal Aid Project No. BR-360(012)

Dear Ms. Kaiwi:

Thank you for having one of your board members attend the Hana Lani Senior Citizens February 23, 2015 meeting, to join the State Department of Transportation (DOT), Highways Division consultant team in their presentation of the 75% draft report. A Pre-Final Plan has now been developed, considering all input received by organizations and the rest of the community. A CD copy of the Pre-Final Plan was recently mailed to you along with internet instructions for report downloads.

In addition, we would like to provide responses to those questions and comments expressed at the February meeting. See the attached **Exhibit "A"**.

On behalf of the project team, we would like to express our sincere appreciation in your organization's continued participation in the development of the plan.

Harolen Kaiwi, Board President
July 23, 2015
Page 2

If you or any of your members have further concerns or questions on the responses provided, please call me at 244-2015.

Very truly yours,



Charlene S. Shibuya
Senior Associate

CSS:yp

Enclosure

cc: Paul Santo, Department of Transportation (HWY-DB)
Cody Aihara, Nagamine Okawa Engineers
Alison Chiu, Fung Associates, Inc.
Tonia Moy, Fung Associates, Inc.
Virginia Murison, Fung Associates, Inc.

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EXHIBIT “A”

COMMENTS PROVIDED BY HANA LANI SENIOR CITIZENS AT FEBRUARY 23, 2015 MEETING AND RESPONSES TO COMMENTS

No.	Person	Issue Description	Action/Response
1	Jotte Roggenbuck	i) Questioned the difference between a culvert and a bridge.	<i>C. Aihara responded that the culverts are structures less than twenty (20) feet wide; a bridge exceeds that dimension.</i>
2	Jotte Roggenbuck	ii) If bridges are repaired, will it have to comply with current design standards?	<i>P. Santo responded that replacements will be in-kind with a stronger capacity to carry emergency vehicles and rehabilitation designs will have to be brought up to standards.</i>
3	Elliot Kalama	Concerned with having to go all around Kaupo with bridge work closures.	<i>C. Aihara responded that temporary bypass bridges are being looked at to avoid routing traffic through Kaupo.</i>
4	Annie Gilbert	What does “exceptional” mean?	<i>V. Murison pointed out attributes making a bridge exceptional, such as date panels, best example of type, unique features, age, etc., as noted on slide #12.</i>
5	Unidentified Gentlemen	Has there been a bridge failure?	<i>P. Santo stated not on Maui but there was an instance in Hanalei, Kauai.</i>
6	Max Mattson	Concerned that after all the bridges get reinforced, that the 10 ton weight limit postings remain.	HDOT acknowledges that although some bridges will have their load limits upgraded, the route can remain posted at 10 tons per the community's desire. Also, until all the bridges are upgraded, the route will remain posted at a 10 ton limit. HDOT will re-look into this matter as the bridges are upgraded.
7	Carolyn Fuhrmann	There are bridges where ponding occurs; cited the solid parapet bridge with the green shack building. She later contacted P. Santos to report that the solid railing bridges had ponding issues and that the open type railing bridges had ponding issues as well.	As each bridge's design is undertaken, proper bridge deck drainage features will be implemented to effectively keep storm runoff and ponding off the deck and approach pavements.

APPENDIX 8

ATTACHMENT 8j

Hana Community Meeting
Response to Comments Matrix

**COMMENTS PROVIDED AT HANA COMMUNITY MEETING ON
FEBRUARY 23, 2015
AND RESPONSES TO COMMENTS**

No.	Person	Issue Description	Action/Response
1	Anna-Lisa Singer and Shane Sinenci	On Slide 35 showing a crash-tested rail/parapet, questioned whether the space is for a pedestrian walkway and its appropriate width?	<i>C. Aihara clarified that the space is not a walkway but a buffer to protect the original railing from damage in case the inside rail is subject to a crash. The width ranges from 2 to 22 inches</i>
2	Anna-Lisa Singer	Questioned whether there is enough space at the approaches to the bridges.	<i>M. Nakamoto explained that temporary bridges will have to maintain at least one (1) open lane.</i>
3	Don Atay	i) Expressed concern that replacement bridges have designs which allow emergency vehicles and larger vehicles to negotiate.	The project team is working with the traffic engineer on approach alignments on bridges to be widened to appropriately accommodate various types and sizes of vehicles that are expected to traverse this route.
4	Don Atay	ii) Made a suggestion to install solar cameras such as at Waikani Bridge to automatically issue citations.	<i>P. Santo explained that legislation is needed to allow that system of enforcement.</i>
5	Don Atay	iii) What is on the priority list and expected schedule.	<i>P. Santo explained that funds are programmed for six (6) bridges. After the bridge preservation plan is finalized later this year, design consultants will be selected in 2016. Within the next two (2) years, HDOT is looking at a few bridges to first be upgraded to a 15 ton capacity to help emergency vehicles.</i>
6	Don Atay	iv) He asked that the 10 ton limit remain unchanged.	<i>P. Santos clarified that although some bridges will have their load limit upgraded, the route can remain posted at 10 tons per the community's desire. Also, until all the bridges are upgraded, the route will stay posted at a 10 ton limit. HDOT will relook into this matter as the bridges are upgraded.</i>
7	Kathleen Flanders	i) As a postal carrier that delivers between Haiku and Kaupo, she is concerned with delays from construction road closures.	<i>C. Aihara state that the plan calls for temporary bypass bridges to maintain traffic flow during construction. M. Nakamoto further stated that temporary bypass bridges will be considered or alternatives such as night construction and closing one side of a two-lane bridge. Traffic studies show very little traffic between 9:00 p.m. and 5:00 a.m.</i>

No.	Person	Issue Description	Action/Response
8	Kathleen Flanders	ii) She complained that cars rented by tourist impede traffic.	There is a recommendation in the Plan in Chapter 6, <i>Related Issues Along the Hana Highway</i> regarding collaborating with rental car companies, airlines, travel experience companies and the Hawaii Tourism Authority to develop and provide travel literature to educate visitors on driving etiquette along Hana Highway. A small example is included in the <i>Maui Visitor Guide</i> magazine publication which has in their Hana coverage, <i>"Tip for the Trip to Hana: Enjoy a relaxed pace on the road, but pull over often to wave local drivers by – they've seen the sights before and prefer to hurry home"</i> .
9	Lehua Cosma	i) How was the 40 ton load limit determined?	C. Aihara responded that current federal codes require this design loading.
10	Lehua Cosma	ii) Commented that safety rails are not visible at night and people crash into them. Not all bridges have reflectors; this should be a part of the project.	Bridges which will undergo preservation work will appropriately incorporate necessary delineation features for its safety rails. For existing bridges that are under a maintenance program, HDOT conducts inspections every 2-years to identify deficiencies. Missing reflectors along bridge rails and approach guardrails are replaced by the road maintenance crew. Residents may also alert the Department of Transportation, Maui District Office and make direct requests for new or replacement reflectors.
11	Lehua Cosma	iii) Tourists do not pay attention to NO PARKING signs installed at bridges.	Unfortunately, regular enforcement of NO PARKING restrictions at these remote bridge locations may not be practical for the distant Hana Police Department. Nonetheless, if a long term violation occurs, the police department would have to be dispatched.
12	Eileen Comeaux	Stated that bicycle traffic has become a problem.	HDOT has to reasonably accommodate all modes of transportation which also include bicyclists. There are challenges to comfortably accommodate cyclists due to the narrow, windy, and steep road inclines. See discussion in Chapter 6, <i>Related Issues Along the Hana Highway</i> ; paragraph <i>iii.b. Alternative Transportation Concerns</i> . The Plan is limited to the bridges/culverts and does not include the entire Hana Highway. However, as road improvement projects are undertaken along the route such as resurfacing, HDOT has been paving the shoulders where space is available. This will allow cyclists, as well as, slow driving tourists to pull over and allow other drivers to pass.

No.	Person	Issue Description	Action/Response
13	Doria Lind	i) Asked if the safety rails suggested are already accepted.	<i>C. Aihara stated that example safety rails proposed have been used in other states nationally, but not in Hawaii.</i>
14	Doria Lind	ii) Described old bridge's drainage systems that are not working; bridges are ponding. S. Sinenci added that bridges like Waikani, Waikamoi, and Makapipi that are close to the cliffs have a lot of water running down onto them.	<i>C. Aihara explained that paving over deck drain holes will be addressed.</i>
15	Shane Sinenci	Can the use of asphalt on decks be avoided?	<i>P. Santo stated that at one time, residents wanted the asphalt paving to cover the concrete surface, but concrete would be fine with HDOT. The team needs more community input as to which is preferred.</i>
16	Moke Bergau	He noted that road approaches to the Puaakaa Stream Bridge are curvilinear but the bridge is straight and will need to be addressed.	The project team is working with the traffic engineer on approach alignments on bridges to be widened to appropriately accommodate various types and sizes of vehicles that are expected to traverse this route.

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APPENDIX 8

ATTACHMENT 8k

Department of Planning
(William Spence, Director)
Response Letter



MUNEKIYO HIRAGA

Planning, Project Management, Sustainable Solutions

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COUNTY OF MAUI
DEPT. OF PLANNING
ADMINISTRATION

Michael T. Munekiyo
PRESIDENT

Karlynn K. Fukuda
EXECUTIVE VICE PRESIDENT

Mark Alexander Roy
VICE PRESIDENT

Tessa Munekiyo Ng
VICE PRESIDENT

Mitsuru "Mich" Hirano
SENIOR ADVISOR

July 28, 2015

William Spence, Director
County of Maui
Department of Planning
One Main Plaza, Suite 315
2200 Main Street
Wailuku, Hawaii 96793

SUBJECT: Hana Highway Route 360, Bridge Preservation Plan with the Hana Highway Historic District, Federal Aid Project No. BR-360(012)

Dear Mr. Spence:

This is to provide responses to points brought up in your memo dated March 5, 2015 addressed to the Chair of the Cultural Resources Commission concerning department recommendations on the Draft Preservation Plan. The comment and corresponding responses are as follows:

Comment No. 1:

Correct page A-9, Hoalua Stream Bridge is not on the Kipahulu side, it is on the Huelo side of Route 360.

Response: Correction made.

Comment No. 2:

Correct the discrepancy between the number of bridges mentioned in the Overview on page A-5 (43 bridges), and the number of bridges shown in the table in the Scope of Survey on page A-9 (40 bridges).

Response: Correction made.

Comment No. 3:

Although Cultural Surveys Hawai'i recently performed an Archaeological Literature Review (ALR) for Route 360, an Archaeological Inventory Survey (AIS) should be completed as well. The ALR provided a summary of cultural background and information on existing archaeological conditions. The ALR also confirmed that there are a number of known archaeological sites along Route 360, particularly along the stream drainages and gulches, which could potentially be affected by activities proposed in the plan. Based on this information, the Department concurs with Cultural Surveys Hawai'i's recommendation that an AIS should be completed prior to commencing major structural repairs. The Department also concurs with the recommendation that the scope of the AIS should be developed in consultation with the State Historic Preservation Division, Archaeology Branch.

Response: In the Archaeological Literature Review section of the Plan, an Archaeological Inventory Survey (AIS) is recommended as each project is undertaken. Each AIS will have to be developed in consultation with and approved by the State Historic Preservation Division.

Comment No. 4:

Use diacritical marks for Hawaiian words and names consistently throughout the report, or do not use them at all.

Response: For consistency with the *Statewide Bridge Inventory* (2014) and ease of searching digitally within this report, it was agreed that diacritical marks for Hawaiian words and names will be omitted from the text. Where diacritical marks are used as a reference through direct quotation from an original source, these have been included (primarily in Chapter 7 History as noted in the preservation plan).

Comment No. 5:

Correct the discrepancy between the number of culverts mentioned in the Overview (12 culverts) and the Transportation Management Plan (10 culverts) on page G-125 of the appendix.

Response: Correction made.

Comment No. 6:

Clarify whether an engineer has performed a structural assessment or inspection of each bridge. It is difficult to discern what the structural treatment recommendations are based on. Are the recommendations the result of an engineering study? If so, the report or study should be included in the appendix of this preservation plan. The plan recommends demolition and reconstruction of concrete rubble masonry abutments and piers for nearly every bridge, which could negatively affect character defining features. Is it structurally necessary to do this to every bridge?

Response: Inspection of the bridges are conducted on a 12-24 month cycle based on requirements set by FHWA and HDOT. Referring to Section B of the plan, individual reports, for each bridge, states when the previous inspection was performed by DOT. Repair recommendations are made with each inspection report and a list of references used to prepare the recommendations are provided in Section A, Chapter 5.

For the purpose of safety, the concrete rubble masonry abutments and piers are not sound for current seismic design loads. The rocks are held in place with/without mortar; therefore proving little to no lateral force resistance to withstand current design codes.

Comment No. 7:

The plan recommends the addition of TL-2 crash-tested rails across the interior faces of some historic bridge parapets and railings. Photos of the proposed TL-2 crash-tested rails should be included. It is difficult to determine what effect these rails might potentially have on character defining features without visual examples. Additionally, aside from the lack of sufficient 16' width for some single lane bridges, it is unclear why some historic bridge railings are recommended to be removed and rebuilt and others are recommended to be retrofitted with the addition of the crash-tested rails.

Response: For the Pre-Final report, recommendations for TL-2 railings are provided and has gone through initial comments by SHPD and FHWA.

Chapter 4, *Design Guidelines and Standards* of the plan details all the federal and state guidelines, standards, and policies regarding bridge preservation that were considered in developing each unique bridge's recommendations. Also, the feasibility of each bridges railings to be preserved, rehabilitated, restored, or replaced is dependent upon its

structural condition, material make-up, constructability factors, etc.

Comment No. 8:

Although the bridge matrix in the Executive Summary identifies the general features of each structure, it is crucial that the plan identifies the character defining features of each resource. Character defining features are the features that are to be protected if possible as they contribute to the significance of a structure. Identification of character defining features should be a top priority as the treatment recommendations need to take these particular features into consideration. Standard No. 2 and No. 6 of the Secretary of the Interior's Standards for the Treatment of Historic Properties - Adapted for Historic Bridges state the following regarding character defining features:

- 2. The original character defining qualities or elements of a bridge, its site, and its environment should be respected. The removal, concealment, or alteration of any historic material or distinctive engineering or architectural feature should be avoided.*
- 6. Deteriorated structural members and architectural features shall be retained and repaired, rather than replaced. Where the severity of deterioration requires replacement of a distinctive element, the new element should match the old in design, texture, and other visual qualities and where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.*

Response: Character-defining features of each structure are identified in the individual bridge/culvert chapters in Sections B & C. Each bridge's recommendations carries a common theme to retain features such as historic railings and CRM approach walls. Some have features that lack structural integrity may need to be rebuilt, rehabilitated, or restored if required. Features that need to be replaced calls for a best match design. Also, as mentioned previously, HDOT performs bridge inspection reports every 12-24 months. These reports contain written and photographic documentation on each bridges condition and work undertaken since its last inspection that will account for replacement of missing features.

Comment No. 9:

A copy of the draft plan should be transmitted to the State Historic Preservation Division, Architecture Branch for review and comment.

Response: A copy of the draft plan was submitted to SHPD Architecture and Archaeology branches on 3/2/2015.

Comment No. 10:

The Oregon Department of Transportation (ODOT) has produced a Historic Bridge Preservation Plan and a Historic Bridge Field Guide, which provide helpful information and strategies that could be applied to this plan. Both documents are available on ODOT's website.

Response: ODOT, as well as other historic documents, have been consulted. The biggest issue with some of the recommendations are that most of these areas do not have the same traffic volume as Hana; therefore any recommendations for "low volume" capacities do not really apply.

Comment No. 11:

The plan would benefit from the development of a routine maintenance program that includes clearing bridges of biological growth and debris, ensuring bridges are draining properly, and repairing crumbling or missing sections of parapets and railings. Information contained in Preservation Briefs 1, 15, and 47 could be adapted for use in the development of a routine bridge maintenance program. Additionally, removal of excessive asphalt overlay should seriously be considered for as many structures as possible. Excessive asphalt overlay decreases historic railing heights and adds considerably to the bridges' loads.

Response: Removal of excessive asphalt overlay is recommended at bridges where applicable; this information can be found in Chapter 5 and also within the individual bridge/culvert chapters in Sections B & C. General preventative maintenance items are addressed in Chapter 4.ii.d. under Materials Repair and Maintenance.

William Spence, Director
July 28, 2015
Page 6

If there are any questions on the responses, please call or email
Charlene@munekiyohiraga.com .

Very truly yours,

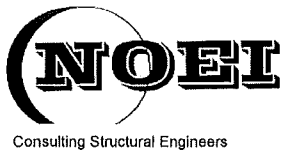


Charlene S. Shibuya
Senior Associate

CSS:yp

cc: Paul Santo, Department of Transportation (HWY-DB)
Cody Aihara, Nagamine Okawa Engineers
Alison Chiu, Fung Associates, Inc.
Tonia Moy, Fung Associates, Inc.
Virginia Murison, Fung Associates, Inc.

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NAGAMINE OKAWA ENGINEERS INC.
1003 Bishop Street, Suite 2025
Honolulu, Hawaii 96813
Tel: (808) 536-2626

DATE: August 6, 2015

Project No. 12069

TO: County of Maui
Department of Planning
One Main Plaza, Suite 315
2200 Main Street
Wailuku, Hawaii 96793

Attention: William Spence, Director

Project: Hana Highway Route 360, Bridge Preservation Plan with the Hana Highway Historic District, Federal Aid Project No. BR-360(012)

Subject: Amendments to responses for questions received from memo dated March 5, 2015

Remarks:

Due to continued work on the report between the 75% and the Pre-final submittals, three responses to the earlier questions in letter dated July 28, 2015 are no longer accurate.

Response to #6, last sentence of the first paragraph should be revised to read:

Repair recommendations are made with each inspection report and a list of references used to prepare the recommendations are provided in Section A, Chapter 4.

Response to #7, first sentence of the second paragraph should be revised to read:

Chapter 4, Design Standards & Guidelines, and Chapter 5, Application of Design Standards & Guidelines, of the plan details all the federal and state guidelines, standards, and policies regarding bridge preservation that were considered in developing each unique bridge's recommendations.

Response to #11, last sentence should be revised to read:

General preventative maintenance items are addressed in Chapter 4.ii.d. under Materials Repair Maintenance and Chapter 5, iii.f. addresses activities to prolong the life of a bridge.

If there are any questions regarding these amendments, please email or call me at codya@nagamineokawa.com or (808) 535-3010.

Thank you,
Ms. Cody Aihara
NAGAMINE OKAWA ENGINEERS, INC.

Attached: Letter dated July 28, 2015

APPENDIX 8

ATTACHMENT 8I

Hana Advisory Committee
(Clayton Carvalho, Jr., Chair)
Response Letter

COUNTY OF MAUI
DEPT OF PLANNING
CURRENT DIV RECEIVED

15 JUL 23 P2:44

July 23, 2015

Clayton Carvalho, Jr., Chair
Hana Advisory Committee
c/o Clayton Yoshida, Current Division Head
County of Maui
Department of Planning
One Main Plaza, Suite 619
2200 Main Street
Wailuku, Hawaii 96793

SUBJECT: Hana Highway Route 360, Bridge Preservation Plan within the Hana Highway Historic District, Federal Aid Project No. BR-360(012)

Dear Chair Carvalho:

Thank you for allowing the State Department of Transportation (DOT), Highways Division's consultant team to present the 75% draft report at your committee meeting of March 9, 2015. A Pre-Final Plan has now been developed, considering all input received by your committee and the rest of the community. A CD copy of the Pre-Final plan was recently mailed to you along with internet instructions for report downloads.

In addition, we would like to provide responses to those questions and comments expressed at the March Committee meeting. See the attached **Exhibit "A"**.

On behalf of the project team, we would like to express our sincere appreciation in your Committee's continued participation in the development of the plan.

Clayton Carvalho, Jr., Chair
July 23, 2015
Page 2

If you or any of your members have further concerns or questions on the responses provided, please call me at 244-2015.

Very truly yours,



Charlene S. Shibuya
Senior Associate

CSS:yp

Enclosure

cc: Paul Santo, Department of Transportation (HWY-DB)
Cody Aihara, Nagamine Okawa Engineers
Alison Chiu, Fung Associates, Inc.
Tonia Moy, Fung Associates, Inc.
Virginia Murison, Fung Associates, Inc.

K:\DATA\Nagamine\HanaHwyBridgePreserv\PreFinalPlan\Response ltrs\HanaAdvisoryCommittee.docx

EXHIBIT “A”

COMMENTS PROVIDED BY HANA ADVISORY COMMITTEE AT MARCH 9, 2015 MEETING AND RESPONSES TO COMMENTS

No.	Person	Issue Description	Action/Response
1	Ward Mardfin (Vice Chair)	i) He pointed out that two (2) bridge names Puakaa Stream Bridge (MM 22.31) and Waiohue Stream Bridge (MM 22.47) are incorrectly cited in the draft report, as it relates to photographs referenced.	The project team conducted further research with USGS maps, Google Maps, HDOT's Structure Inventory & Appraisal Sheets, HDOT's as-built paving plans, and Historic American Engineering Record documents on file with U.S. Department of the Interior – National Park Service. HDOT believes the straight line maps and as-built paving plans are incorrect and will have the Plan corrected to reflect Puaakaa Stream Bridge at MM 22.31 and Waiohue Stream Bridge at MM 22.47.
2	Ward Mardfin (Vice Chair)	ii) After T. Moy explained one of the Cultural Resources Commission members recommended that diacritical marks be left out of the bridge names, he responded that the community may be divided on this matter so will have to check with them.	<i>C. Aihara explained that the Honomanu Bridge is monitored on a one (1) year inspection cycle versus the standard two (2) year cycle.</i>
3	Ward Mardfin (Vice Chair)	iii) He emailed C. Shibuya on 3/12/15 requesting that report Section 3.3 Settlement Pattern and Predictive Model to be updated with more recent research.	CSH is further revising Section 3.3 to address the updates and references.
4	Ward Mardfin (Vice Chair)	iv) He emailed C. Shibuya on 4/3/15 a list of errors found in the plan.	The project team will verify the errors and make appropriate corrections in the Plan.
5	Tom Hoeffken (meeting attendee)	He offered comments from a trucker's perspective. He stated that widening towards the mountain does not help truckers that need to negotiate curves clear of the banks.	<i>C. Aihara explained that the team is working with the traffic engineer on approach alignments to bridges to be widened. T. Moy added that the community desires some degree of traffic calming as well.</i>

APPENDIX 8

ATTACHMENT 8m

Team Responses
(Ward Mardfin, Hana Advisory
Committee)

Errors in Preservation Plan Project (January 2015){Aug. 2015}

For Bridges within the Hana Belt Road Historic District

(by Ward Mardfin, 248-4061, mardfin@gmail.com)

*Blue text indicates team responses (09/03/2015) to report comments

Executive Summary: 1st paragraph, 4th line, “Wainapanapa” should be “Wai~~a~~anapanapa”

- n/a. The Executive Summary has been revised and this particular reference to Waianapanapa was removed. *{see p. 1315 G-57, 1378 G-120 – page numbers in italics from pdf file}*
- Appendix references will be revised for final.

Page G-281 G-381:

6th line from the bottom: “Puakaa Stream Bridge” should be “Waiohue Stream Bridge” based on a Mile Marker (MM) of 22.31 – see DOT Maui RTE 360 Straight Line Map
{still wrong – see p. 605 B20-3, 607 B20-5 – also name of stream wrong and photo is of Waiohue Bridge}

- DOT has confirmed that the straight line map is incorrect at this location. The stream under this bridge is Puaakaa Stream based on USGS maps. This bridge is incorrectly spelt and the recommendation will be to change the name to “Puaakaa Stream Bridge”.

5th line from the bottom: “Waiohue Stream Bridge” should be “Paakea Stream Bridge” based on a Mile Marker (MM) of 22.47 – see DOT Maui RTE 360 Straight Line Map – note: this is the bridge right by Puaa Kaa Park
{still wrong – see p.621 B21-3 – should be Paakea Stream Bridge right by Puaakaa state park (not Waiohue Stream)}

- DOT has confirmed that the straight line map is incorrect at this location. The park name is correct, but the stream adjacent to it is not Puaakaa Stream. Puaakaa Stream is the stream to the west of this stream.

2nd line from the bottom: Unknown Stream No. 3 (Paakea) Bridge should have the “(Paakea)” removed since Paakea is to be shown on the 5th from the bottom line

- This is the correct bridge name.

Page G-282 G-382: Bridge 41 is spelled “Oilowai”, not “Oliwai” on page G-282 nor “Oilawai” in bridge photos (it is spelled correctly in the Table of Contents)

{still wrong – see p. 1615}

- Will be revised for final.

Page G-283 G-408: 5th line: “Waikamilo” should be “Wai~~a~~kamilo”

{still wrong – see p. 17, 510, 1077, 1666, 1724}

- Will be revised for final, except for page 1724 which is a blank page.

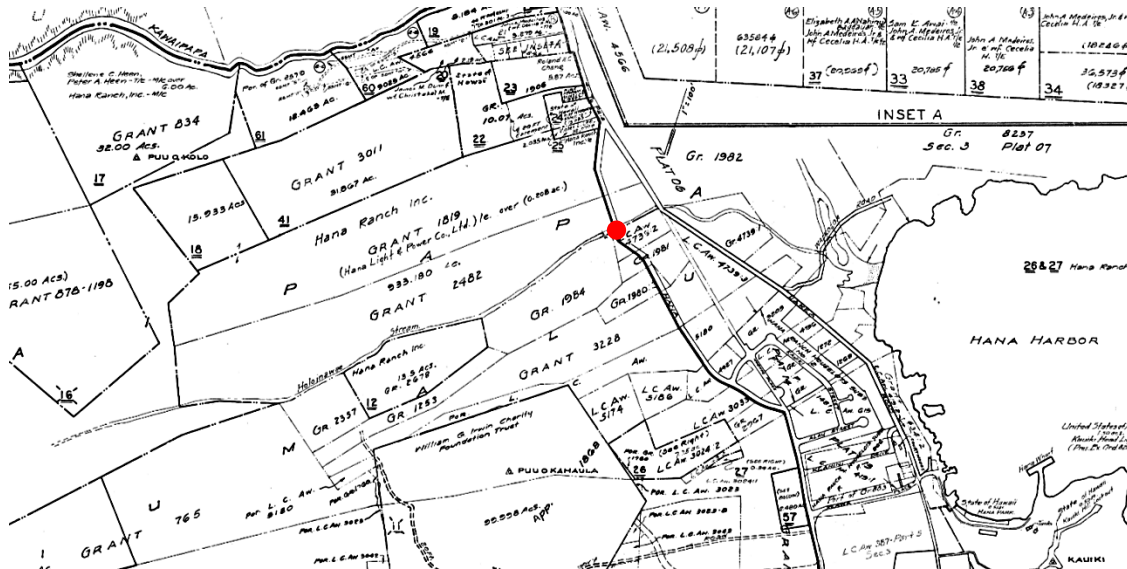
Between 8th line and 9th line, an additional line should be inserted for “Culvert No. 7” and it should be shown at Mile Marker “30.20”

- Will be revised for final.

Culvert #9 at MM 33.74 (recently reconstructed between the Public Works and Fire Station goes across the Stream named “Holoinawawae” (I kept telling people this and nobody writes it down – please write it down). My sources are Melody Cosma Gonsalves and Kauai Kanakaole who are both born and raised in Hana and Hawaiian language experts. *{also see Place Names of Hawaii}*
{still not done – no mention of Holoinawawae in entire report}

- Culvert #9 has a concrete name plaque on the exterior side of the mauka parapet: “Holoina wa wae Gulch 1951”. The date is incorrect, since records indicate this culvert was constructed in 1915. The 1934 Tax Map

(see below; red circle indicates location of Culvert #9) indicates the feature crossed is actually “Holoinawae Stream” which also presents a slight discrepancy in the name. The team will document this information and will recommend that further research be carried out on this particular culvert, and that the date be corrected on the plaque. Naming bridges is not included in the scope of this project; however, the team has documented the information available to us at this time. Future bridge projects will require full verification of bridge names based on expert knowledge and geographic information.



Last line, for “Culvert No. 10” should be shown at Mile Marker “33.89” instead of “34.00” – see DOT Maui RTE 360 Straight Line Map

- No change. As noted on page A-7 in the pre-final report, the term “mile marker” is used in selected sole context per measurement data provided in the National Register Nomination. However, throughout the remainder of the bridge preservation plan report, the term “mile point” or “MP” is used to indicate accuracy in bridge and culvert locations consistent with measurements in the HDOT bridge database.

In general, column 2 showing “Mile Marker” is NOT consistent with column 3 showing “Mile Points” in your Culvert Matrix on page C-3 and somewhat off from the DOT Maui RTE 360 Straight Line Map

- Will be revised for final. HDOT is aware that mile markers are incorrect due to various realignment projects over the years, resulting in some discrepancies.

Regarding the section showing the photos and descriptions of the bridges (no page numbers), I will discuss them in order by reference to the bridge numbers you have assigned.

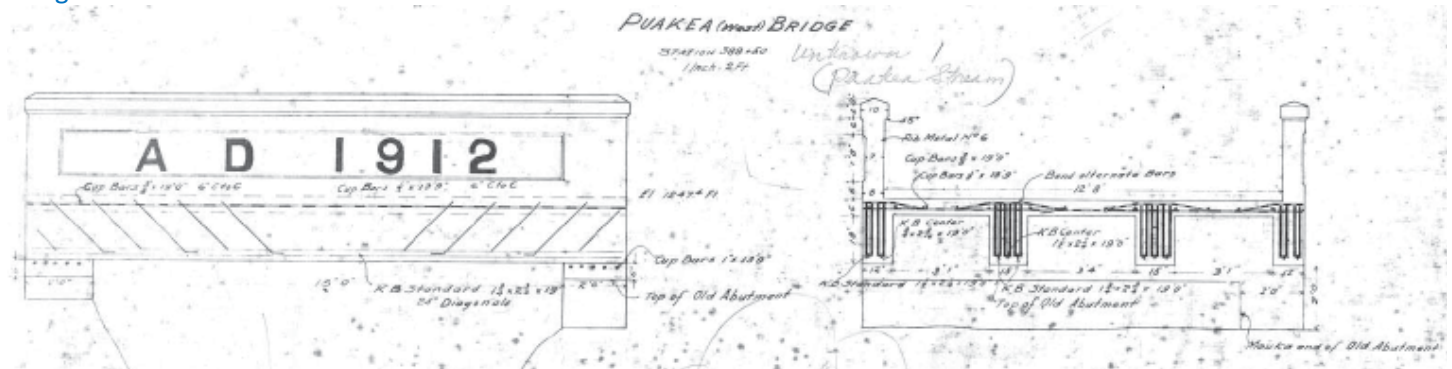
Bridge 21 is NOT a photo of of “Waiohue Stream Bridge” – it is a photo of “Paakea Stream Bridge” right by Puaa Kaa Park (see note above about related error on page G-281)

- Please see above response. This is the correct bridge.

Bridge 22 seems okay but neither Kauai Kanakaole nor I had it called “Waiohuolua Stream” – it may well be but neither of us had encountered that name before. I will add that information to my spreadsheet. I do not know why the reference to a “name variation of ‘Puakea’” on that and the next two bridges; again that may be true but I have no evidence one way or the other. {nor in *Place Names of Hawaii*}

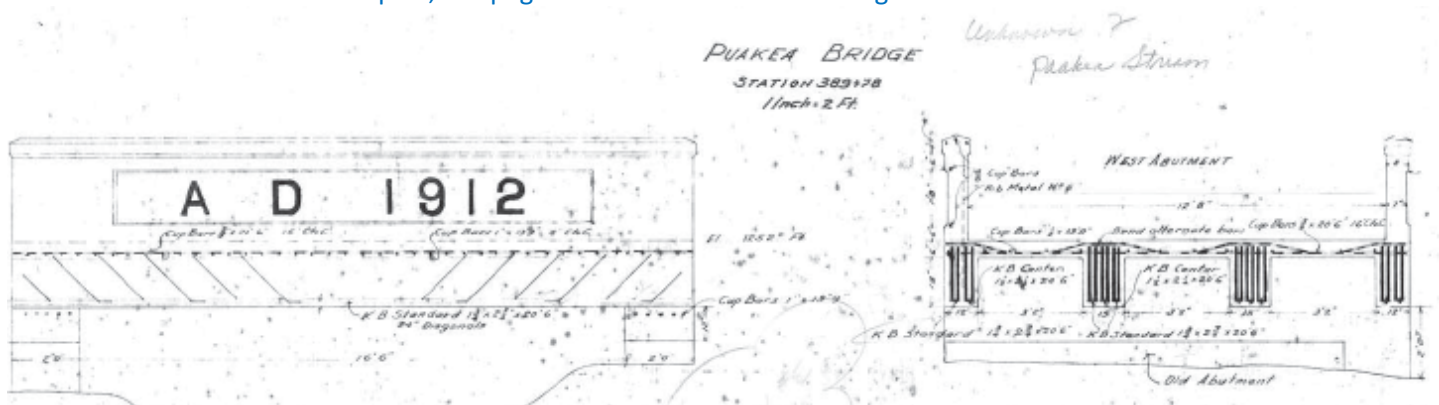
- The name is discussed in the report, see page B22-11 and historic drawing below. Regarding the name of these bridges, discrepancies have been identified by comparing available modern and historic resources and in response to community comments during the preparation of this report. For Bridge #22, the name “Waiohulua” was identified in the National Register nomination and HAER report for this bridge, although team research was unable to find further information connecting the Hawaiian place name and bridge name.

Bridge 22:



Bridge 23:

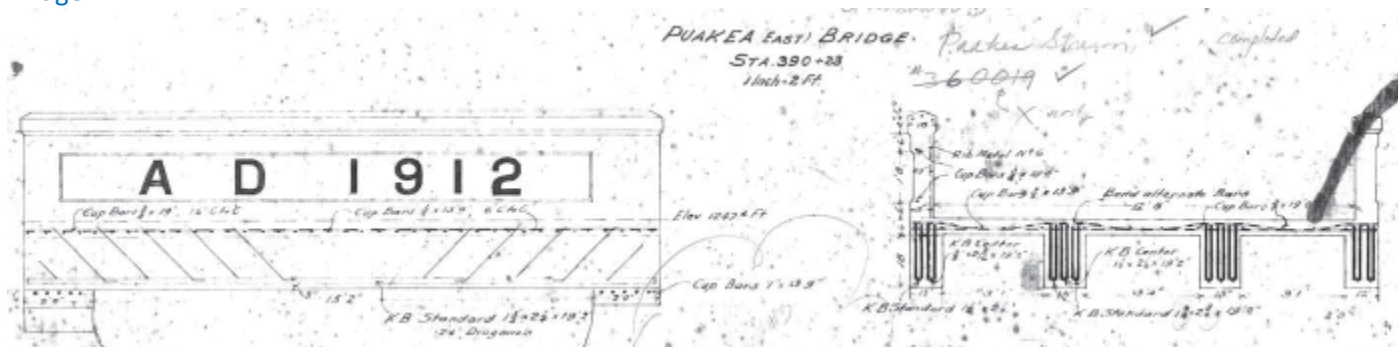
The name is discussed in the report, see page B23-11 and historic drawing below.



Bridge 24 that is designated as “Unknown Stream #3 (Paakea)” can be called “Unknown Stream #3)” but the “(Paakea)” should be removed since Paakea is by Puaa Kaa Park (see note for Bridge 21 above)

- The name is discussed in the report, see page B24-11 and historic drawing below.

Bridge 24:



Bridge 1 seems okay except under the parapet description does the “3-segment railing curved” refer to the bridge curving (it seems pretty straight to me) or to the top of the railing being rounded (it appears to be flat to me)? I would remove the word “curved”.

- Agree. This was revised for the pre-final; see introduction summary pages.

Bridge 06 seems okay except under the parapet description it says “square post caps” and I don’t see this on any of my many photos.

- The end posts with panel detail and square post caps appear to be “buried” into the approach wall connections at each end and are not readily visible; thus, we are considering the inappropriate railing repair at the ends to be a detracting feature

Bridge 20 is NOT a photo of of “Puakaa Stream Bridge” – I believe it is a photo of “Waiohue Stream Bridge” some distance to the north of Puua Kaa Park (see note above about related error on page G-281)

- Please see above response. This is the correct bridge and the name has been changed to reflect the correct spelling.

Bridge 41 should be spelled “Oilowai”, not “Oilawai” (see note above on page G-282)

- Will be revised for final.

Culverts photo numbers 19C, 20C, and 21C (named Culvert #2 ,3, and 4 respectively) are in Waianu Valley but do not have separate names. At the makai base of 19C (Culvert #2) is where “Ohia Spring” emerges. If any work is done on Culvert 19C, a great deal of care should be taken NOT to interfere with the Ohia Spring waters that irrigate the agricultural fields.

{refers to Ohia Stream on p. 19c-7; Ohia Spring on 19c-9 but no special warning in any case}

- This will be added to the recommendations for the final report.

Culvert photo number 56C (named Culvert #09) should also have the stream name included as “Holoinawawai” (see note above)

- We are using the spelling “Holoinawawae” per the earlier comment on page 1 which is also consistent with USGS website.

APPENDIX 8

ATTACHMENT 8n

Email Responses
JULY 23, 2015

Charlene Shibuya

From: Charlene Shibuya
Sent: Thursday, July 23, 2015 3:31 PM
To: deona.naboa@hawaii.gov; Domingo.Galicinao@dot.gov; Meesa.otani@dot.gov; Anna Broverman; Jessica.L.Puff@hawaii.gov; 'Kiersten Faulkner'; Tanya Gumapac-McGuire; David.L.Zevenbergen@hawaii.gov; pua.aiu@hawaii.gov
Cc: Paul.Santo@hawaii.gov; Neil.S.Hasegawa@hawaii.gov; Morgan.E.Davis@hawaii.gov; Jenny.L.Pickett@hawaii.gov; KFolio@culturalsurveys.com; George Gutierrez (georgeg@nagamineokawa.com); 'Cody Aihara'; tonia@funghawaii.com; 'Virginia Murison'; alison@funghawaii.com; mayu@funghawaii.com; michelle@funghawaii.com
Subject: Hana Highway Bridge Preservation - PreFinal Plan
Attachments: Hana FTP.pdf; SHPD.commentresponsematrix.pdf; Notice to Reviewers 7 2 15.pdf

To ALL:

Attached is a table listing some key Issues that arose out of the March 24, 2015 meeting when the 75% Draft Report was presented. The response column explains how the team has or will address them. Included are instructions to access the PreFinal Plan via the internet for further review and comment. The third attachment Notice to Reviewers is a recap of the public review process of the plan since last summer. If you have any further questions or concerns, feel free to call email me.

Charlene Shibuya, Senior Associate
Email: charlene@munekiyohiraga.com



MUNEKIYO HIRAGA

Maui: 305 High Street, Suite 104, Wailuku, Hawaii 96793 T: 808.244.2015 F: 808.244.8729
Oahu: 735 Bishop Street, Suite 321, Honolulu, Hawaii 96813 T: 808.983.1233
Planning. Project Management. Sustainable Solutions. www.munekiyohiraga.com

CONFIDENTIAL AND PRIVILEGED COMMUNICATION: This message (including attachments) is intended for the use of the designated recipient(s) named above. The contents of this correspondence are considered privileged and confidential. If you have received this message in error, kindly notify us immediately by email or telephone, and delete this email from your computer system. Thank you.

**COMMENTS PROVIDED BY FEDERAL HIGHWAY, STATE HISTORIC
PRESERVATION DIVISION AND HAWAII HISTORIC FOUNDATION
AND OUTDOOR CIRCLE AT
APRIL 9, 2015 MEETING AND RESPONSES TO COMMENTS**

No.	Person	Issue Description	Action/Response
1	SHPD	There are possible burial mounds identified at mauka vicinity of Wailuanui Culvert near Keanae Lookout.	<i>Outstanding documentation will be provided by CSH, following CSH/SHPD site visit to confirm and document conditions. SHPD Archaeology to provide mile marker for team's reference.</i>
2	SHPD	Requests CSH recommendations be further refined by bridge to include information such as whether a monitor is need on site during construction. Information will help to identity suitable locations for staging areas (unknown at this time)+	In the Archaeological Literature Review section of the Plan, an Archaeological Inventory Survey is recommended as each project is undertaken.
3	SHPD	Since SHPD is commenting on the draft report, this review and concurrence is a good basis upon which to form the Programmatic Agreement (PA). Suggest add mention of the PA into Chapter 6 Related Issues. Integrating lessons learned over a 10-year period can be incorporated into the PA.	A Section <i>ii Programmatic Agreement</i> section has been added to Chapter 6 <i>Related Issues Along the Hana Highway</i> which covers the suggestions made.

K:\DATA\Nagamine\HanaHwyBridgePreserv\PreFinalPlan\Response ltr\SHPD.commentresponsematrix.docx

Note: Italicized verbiage are responses provided by the presenters at each meeting. Verbiage noted in regular red text are responses/actions developed after further evaluation of bridge sites and preliminary recommendations were formulated.

APPENDIX 9

3rd Cycle of Community
Meetings – Final Plan Stage
(July to August 2015)

APPENDIX 9

ATTACHMENTS & INDEXES

Final Plan Stage
(July to August 2015)

**HANA HIGHWAY, ROUTE 360 BRIDGE PRESERVATION PLAN
WITHIN THE HANA HIGHWAY HISTORIC DISTRICT
STAKEHOLDER LIST
MEETING TRACKING MATRIX AND PRE-FINAL PLAN DISTRIBUTION
Third Cycle of Meetings and Consultations (July to September 2015)**

Meeting No.	Meeting/Report Distribution Coordinator	Stakeholder	Category	Action	Consultation Purpose
1	MH	Hana residents and East Maui community associations and organizations (Hana, Nāhiku, Kīpahulu, Kaupo Community Associations, Hana Lani Senior Citizens and Aha Moku Representatives)	Community At Large	Meeting held 5:00 p.m. on 7/30/15 at Helene Hall. The Pre-Final Plan was presented for input. Also, a summary of responses to comments from the 2/23/15 meeting were provided for attendees to review. Transmitted Pre-Final Plan (CD copy) to all the community association presidents on 7/8/15.	Review and comments on Pre-Final Plan. See Attachment "A" , 7/30/15 meeting summary.
2	MH	Maui County Cultural Resources Commission (CRC) Janet Six, Chair	Advisory	Meeting held on 8/6/15 at the CRC's regularly scheduled monthly meeting date. The Pre-Final Plan was presented for input. Transmitted Pre-Final Plan (CD copy) on 7/8/15 to Janet Six for the commission's review and comment.	Review and comments on Pre-Final Plan. See Attachment "B" , 8/6/15 meeting summary.
3	NOEI/FAI	Federal and State Agencies: Federal Highway Administration; State Department of Transportation, Highways Division, Bridge Design Section, and Environmental Design Section; State Historic Preservation Division, Architecture Branch and Archaeology Branch; Outdoor Circle; Hawaii Historic Foundation	Federal and State Government, Community Organization	Meeting held on 8/20/15 to present Pre-Final Plan was presented for input. The Pre-Final Plan was presented for input E-mailed attendees on 7/23/15 the FTP site instructions to access the Pre-Final Plan.	Review and comments on Pre-Final Plan. See Attachment "C" , 8/20/15 meeting minutes, Hana Highway Bridge Discrepancy List, and Sign-In Sheet.
4	MH	Maui County Hana Advisory Committee (HAC) Ward Mardfin, Chair	Advisory	Meeting held on 9/14/15 at the HAC's scheduled meeting date. The Pre-Final Plan was presented for input. Transmitted Pre-Final Plan (CD copy) on 7/8/15 to Clayton Carvalho, Jr. (Former Chair), c/o County Planning Department for the committee's review and comment.	Review and comments on Pre-Final Plan. See Attachment "D" , 9/14/15 meeting summary.

ATA	Austin Tsutsumi & Associates, Inc.	HDOT	Hawaii Department of Transportation
CSH	Cultural Surveys of Hawaii	MH	Munekiyo Hiraga
FAI	Fung Associates, Inc.	NOEI	Nagamine Okawa Engineers, Inc.
FHWA	Federal Highway Administration	SHPD	State Historic Preservation Division

Meeting No.	Meeting/Report Distribution Coordinator	Stakeholder	Category	Action	Consultation Purpose
5	MH	State Historic Preservation Division, Maui Archaeologists (Morgan Davis and Jenny Pickett)	State Government	Transmitted Pre-Final Plan (CD copy) on 7/8/15 for review and comment.	Review and comments on Pre-Final Plan.
6	MH	Mayor Alan Arakawa	Elected Official	Transmitted Pre-Final Plan (CD copy) on 7/8/15 for review and comment.	Review and comments on Pre-Final Plan.
7	MH	County Department of Public Works (David Goode, Director)	Agency	Transmitted Pre-Final Plan (CD copy) on 7/8/15 for review and comment.	Review and comments on Pre-Final Plan.
8	MH	County Department of Public Works, Engineering Division (Cary Yamashita, Chief)	Agency	Transmitted Pre-Final Plan on (CD copy) on 7/8/15 for review and comment.	Review and comments on Pre-Final Plan.
9	MH	County Department of Planning (William Spence, Director; Michele McLean, Deputy Director; Clayton Yoshida, Current Division Head; and Analise Kehler, Staff Planner)	Agency	Transmitted Pre-Final Plan (CD copy) on 7/8/15 for review and comment.	Review and comments on Pre-Final Plan.
10	MH	Senator Kalani English	Elected Official	Transmitted Pre-Final Plan (CD copy) on 7/8/15 for review and comment.	Review and comments on Pre-Final Plan.
11	MH	Representative Lynn DeCoite	Elected Official	Transmitted Pre-Final Plan (CD copy) on 7/8/15 for review and comment.	Review and comments on Pre-Final Plan.
12	MH	Councilmember Robert Carroll	Elected Official	Transmitted Pre-Final Plan (CD copy) on 7/8/15 for review and comment.	Review and comments on Pre-Final Plan.
13	MH	Kyle Nakanelua, Po'o, Aha Moku Advisory Council, Maui Representative	Hawaiian Cultural Organization	Transmitted Pre-Final Plan on 7/8/15 for review and comment. Additional CDs provided for relaying project information to individual moku representatives.	Review and comments on Pre-Final Plan.
14	MH	Jocelynn Costa Maui Po'o-Moku O Kahekili; Hamakualoa moku	Hawaiian Cultural Organization	Transmitted Pre-Final Plan (CD copy) on 7/8/15 for review and comment.	Review and comments on Pre-Final Plan.
15	MH	Kimo Ka'a'a Maui Po'o-Moku O Kahekili Koolau moku	Hawaiian Cultural Organization	Transmitted Pre-Final Plan (CD copy) on 7/8/15 for review and comment.	Review and comments on Pre-Final Plan.
16	MH	Shane Senenci Maui Po'o-Moku O Kahekili Hana moku	Hawaiian Cultural Organization	Transmitted Pre-Final Plan (CD copy) on 7/8/15 for review and comment.	Review and comments on Pre-Final Plan.

Meeting No.	Meeting/Report Distribution Coordinator	Stakeholder	Category	Action	Consultation Purpose
17	MH	Leona Bak Nomura Maui Po'o-Moku O Kahekili Hamakuapoko moku	Hawaiian Cultural Organization	Transmitted Pre-Final Plan (CD copy) on 7/8/15 through Kyle Nakanelua for review and comment.	Review and comments on Pre-Final Plan.
18	MH	Hana Community Association Sol Church, President	Community Association	Transmitted Pre-Final Plan (CD copy) on 7/8/15 to Sol Church for the association's review and comment.	Review and comments on Pre-Final Plan.
19	MH	Nahiku Community Association (NCAMAUI@gmail.com) Kamalu Kahookele, President	Community Association	Transmitted Pre-Final Plan on 7/8/15 to Kamaku Kahookele, for the association's review and comment.	Review and comments on Pre-Final Plan.
20	MH	Haiku Community Association	Community Association	Transmitted Pre-Final Plan (via internet access) on 7/8/15 to Jennifer Livingston for the association's review and comment.	Review and comments on Pre-Final Plan.
21	MH	Kipahulu Community Association Theodore Firestone, President	Community Association	Transmitted Pre-Final Plan (CD copy) on 7/8/15 to Theodore Firestone c/o Tweetie Lind, Board Member, for the association's review and comment.	Review and comments on Pre-Final Plan.
22	MH	Kaupo Community Association Linda Clark, President	Community Association	Transmitted Pre-Final Plan on 7/8/15	Review and comments on Pre-Final Plan.
23	MH	Hana Cultural Center and Museum Harolen Kaiwi, President	Public Location	Transmitted Pre-Final Plan (CD copy) on 7/8/15 to Harolen Kaiwi for the board members review and comment. Also, provided a hard copy the Pre-Final Plan binder for public review.	Public review and comments on Pre-Final Plan.
24	MH	Hana Council District Office Dawn Lono	Public Office	Transmitted hard copy of Pre-Final Plan binder for public review.	Public review and comments on Pre-Final Plan.
25	MH	Hana Public & School Library	Public Location	Transmitted hard copy of Pre-Final Plan binder for public review.	Public review and comments on Pre-Final Plan.
26	MH	HIDOT, Maui District Office	Public Office	Transmitted hard copy of Pre-Final Plan binder for public review.	Public review and comments on Pre-Final Plan.
27	MH	Ward Mardfin, Researcher of Hana Bridges & Hana Advisory Committee, Vice Chair	Public Office Individual	Transmitted Pre-Final Plan (CD copy) on 7/8/15 for review and comment.	Public review and comments on Pre-Final Plan.
28	MH	Kaui Kanakaole (Teacher/Researcher of East side water resources)	Individual	Transmitted Pre-Final Plan (CD copy) on 7/8/15 for review and comment.	Public review and comments on Pre-Final Plan.
29	MH	East Maui Irrigation (Garret Hew, HC&S Manager)	Private Water Resource Company	Transmitted Pre-Final Plan (CD copy) on 7/8/15 for review and comment.	Public review and comments on Pre-Final Plan.
30	MH	Hana Lani Senior Citizens Community Organization Annie Gilbert, President	Community Organization	Transmitted Pre-Final Plan (CD copy) on 7/8/15 for review and comment.	Public review and comments on Pre-Final Plan.

APPENDIX 9

ATTACHMENT 9a

JULY 30, 2015

Hana Town Community
Meeting Summary



Michael T. Munekiyo
PRESIDENT

Karlynn Fukuda
EXECUTIVE VICE PRESIDENT

Mark Alexander Roy
VICE PRESIDENT

Tessa Munekiyo Ng
VICE PRESIDENT

September 18, 2015

MEETING MEMORANDUM

Date of Meeting: Saturday, July 30, 2015 (5:00 p.m.)

Presenters: Ray McCormick (*State Department of Transportation*)
Paul Santo (*State Department of Transportation*)
Cody Aihara (*Nagamine Okawa Engineers, Inc.*)
Tonia Moy (*Fung Associates, Inc.*)
Alison Chiu (*Fung Associates, Inc.*)
Virginia Murison (*Fung Associates, Inc.*)
Tyler Fujiwara (*Austin, Tsutsumi & Associates, Inc.*)
Katie Folio (*Cultural Surveys Hawaii*)
Charlene Shibuya (*Munekiyo Hiraga*)

Participants: See Attached Sign-In Sheet

Subject: Hana Town Meeting – Hana Highway Historic District, State Department of Transportation Bridge Preservation Pre-Final Plan

Purpose

The purpose of the town meeting was to present to the Hana residents and East Maui community associations and organizations (Hana, Nahiku, Kipahulu, Kaupo Community Associations, Hana Lani Senior Citizens and Aha Moku Representatives), the Pre-Final Bridge Preservation Plan, and to solicit additional public comments prior to the completion of the final plan.

Meeting Summary

1. R. McCormick welcomed the attendees and introduced himself as the Department of Transportation (DOT), Highway Administrator. He gave a brief background of his position as a bridge engineer with the Federal Highway Administration. He described the plan as a great piece of work with excellent public comments and turned over the presentation to the consultant team.

2. T. Moy opened the slide presentation (see **Exhibit “1”**) by introducing the team and explaining the project's purpose. The project's objective is to have the preservation plan become a 'legal' document through implementation of a Programmatic Agreement among the Federal Highway Administration, State DOT, and State Historic Preservation Division. She recapped the previous two (2) rounds where overwhelming feedback was to keep the area rural, maintain existing bridge laneage, and to keep the traffic slow. T. Moy proceeded with an explanation of the report and its contents.
3. V. Murison continued with an explanation of which bridges were designated as having 'Exceptional' value and 'Contributing' features to merit special treatment efforts. She discussed criteria used and showed examples of various types of historical architectural bridge features.
4. A. Chiu covered the treatment recommendations of character defining features for railings, parapets, and approach walls. She described historic parapet designs and treatments and explained that historic parapets are not crash tested and may need to have a crash tested railings placed in front of it to protect the historic rails. Where historic railings need to be replaced, a new crash tested rail will be replaced in-kind.
5. C. Aihara concluded the presentation with treatments involving structural character defining features such as concrete girders, Concrete Rubble Masonry (CRM) approach walls, and abutments with rock clad facades. Other structures evaluated and included hillside bridges (cantilevered structures) and "found" culverts identified as those on record, on the as-built construction plans. Also that the community has expressed a desire to install name plates at bridges and proposed are concrete insets with names to prevent thefts of the signage.

Community Questions and Comments

1. Dawn Lono asked if the 40-ton criterial is regulated by Federal law. P. Santo explained that it is a DOT standard. As far as posting of the load, it will remain at the 10-ton limit until all the bridges are upgraded.
2. B. Benton questioned if for example, the first ten (10) years the bridges will be designed for 40-ton limits then will the future have 50 ton bridges? P. Santo stated that it will not make sense to increase the loading with the previous ones designed at a lesser load. Posting will still remain at the 10-ton limit.
3. D. Atay recommends leaving the 10-ton limit since people will ignore signs.
4. S. Sinenci asked how many yards of cement will be detrimental to the bridges. P. Santo responded that would be four (4) to five (5) cubic yards for a 10 ton loading.

5. T. Bacon asked what is the rest of the road posted at? Is it 40 tons? P. Santo responded that the entire historic Hana Highway will be designed for the same truck loading.
6. D. Lono then asked how much the interior crash tested rail would narrow the bridge? A. Chiu stated that it will vary. P. Santo added that where bridges will remain single lane, the clear distance will not be less than 16 feet.
7. D. Lono asked if there will be a replacement of the capped top with a flat top rail? C. Aihara explained the need to use a crash tested design which only comes with a flat top rail.
8. T. Bacon asked if it is possible to put a cap on the railings. C. Aihara stated that Federal Highway Administration (FHWA) provides that there should not be an altered design, but there is an exemption process.
9. D. Lono commented that she thought historic districts allow exemptions and that the design exception should be granted at the construction phase.
10. D. Lono noted that guardrail approaches to bridges are unattractive, rusted, and are not durable.
11. S. Sinenci asked if rock walls will be stamped or made of genuine rocks? P. Santo responded that it will be regular rock walls with a concrete core.
12. D. Atay stated that the bridge name tells the story and incorrect use of diacritical marks may change its meaning. C. Aihara stressed to give comments on the Bridge/Stream Name chart in the Appendix. D. Lono proposed using stream names.
13. D. Lono expressed that there is excessive asphalt when repaving work is undertaken without removing old asphalt before placing the new overlay. P. Santo stated that designers will need to correct the situation.
14. S. Sinenci commented that less paving over bridges will minimize oil in concrete drain holes getting into the streams and watersheds. P. Santos prefers concrete decks for easier inspections.
15. D. Lono suggested that instead of repaving, concrete be utilized for more durability, even if the initial cost is more expensive. She suggested asking the Hana Advisory Committee on whether asphalt or concrete is preferred.
16. S. Sinenci made a suggestion to use TURNOUT signs to help tourist recognize areas to pull over and let traffic pass. He provided a large printed example. B. Carroll stated that District Engineer Ferdinand Cajigal has a list of pullouts that they have been paving.

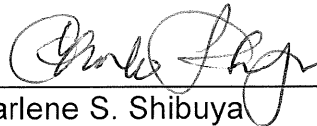
17. B. Benton noticed mile markers appear to be incorrect and off by about a mile. She also recommended to leave out diacritical marks.
18. D. Lono suggest long term maintenance considerations to use appropriate ground cover that does not have to be sprayed with herbicide.

Follow-up Information

1. The consultant team will email the updated archaeological literature review to D. Lono who will assist in inserting them into the binders on file at the Hana Library, Hana Council office, and Hana Cultural Center & Museum.

C. Aihara requested that comments be submitted to the project team by August 31, 2015. Contacts are noted on slide handout. Comments can also be brought in to the team's presentation at the upcoming Hana Advisory Committee.

There being no further questions or comments from the audience, the meeting ended at about 7:10 p.m.



Charlene S. Shibuya
Senior Associate

CSS:yp
Attachment

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District
Hana Community Association

Thursday, July 30, 2015 – 5:00 p.m.

Helene Hall, 150 Keawa Place, Hana Bay

Attendance Sheet

PLEASE PRINT LEGIBLE

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS AND/OR PHONE NO.	AFFILIATION (Community Association Member, Board Member, Aha Moku Representative, Organization, Resident, Visitor, Etc.)
1.	Tonia Moy			FAL - preservation architects
2.	Alison Chiv			"
3.	Cody Aihara			NOEL - Structural Engineer
4.	Paul Santo			HDOT
5.	Rory McComick			HDOT
6.	Veronica Murison			FAL - PRESERVATION ARCHITECT
7.	Charlene Shibuya			Planning consultant
8.	Robert Carroll			Hana County Council
9.	Tyler Fujiwara			ATA - Traffic Engineer
10.	Tori Bacon			RESIDENT
11.	Chris Gaarder			RESIDENT

Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

Hana Community Association

Thursday, July 30, 2015 – 5:00 p.m.

Helene Hall, 150 Keawa Place, Hana Bay

Attendance Sheet

PLEASE PRINT LEGIBLE

	NAME	MAILING ADDRESS (INCLUDING CITY, STATE, ZIP CODE)	EMAIL ADDRESS AND/OR PHONE NO.	AFFILIATION (Community Association Member, Board Member, Aha Moku Representative, Organization, Resident, Visitor, Etc.)
12.	Dawn Long			Council Aide, MCH Hana Advisory Committee
13.	Barbara Ann Benton			HCA
14.	Shane Sinenci			HCA
15.	Jon Atay			HCA
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				

**COMMENTS PROVIDED AT HANA COMMUNITY MEETING ON
FEBRUARY 23, 2015
AND RESPONSES TO COMMENTS**

No.	Person	Issue Description	Action/Response
1	Anna-Lisa Singer and Shane Sinenci	On Slide 35 showing a crash-tested rail/parapet, questioned whether the space is for a pedestrian walkway and its appropriate width?	<i>C. Aihara clarified that the space is not a walkway but a buffer to protect the original railing from damage in case the inside rail is subject to a crash. The width ranges from 2 to 22 inches</i>
2	Anna-Lisa Singer	Questioned whether there is enough space at the approaches to the bridges.	<i>M. Nakamoto explained that temporary bridges will have to maintain at least one (1) open lane.</i>
3	Don Atay	i) Expressed concern that replacement bridges have designs which allow emergency vehicles and larger vehicles to negotiate.	The project team is working with the traffic engineer on approach alignments on bridges to be widened to appropriately accommodate various types and sizes of vehicles that are expected to traverse this route.
4	Don Atay	ii) Made a suggestion to install solar cameras such as at Waikani Bridge to automatically issue citations.	<i>P. Santo explained that legislation is needed to allow that system of enforcement.</i>
5	Don Atay	iii) What is on the priority list and expected schedule.	<i>P. Santo explained that funds are programmed for six (6) bridges. After the bridge preservation plan is finalized later this year, design consultants will be selected in 2016. Within the next two (2) years, HDOT is looking at a few bridges to first be upgraded to a 15 ton capacity to help emergency vehicles.</i>
6	Don Atay	iv) He asked that the 10 ton limit remain unchanged.	<i>P. Santos clarified that although some bridges will have their load limit upgraded, the route can remain posted at 10 tons per the community's desire. Also, until all the bridges are upgraded, the route will stay posted at a 10 ton limit. HDOT will relook into this matter as the bridges are upgraded.</i>
7	Kathleen Flanders	i) As a postal carrier that delivers between Haiku and Kaupo, she is concerned with delays from construction road closures.	<i>C. Aihara state that the plan calls for temporary bypass bridges to maintain traffic flow during construction. M. Nakamoto further stated that temporary bypass bridges will be considered or alternatives such as night construction and closing one side of a two-lane bridge. Traffic studies show very little traffic between 9:00 p.m. and 5:00 a.m.</i>

No.	Person	Issue Description	Action/Response
8	Kathleen Flanders	ii) She complained that cars rented by tourist impede traffic.	There is a recommendation in the Plan in Chapter 6, <i>Related Issues Along the Hana Highway</i> regarding collaborating with rental car companies, airlines, travel experience companies and the Hawaii Tourism Authority to develop and provide travel literature to educate visitors on driving etiquette along Hana Highway. A small example is included in the <i>Maui Visitor Guide</i> magazine publication which has in their Hana coverage, “ <i>Tip for the Trip to Hana: Enjoy a relaxed pace on the road, but pull over often to wave local drivers by – they’ve seen the sights before and prefer to hurry home</i> ”.
9	Lehua Cosma	i) How was the 40 ton load limit determined?	C. Aihara responded that current federal codes require this design loading.
10	Lehua Cosma	ii) Commented that safety rails are not visible at night and people crash into them. Not all bridges have reflectors; this should be a part of the project.	Bridges which will undergo preservation work will appropriately incorporate necessary delineation features for its safety rails. For existing bridges that are under a maintenance program, HDOT conducts inspections every 2-years to identify deficiencies. Missing reflectors along bridge rails and approach guardrails are replaced by the road maintenance crew. Residents may also alert the Department of Transportation, Maui District Office and make direct requests for new or replacement reflectors.
11	Lehua Cosma	iii) Tourists do not pay attention to NO PARKING signs installed at bridges.	Unfortunately, regular enforcement of NO PARKING restrictions at these remote bridge locations may not be practical for the distant Hana Police Department. Nonetheless, if a long term violation occurs, the police department would have to be dispatched.
12	Eileen Comeaux	Stated that bicycle traffic has become a problem.	HDOT has to reasonably accommodate all modes of transportation which also include bicyclists. There are challenges to comfortably accommodate cyclists due to the narrow, windy, and steep road inclines. See discussion in Chapter 6, <i>Related Issues Along the Hana Highway</i> ; paragraph iii.b. <i>Alternative Transportation Concerns</i> . The Plan is limited to the bridges/culverts and does not include the entire Hana Highway. However, as road improvement projects are undertaken along the route such as resurfacing, HDOT has been paving the shoulders where space is available. This will allow cyclists, as well as, slow driving tourists to pull over and allow other drivers to pass.

No.	Person	Issue Description	Action/Response
13	Doria Lind	i) Asked if the safety rails suggested are already accepted.	<i>C. Aihara stated that example safety rails proposed have been used in other states nationally, but not in Hawaii.</i>
14	Doria Lind	ii) Described old bridge's drainage systems that are not working; bridges are ponding. S. Sinenci added that bridges like Waikani, Waikamoi, and Makapipi that are close to the cliffs have a lot of water running down onto them.	<i>C. Aihara explained that paving over deck drain holes will be addressed.</i>
15	Shane Sinenci	Can the use of asphalt on decks be avoided?	<i>P. Santo stated that at one time, residents wanted the asphalt paving to cover the concrete surface, but concrete would be fine with HDOT. The team needs more community input as to which is preferred.</i>
16	Moke Bergau	He noted that road approaches to the Puakaa Stream Bridge is curvilinear but the bridge is straight and will need to be addressed.	The project team is working with the traffic engineer on approach alignments on bridges to be widened to appropriately accommodate various types and sizes of vehicles that are expected to traverse this route.

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APPENDIX 9

ATTACHMENT 9b

AUGUST 6, 2015

Cultural Resources Commission
Meeting Summary



Michael T. Munekiyo
PRESIDENT

Karlynn Fukuda
EXECUTIVE VICE PRESIDENT

Mark Alexander Roy
VICE PRESIDENT

Tessa Munekiyo Ng
VICE PRESIDENT

September 18, 2015

MEETING MEMORANDUM

Date of Meeting: Thursday, August 6, 2015 (10:30 a.m.)

Presenters: Cody Aihara (*Nagamine Okawa Engineers, Inc.*)
Tonia Moy (*Fung Associates, Inc.*)
Alison Chiu (*Fung Associates, Inc.*)
Virginia Murison (*Fung Associates, Inc.*)
Charlene Shibuya (*Munekiyo Hiraga*)

Commissioners: Janet Six (Chair)
Bridget Mowat (Vice-Chair)
Timothy Bailey
Mikala Enfield
Arleen Ricalde-Garcia
Frank Skowronski
Jarrett Wong

Subject: Hana Highway Historic District, State Department of Transportation
Bridge Preservation Pre-Final Plan

Purpose

Present to the Cultural Resources Commission (CRC) the Pre-Final Bridge Preservation Plan to solicit additional comments and input prior to the completion of the final plan.

Meeting Summary

1. C. Shibuya opened the presentation, thanking the Commission for providing valuable input during the first and second round stages of the preservation plan development. She explained the distributed handouts to be an updated Archaeological Literature Review section. She noted that a copy of the slide presentation is provided and a memo to supplement responses on questions and

concerns brought up by the Planning Department from the previous CRC meeting.

2. T. Moy continued with the slide presentation (Refer to **Exhibit “1”**) by introducing the team and explaining each team member’s contribution to the plan. She went over the project’s purpose, indicating that the preservation plan will be used for designers each time a bridge is worked on. She recapped the previous two (2) rounds where overwhelming feedback was to keep the area rural, to maintain existing bridge laneage, and to avoid straightening of the road. She proceeded with how to review the report and described what each chapter covers. She added that Department of Transportation (DOT) will be implementing a Programmatic Agreement, among the Federal Highway Administration, State DOT, and State Historic Preservation Division to make the plan recommendations a legal document.
3. V. Murison continued describing which bridges were designated as having ‘Exceptional’ value and ‘Contributing’ features to merit special treatment efforts. She continued to explain the criteria used and showed examples of various types of historical architectural bridge features.
4. A. Chiu covered the treatment recommendations of character defining features of the railings and parapet walls. She went over historic parapet designs and treatments and explained that historic parapets are not crash tested and may need to have crash tested railings placed in front of it to protect the historic rails. Where historic railings need to be replaced, a new crash tested rail will be replaced in-kind.
5. C. Aihara concluded the presentation with treatments involving structural character defining features such as concrete girders, Concrete Rubble Masonry (CRM) approach walls, and abutments with rock clad facades. She noted that the community has expressed a desire to install name plates at bridges and proposed are concrete inserts with names to prevent thefts of the signage. Other structures evaluated were hillside bridges (cantilevered structures) and ‘found’ culverts identified as those on record on as-built construction plans. She also talked about the two (2) different opinions regarding the inclusion or exclusion of diacritical marks in the Hawaiian bridge names. Comments on the Pre-Final plan were requested by August 21, 2015. She further explained that contacts are noted on the slide handout and the team seeks to finish the plan by end of September. Later in the meeting, she mentioned the suggestion raised at the Hana town meeting to post TURNOUT signs and asked for the commissioners feedback on that matter, as well.

Commission Members Questions and Comments

1. J. Six pointed out that bridges back in 1901 were built when asphalt was not available. V. Murison stated that it was a macadam (oil and rock) surface until about the 1960s.

2. B. Mowat asked when the total of seven (7) hillside bridges were built. C. Aihara clarified the period as being between 2001 and 2004.
3. Chair Six opened the floor to Public Testimony.
 - Ray Hutaff representing Valley Isle Excursions explained that he has knowledge of the area with doing about 3,000 vehicle tours a year. They see accidents on bridges that are about sixteen (16) foot wide which makes drivers think two (2) vehicles can pass. It is better to make the width ten (10) feet wide to not appear wide enough for two (2) car to pass. Also, the 42" high rails have gotten lower with the asphalt overlays. Tourist like to take pictures everywhere and lower walls are better for them. Since tourist cars cannot see over rails, they stop on the bridges and open the door to take photos instead of just taking photos through their window. Their tour vans can see over the walls to allow picture taking from the van. Finally, we should try to preserve any historic value of bridges and should not try to improve on it.
 - T. Moy followed up with an explanation that 16 feet will still be a one-lane bridge. Existing 12-feet wide bridges will be widened. Curved bridges that are wider than 16 feet will have interior rails to narrow them.
4. B. Mowat found the plan to be very thorough and compliments the team on the hard work. She is still evaluating the matter of whether diacritical marks should be used. She believes all bridges should be one-way, to better enable speed management, thereby allowing drivers to be mindful of others travelling on the road.
5. J. Six cited the problem of people disregarding signage indicating that a bridge is only one-lane. C. Aihara stated that some one-lane signed bridges have YIELD signs but the striping does not match. The plan recommends addressing the inconsistent markings to make one-lane bridge conditions clearer to the drivers.
6. J. Six asked if replacement walls will be stamped rock. C. Aihara confirmed that the plans are recommending to use genuine rock material.
7. J. Six has seen tourists standing on the railings. She asked if there is any style of railing to discourage standing. C. Aihara recounted a resident's thought that the existing capped railing design would discourage standing. However, the crash tested railing accepted by Federal Highway Administration (FHWA) has a flat top and FHWA discourages deviations due to liability concerns. However, future designers could still propose to FHWA later, a capped design as an exception request.
8. J. Six stated that features such as a bridge name embossed backwards does add to its historical charm but the importance of maintaining historic accuracies should be recognized, as well.

9. B. Mowat stated that the main concern is to have bridge name spellings correct.
10. T. Bailey asked for the source of the ahupuaa maps. C. Shibuya explained the source noted at the bottom of the map is off a website and acknowledged that the boundaries along the east end are generally correct but that the Wailuku district is a little different from the ones on file with Office of Hawaiian Affairs and other sources. However, since the other maps had numerous ahupuaa shown and was quite dark. Therefore, the team used the lighter shade map in the report that could clearly show an overlay of the historic district limits across the east side ahupuaas.
11. T. Bailey pointed out many old time County maintenance workers that would be good consultation resources. The team explained the extensive outreach that was done but no one of this background came forward. C. Shibuya added that historic bridge inspection reports were extensively reviewed on past records of repair work.
12. T. Bailey pointed out that bridges on the County side were built with an initial intent that is now very different from how it is used. Who will be responsible for the Programmatic Agreement that addresses concerns of the community and impacts to facilities? T. Moy clarified that it will Federal Highways Administration, State Historic Preservation Division, CRC, and DOT which will become legal signatories. Invited parties will be sent letters if they want to be part of the process.
13. T. Bailey asked if the preservation plan was federally funded? T. Moy answered that is state funded but most bridge project are federally funded and the Programmatic Agreement will cover all the bridges.



Charlene S. Shibuya
Senior Associate

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Attachments

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APPENDIX 9

ATTACHMENT 9c

AUGUST 20, 2015

Federal & State Agencies
Meeting Summary



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MEETING MINUTES

By: Alison Chiu

August 21, 2015

Project: Hana Highway Bridge Preservation Plan

Meeting Date: August 20, 2015

Time: 9:30 am

Location: DOT Office Conference Room 611, Kapolei
DOT Maui District Office Conference Room, Kahului

Attendees:

HDOT	Paul Santo, Neil Hasegawa, Deona Naboa
FHWA	Domingo Galicinao, Meesa Otani
SHPD Architecture	Jessica Puff
SHPD Archaeology	Morgan Davis, Jenny Pickett
HHF	Tanya Gumpac-McGuire
Outdoor Circle	Mike McFarlane
NOEI	George Gutierrez, Cody Aihara
CSH	Tanya Lee-Grieg, Katie Folio
FAI	Tonia Moy, Virginia Murison, Alison Chiu, Mayu Ohama, Michelle Cheang

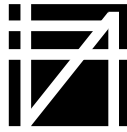
The following items were discussed and confirmed at the meeting. Comments and corrections to this report should be addressed to the report preparer within 3 days from the date of the report or these minutes will be recorded.

I. Items from 3/24/2015 Meeting

- a. Wailuanui Burial Mounds (complete)
 - i. CSH provided revised report recommendations per discussion with SHPD
- b. Hawaiian Names & Meanings (in progress, further discussion follows, rafter to item III)
- c. Asphalt Removal Dimensions (complete)

II. Programmatic Agreement

- a. Point of Contacts
 - i. ACHP: MaryAnn Nabors
 - ii. FHWA: Meesa Otani
 - iii. SHPD: Jessica Puff, Morgan Davis, Jenny Pickett; Dr. Alan Downer (signatory)
 - iv. HDOT (invited signatory): Paul Santo, Neil Hasegawa, Deona Naboa



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b. Concurring Parties:

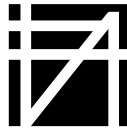
- i. Outdoor Circle
 - ii. Historic Hawaii Foundation
 - iii. Maui CRC (CLG)
 - iv. Hana Advisory Commission
 - v. FAI requested contact information for any others who may wish to be a concurring party in this process
 - vi. NPS list of NHOs
- c. Because Hawaii SHPD is currently on a corrective action plan, NPS must review the document and has 30 days to comment; NPS must concur before SHPD can sign
- d. PA should include review process for new railing design if crash-test standards change per upcoming MASH report
- e. PA should set out processes that can provide for future changes in technology or standards

III. Hawaiian Names

- a. Team has received limited feedback on names thus far (Refer to Appendix G13); SHPD/MHI/CSH to continue outreach with additional resources, but confirmation will ultimately be done during future projects as determined by the PA
- b. Diacritical Markings:
- i. Community appears divided on use of diacritical markings for bridge names; no consensus to date
 - ii. HDOT confirmed it is acceptable to use diacritical markings on bridge names at the bridge, but typical HDOT policy is not to use them on detached signs or related street signs
 - iii. All bridge names should be vetted for consistency of use, by both the community and Hawaiian language scholars
- c. General Discussion:
- i. The current discussion on names, in itself, may be used for future education, with interpretive signage as mitigation
 - ii. It would be interesting to note of the bridge was at the time of original construction
 - iii. Team can do more research and talk to the scholars; ie., Present the historic name along with current usage and ask the community which name they prefer
 - iv. UPDATE: FAI has been in contact with Kepā Maly , of the Lanai Culture and Heritage Center to see if he can provide the service of reviewing names which will be part of the PA

IV. Railing Options

- a. Detached Crash-Tested Rail: Wyoming 740 Type
- i. Preferred option due to openness and ability to specify curvature
- b. Open Picket Railing Options: C411 Type



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- i. Preferred option due to intermediate post placement, and similar proportions and height compared to historic railings
- ii. Width of windows and pickets is opposite dimensionally compared to historic railings; provides a subtle way to determine old and new
- c. Solid Parapet Options: Vertical Concrete Wall Type
 - i. Preferred option due to choice of top cap and having the exterior vertical wall surface be either flush/flat or paneled to match historic parapet details
 - ii. There is a height difference between historic (36") and crash-tested new solid parapets (32" or 42")
- d. All new railings should be existing height or higher, per HDOT
- e. Report appendix to include crash-tested railing options

V. Approach Walls

- a. No stamped concrete to be used for rock veneer
- b. CRM approach wall option: Stone Masonry Guardwall
 - i. Interior is made of reinforced concrete, which allows for a connection with a guardrail transition
 - ii. Exterior will be clad with existing stones
 - iii. It is proposed to put the bridge name into the upstream Kahului approach wall. Bridge name will be concrete

VI. ACTION ITEMS:

- a. FAI to provide HDOT with list of recommended name changes
- b. CSH will follow up with Charlene from MHI additional people to contact for Hawaiian names

The meeting was concluded at approximately 11:00 a.m.

**Hana Highway Bridge Discrepancies
Potential Name Corrections/Changes**

Br #	Current Name	Discussion	Recommended Name / Reason*
10	Kolea Stream (Punalau Stream) Bridge	Spans Punalau Stream (Bridge name usually use the stream name)	Check with HDOT and experts
16	Waikani Stream Bridge	Spans Wailua Nui Stream Near Waikani Falls, at the head of Wailuanui Valley.	Keep it as "Waikani " but take out the "Stream" since the bridge is already known as Waikani unless experts disagree.
20	Pua[a]kaa Stream Bridge	Added 'a' for correct spelling HDOT database shows "Pua'a Ka'a Stream Bridge" with two words and okinas. Should check with experts.	Puaakaa Stream Bridge or Puaa Kaa Stream Bridge Check with expert
22	Unnamed Stream #1 (Waiohoulua)	Historic Drawing labels this "Puakea (West)" Bridge. The bridge spans an unnamed stream in Puakea Ahupuaa. There is no geographic evidence for (Waiohoulua), and "no definition could be located for the hawaiian word Waiohoulua	Puakea (West) Bridge (historic ca 1912 drawing)**
23	Unnamed Stream #2	Historic Drawing labels this "Puakea" Bridge. The bridge spans an unnamed stream in Puakea Ahupuaa, which is branch of Puakea Gulch	Puakea Bridge or Puakea Gulch Bridge (historic ca 1912 drawing)**
24	Unnamed Stream No. 3 (Paakea) Bridge	Historic Drawing labels this "Puakea (East)" Bridge. The bridge spans Paakea Gulch, which divides Puakea Ahupuaa and Paakea Ahupuaa	Paakea Gulch Bridge
25	Kapaula Stream Bridge	Crosses Kapaula Gulch (not Stream)	Replace Stream to Gulch? Kapaula Gulch Bridge check with HDOT and experts if we need to change
31	Kahalaowaka Stream Bridge	Historic Drawing labels this as 'Kahalaowaka' Bridge It spans Kalepalehua Gulch. No translation of the Hawaiian word <i>kahalaowaka</i> could be determined (CSH).	Kahalaowaka (Historic 1925 drawing)**. For now, to be confirmed by experts at the time of bridge work)
32	Pupape Stream Bridge	Spans Manawaikeae Stream No translation of the Hawaiian word <i>pupape</i> could be determined (CSH)	Pupape (Historic 1924 drawing)**. For now, to be confirmed by experts at the time of bridge work)

**Hana Highway Bridge Discrepancies
Potential Name Corrections/Changes**

37 & 38	Lanikele & Heleleikeoha Stream Bridges	#37 Lanilele – spans Heleleikeoho Stream #38 Heleleikehoa – spans Kakamalaole Stream Also see Appendix G13 for CSH discussion of confusion over which stream or gulch is crossed	Use same names For now, to be confirmed by experts at the time of bridge work
40-43	Mokulehua, Oliowai, Honomaele & Kawaipapa Stream Bridges	#40 Mokulehua Stream Bridge – Spans Mokulehua Gulch #41 Oliowai Stream Bridge – Spans Oliowai Gulch #42 Honomaele Steam Bridge – Spans Honomaele Gulch #43 Kawaipapa Stream Bridge – Spans Kawaipapa Gulch These bridges span named after gulches.	Replace Stream to Gulch? Ex. Mokulehua Gulch Bridge Check with HDOT and experts if we need to change

Since a number of the Bridges cross gulches, not named streams, suggest just use Hawaiian Name and not add ‘stream’ at sign.

* “Feature Crossed” on page 4 of various bridges in Section B will need to be verified (stream vs gulch vs neither)

**Refer to last page of individual Bridge Chapter for historic drawing



382 1995

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SIGN IN SHEET

Project: Hana Highway Preservation Plan
Meeting Date: March 24, 2015
Time: 10:30 AM
Location: DOT Office Conference Room 611, Kapolei
Attendees:

Pua
5871497

NAME	COMPANY	PHONE	EMAIL
Paul Santo <i>Paul Santo</i>	Hwy-DB	(808) 692-7611	Paul.Santo@hawaii.gov
Neil Hasegawa <i>NH</i>	Hwy-DB	(808) 692-7611	Neil.S.Hasegawa@hawaii.gov
Deona Naboa	Hwy-DE, Historic Preservation Specialist		Deona.Naboa@hawaii.gov
Domingo Galicinao <i>DG</i>	FHWA, Hawaii Division	(808) 541-2700 x2302	Domingo.Galicinao@dot.gov
Meesa Otani <i>MO</i>	FHWA, Hawaii Division	(808) 541-2316	Meesa.Otani@dot.gov
Anna Broverman	SHPD Architecture Branch	(808) 692-8026	Anna.E.Broverman@hawaii.gov
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Morgan Davis	SHPD Archaeology Branch	(808) 243-4641	Morgan.E.Davis@hawaii.gov
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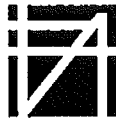
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architecture ■ preservation ■ planning ■ interiors

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APPENDIX 9

ATTACHMENT 9d

SEPTEMBER 4, 2015

Hana Advisory Committee
Meeting Summary



MUNEKIYO HIRAGA

Planning, Project Management, Sustainable Solutions.

Michael T. Munekiyo
PRESIDENT

Karlynn Fukuda
EXECUTIVE VICE PRESIDENT

Mark Alexander Roy
VICE PRESIDENT

Tessa Munekiyo Ng
VICE PRESIDENT

September 18, 2015

MEETING MEMORANDUM

Date of Meeting: September 14, 2015 (4:00 p.m.)

Presenters: Cody Aihara (*Nagamine Okawa Engineers, Inc.*)
Tonia Moy (*Fung Associates, Inc.*)
Alison Chiu (*Fung Associates, Inc.*)
Virginia Murison (*Fung Associates, Inc.*)
Charlene Shibuya (*Munekiyo Hiraga*)

Committee Members: Ward Mardfin (Chair)
Gale Notestone (Vice-Chair)
John Blumer-Buell
Scott Crawford
Anjoleen Hoopai-Waikoloa

Subject: Hana Advisory Committee Meeting – Hana Highway Historic District, State Department of Transportation Bridge Preservation Pre-Final Plan

Purpose

Present to the Hana Advisory Committee, the Pre-Final Draft of the Bridge Preservation Plan, and to solicit additional comments and input prior to the completion of the final plan.

Meeting Summary

1. Chair Mardfin asked C. Shibuya to introduce the consultant team. She thanked the Committee for accommodating a special meeting due to the team's cancellation of the August 31, 2015 presentation, due to stormy weather forecasts. She also expressed appreciation for the members' valuable input during the earlier stages of the preservation plan development. She introduced Cody Aihara, Structural Engineer from Nagamine Okawa Engineers, and Tonia

Moy, Alison Chiu, and Virginia Murison from Fung Associates Inc. who are all Architectural Bridge Preservation Specialists.

2. Chair Mardfin opened the floor to public testimony. Seeing none, he then allowed the team to proceed with the presentation.
3. T. Moy opened with a slide presentation (Refer to **Exhibit “1”**), explaining each team member’s contribution to the plan and the project’s purpose. She further explained that the preservation plan will be used by engineers each time bridge repair, rehabilitation, or replacement work is undertaken. She recapped what transpired in the previous two (2) rounds of meetings and the overwhelming feedback requesting to place names on all the bridges. She added that the Department of Transportation (DOT) and State Historic Preservation Division (SHPD) seeks to have the preservation plan become a legally binding document, via the preparation and execution of a Programmatic Agreement (PA). SHPD’s recommendation is to use a Hawaiian scholar for further review of the bridge names and have the results included in the PA. Kepa Maly, who has done extensive research on Hawaiian names will be hired to complete the task of verifying the bridge names.
4. W. Mardfin asked when Mr. Maly will be hired and whether the Hana Advisory Committee (HAC) will be consulted before he finishes his research. T. Moy responded that he will be hired within the next year and the Cultural Resources Commission (CRC) and HAC will be participants in the preparation of the PA.
5. T. Moy proceeded with an explanation of specific project objectives. To support this discussion, C. Shibuya provided handouts of questions, concerns, and responses that were voiced at previous community group meetings for the committee members to review.
6. V. Murison identified those bridges which were designated as having ‘Exceptional’ value and ‘Contributing’ features to merit special treatment efforts. She continued to explain the criteria used and showed examples of various types of historical architectural bridge features.
7. W. Mardfin noted the minimum bridge width criteria as being 16 feet and, therefore, questioned if any of the bridges are less than 16 feet wide. V. Murison responded that the solid parapet bridges are less than 16 feet wide.
8. A. Chiu covered the treatment recommendations of character defining features of the railings and parapet walls. She addressed historic parapet designs and treatments and explained that historic parapets are not crash tested and may need to have crash tested railings placed in front of it to protect the historic rails. Where historic railings need to be replaced, a new crash tested rail will be replaced in-kind.

9. C. Aihara concluded the presentation with treatments involving structural character defining features such as concrete girders, Concrete Rubble Masonry (CRM) approach walls, and abutments with rock clad facades. She noted that the community has expressed a desire to install name plates at bridges. Concrete inserts with names to prevent thefts of the signage are proposed. Other structures evaluated were hillside bridges (cantilevered structures) and 'found' culverts identified as those on record on as-built construction plans. She also noted the two (2) opinions regarding the inclusion or exclusion of diacritical marks in the Hawaiian bridge names.
10. Comments on the Pre-Final plan was requested by September 18, 2015 to contacts Paul Santo and Charlene Shibuya listed in the handout.

Committee Members Comments and Questions

1. G. Notestone works for the Fire Department and asked who are the engineers that will design the bridges? C. Aihara responded that the product of this current study is a preservation plan and recommendations will be available for future designers selected for each project. Notestone's concern is a bridge by Koki Beach that could have been aligned better to allow emergency vehicles to negotiate through. C. Aihara pointed out that this particular bridge is under the County's jurisdiction. She added that there is a 40 ton criteria to accommodate fire trucks and Emergency Medical Service (EMS) vehicles over the bridges. Noteshone further questioned if there will be road closures during construction? C. Aihara responded that the plan recommends providing temporary bridge detours in all cases.
2. J. Blumer-Buell commented that the document was very interesting. He asked if each and every bridge that is replaced or rehabilitated will require an Environmental Assessment (EA). C. Aihara responded that an EA or Environmental Impact Statement that can address all of the bridges at once is intended by DOT.
3. J. Blumer-Buell pointed out that the Hana Bridges is a preservation plan. However, the County did a preservation plan about 10 years ago and he argued that it was not a preservation plan since the bridges were torn down and replaced. He suggested that the preservation plan put the bridges in a Hawaiian cultural context expression of the water "wai" or "wai wai".
4. J. Blumer-Buell asked if bridges with interior railings will narrow the bridge to less than 16 feet? His preference is to use in-kind railings. C. Aihara responded that in those cases, there is the option of replacing the historic rail with a crash tested in-kind rail to maintain the bridge's width.
5. J. Blumer-Buell asked that the document recommend use of other materials, such as injected epoxies and running electricity through the bridges to keep bridges from deteriorating. He noted that Oregon DOT's approved use of Fiber

Wrapped Polymers (FRP) is discouraged in this bridge plan. C. Aihara explained DOT's concern that FRPs are a fairly new product with uncertainty on its long term performance. She pointed out the disclaimer at the beginning of the plan that states the recommendations are not absolute and encourages exploring other feasible materials or methods that may be an option for the future design team. She added that these materials or methods be re-evaluated and considered by DOT, the Federal Highway Administration, SHPD, and the local communities. C. Aihara confirmed that the team did consider and evaluate the method of applying electricity through the bridges referred to as cathodic protection. However, the method can be done but at a very high cost which is further complicated by the lack of adequate electrical lines necessary to feed a cathodic system to these remote bridges. T. Moy reiterated that the report does allow for future technologies to be applied.

6. W. Mardin noted the plan mentions scraping the roadway? C. Aihara clarified that excess asphalt on the bridges are proposed to be removed for reduction of overburden weight. Asphalt on the approaches will also be removed for a smooth transition. T. Moy brought up a resident's concern with asphalt oils getting into the streams. W. Mardfin agreed with concrete only on the bridge decks.
7. J. Blumer-Buell concurred with the recommendation of removing of asphalt on the bridges to eliminate possibility of oils getting into the streams and oceans. C. Aihara questioned whether the concrete suggestion is a HAC recommendation. W. Mardfin clarified that this is not a HAC recommendation but only a comment from one member.
8. J. Blumer-Buell expressed concern with the road not being wide enough to enable access across the bridges. At Wailuanui which is an arched exceptional bridge, "No Parking" signs are not complied with, resulting in ten (10) cars at times restricting the passage to only a one-lane road. He would like to request some signs to designate parking allowed stretches. C. Aihara explained that DOT was open to TURNOUT signs instead of designating parking areas which could open the department to liability. G. Notestone added that their fire trucks have experienced problems with parked vehicles constricting their passage. A. Hoopai-Waikoloa has experienced the same problem with parked cars constricting the road and suggested signs with more enforcement. C. Aihara pointed out Chapter 6 recommendations for brochures to educate tourists on road etiquette.
9. J. Blumer-Buell questioned what is the realistic time frame for the preservation plan to be accomplished? T. Moy stated that DOT believes the plan to span at least fifty (50) years.
10. W. Mardfin asked if the engineers looked at a priority listing of which are in most danger of failure to prompt immediate work. C. Aihara explained that from an engineering perspective, all the bridges are in need of upgrading its carrying

capacity. Therefore, the logical approach is to address the bridges in the sequence that you traverse the Hana Highway into Hana. From a historical perspective, those bridges with characteristic features in poor condition would be considered higher priorities. T. Moy added that DOT already has a priority based on the lowest loading capacity.

11. As an economist, W. Mardfin commented that consideration should be given to clustering of the same bridge design at once and in a sequence that would allow consecutive reuse of the temporary bridge. Such a construction method would be the most economical.
12. W. Mardfin explained that his errors list was not addressed in the Pre-Final draft but expects that it will be in the final plan. He further explained that his biggest issue on his errors list was Paakea Bridge and Waiohue Bridge near Puakaa Park. He noted that the information presented by the team is correct. However, he recommends that the Puakaa versus Puaakaa name be retained and acknowledged that Kepa Maly could verify the spellings. He also pointed out Holoinawawae bridge near the fire station does not have a name on the new structure. C. Aihara showed a picture of the stamped name on the outside of the mauka bridge parapet but with the wrong date of 1951 instead of 1915. C. Shibuya stated that she has asked DOT to correct the stamped date.
13. J. Blumer-Buell was concerned with the FALLING ROCK signs presenting more of a liability to the DOT and suggested using DRIVE SLOWLY WATCH FOR ROCKS instead.
14. J. Blumer-Buell suggested that all the individual committee member's comments and recommendations be voted on into the record. Chair Mardfin proposed to have the Deputy Corporation Counsel summarize the comments and recommendations to be voted on.
15. W. Mardfin stressed that the other 1,400 or so pages of the report were not specifically discussed by committee members, and does not imply that the members are in full agreement with the plan. HAC wants to retain the rights on any individual situation that will come back before the committee, and to address it at that time. T. Moy stressed that the plan requirement for construction projects needing to undergo consultations with the community provides an opportunity to address this concern.
16. A. Hoopai-Waikoloa made a motion to approve and recommend the comments as stated and discussed by the committee today. G. Notestone second the motion.

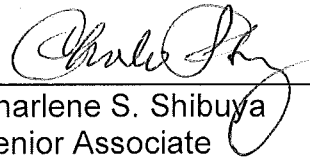
17. The Deputy Corporation Counsel read back her notes and summarized the comments and recommendations stated by the committee members as follows:

- Kepa Maly will be hired to review the bridge names;
- Future design teams should consider emergency response vehicles in their designs;
- For certain bridges, design teams shall consider all of the approach angles;
- Temporary bridges should be considered for all bridges;
- Environmental Assessments can be addressed in the Programmatic Agreement and may be possibly done to cover all the bridges;
- The Disclaimer includes a re-evaluation of new methods needing to be considered by DOT, FHWA, SHPD, and local communities;
- Rehabilitation of the bridges are preferable to demolishing and replacing them;
- Put bridges in a cultural context of “Wai” or water;
- Replace bridges where not wide enough with in-kind railings. V. Murison clarified that only one (1) bridge is proposed to be replaced whereas only individual components are proposed to be replaced in the rest of the bridges;
- Future designs are to consider newer substances or methods such as Fiber Reinforced Wrap or Cathodic protection;
- Maintenance of bridges are very important such as utilizing manual weed removal and avoiding the use of herbicides;
- Use concrete instead of asphalt to avoid oils from entering streams;
- Install No Parking signs at Bridge No. 16 (Waikani Bridge) to prevent parked cars from constricting the passage into a one-lane road;
- Future design teams consider TURNOUT signs by Waikani Bridge;
- Consider different ways to save cost such as doing similar bridge designs at the same time or any other economic applications;
- Changing FALLING ROCK signs to some other type of signage;
- The staff planner added other points made by the project team that were noteworthy such as how they recommend dealing with getting visitors pulled off to the side of the road, community outreach being a priority, the existence of twelve (12) historical culverts that are less than twenty (20) feet wide, the importance of visual integrity and look of the final product remaining the same, that the Oregon DOT are specialists in bridge preservation, and DOT believes the preservation plan effort will span fifty (50) years;
- Use concrete at bridge decks for durability which also presents a better environmental option;
- S. Crawford added that Waikani Bridge's excessive parking is attributed to the guidebooks encouraging visitors to stop at this waterfall and suggests these guidebooks note that parking is unlawful and violators may be cited for no parking;

- The carrying capacity of highway is not unlimited and to recognize the lowest load rating capacity; and
- A. Hoopai-Waikoloa expressed her support for the communities' suggestion to keep the road posted at ten (10) tons after all bridge upgrades are complete to protect the 'aina' of Hana. She also personally prefers leaving out diacritical marks that is used for modern day written language but was not used historically.

Chair Mardfin opened the floor to voting on the motion to approve and recommend the comments summarized above. Members unanimously voted in favor to approve the motion.

There being no other discussion on the Preservation Plan, the meeting was adjourned at ____ p.m.



Charlene S. Shibuya
Senior Associate

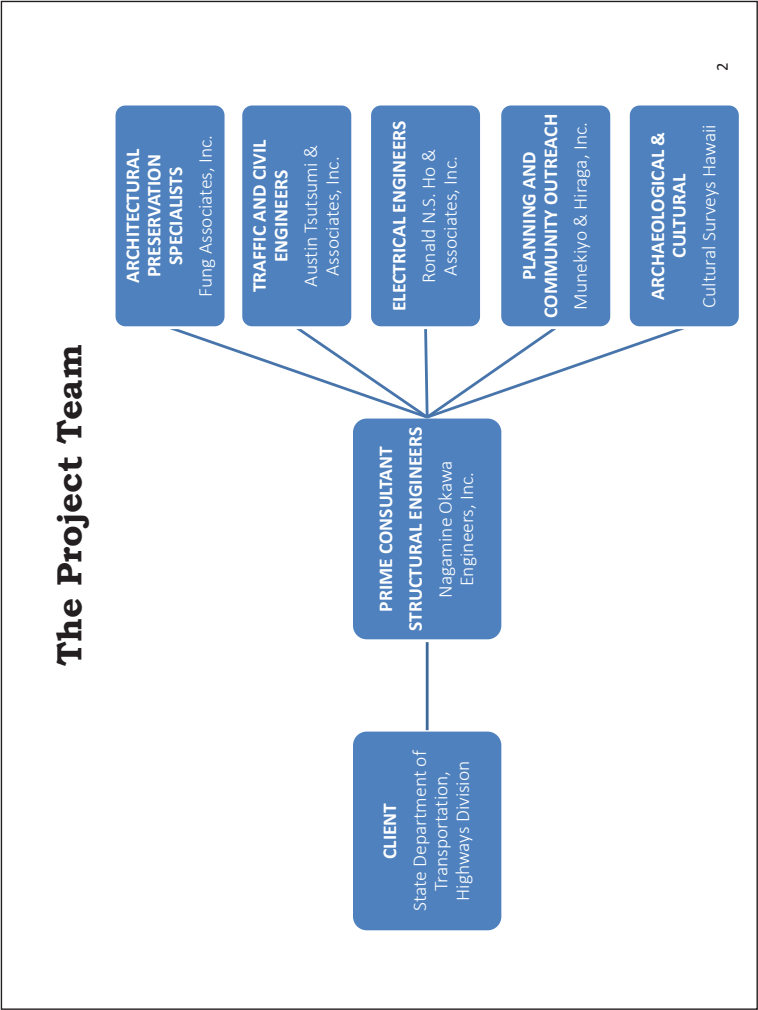
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APPENDIX 9

INDEX 1

(Exhibit “1”) PowerPoint Handout with
List of Bridge & Stream Names



Overall Project Purpose

Preservation Plan

- Develop a preservation plan for 43 bridge structures and 12 culvert structures found within the state owned portion of the Hana Belt Road Historic District.

Context Sensitive Design

- Assist HDOT with context sensitive design philosophies:
 - Gather public input early in the planning process
 - Take holistic approach to entire district

*Project is not a construction project but a preservation plan.

Purpose of this Meeting

1

- Review current progress and project goals.

2

- Present bridge treatment recommendations which have taken into consideration community concerns.

3

- Community feedback on bridge treatment recommendations.

Tentative Project Schedule

2014

MAY - SEPTEMBER

- Data gathering, site visits, and detailed studies
- Community-wide Meetings (June/July 2014)

2014 - 2015

OCTOBER - MARCH

- Prepare bridge preservation concepts and drawings
- Community-wide Meetings (February/March 2015)

2015

MARCH - JULY

- Prepare report with recommendations
- Community-wide Meetings (July/August 2015)

5

The Hana Belt Road Historic District

1

- Extends from mile point 2.8 shortly before Hoalua Bridge near Huelo to Kalepa Gulch past Kipahulu, approximately milepost 51 of Piilani Highway.

2

- Koukouai Bridge is the last bridge in the Historic District.

3

- The width of the district is the historic highway right-of-way (approximately 40 feet but varies).

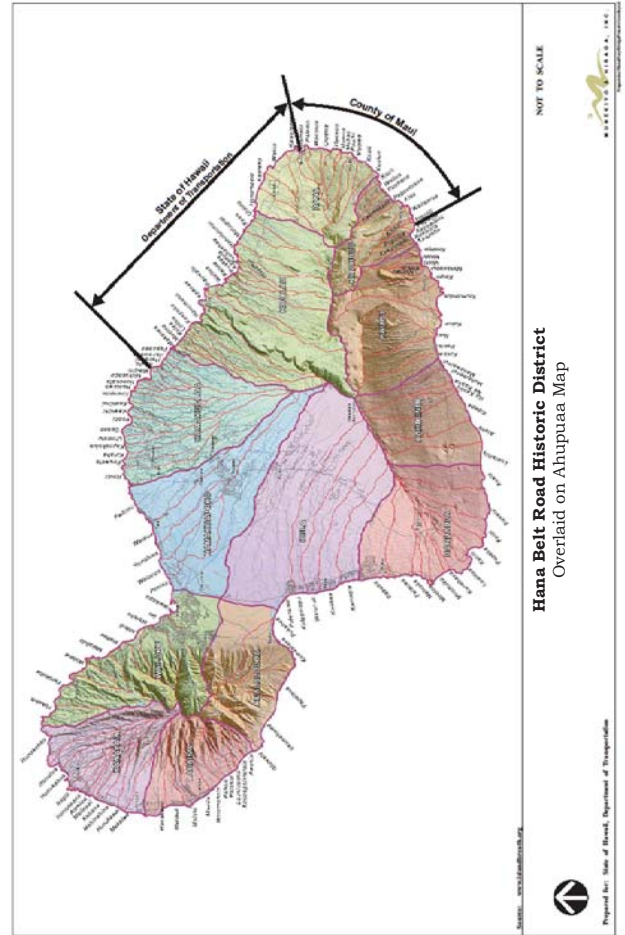
4

- Is listed on the Hawaii Register of Historic Places and the National Register of Historic Places.

5

- The scope of this preservation plan project is defined by those State bridges within the historic district, from Hoalua Stream Bridge to Kawaiapa Stream Bridge in Hana.

6



7

State Historic Bridges along Hana Highway

Note: Culverts and Hillside Bridges have been omitted at this scale for clarity. Please see next page for list of bridges and their corresponding numbers.



8

No.	Bridge Name	Mile Point	Year Constructed	No.	Bridge Name	Mile Point	Year Constructed
01	Hoalua Stream Bridge	5.09	1929	23	Unknown Stream No. 2 Bridge	23.00	1920
02	Kailua Stream Bridge	5.86	1929	24	Unknown Stream No. 3 (Paalea) Bridge	23.01	1920
03	Naillihiaele Stream Bridge	6.22	1930	25	Kapaula Bridge	23.39	1926
---	Culvert No. 1	7.05	unknown	26	Hanawi Stream Bridge	23.99	1926
04	Opooula Stream Bridge	7.94	1925	27	East Hanawi Stream Bridge	24.16	1926
05	Makanani Stream Bridge	8.24	1928	---	East Hanawi Culvert	24.20	unknown
06	Kaalea Stream Bridge	8.57	1928	28	Makapii Stream Bridge	24.98	1926
07	Waikamoi Stream Bridge	9.88	1911	29	Kuhiwa Stream Bridge	25.20	1926
08	Puuhokomoa Stream Bridge	10.97	1912	30	Kupukoi Stream Bridge	25.42	1926
09	Hajipuaena Stream Bridge	11.44	1912	31	Unnamed Stream (Kahalaowaka) Bridge	25.95	1926
10	Punalua Stream (Kolea) Bridge	13.16	1911	32	Pupape (Manawakee) Stream Bridge	26.48	1926
11	Honomanu Stream Bridge	13.71	1911	33	Kahawaihapa Stream Bridge	26.60	1922
12	Nuaalua Stream Bridge	15.39	1911	34	Keaiki Stream Bridge	26.77	1921
13	Pinaau Stream Bridge	16.60	1916	35	West Waioni Stream	26.94	1920
14	Palauhulu Stream Bridge	16.77	1916	36	Waioni Stream Bridge	27.01	1920
---	Culvert No. 2	17.48	circa 1937-1940	37	Lanikele Stream Bridge	27.76	1917
---	Culvert No. 3	17.53	circa 1937-1940	38	Helelekeoha Stream Bridge	27.92	1917
---	Culvert No. 4	17.55	circa 1937-1940	39	Ulaino Stream Bridge	27.98	1914
---	Waikamilo Culvert	18.00	unknown	40	Mokulehua Stream Bridge	28.31	1908
15	Waikamilo Stream Bridge	18.07	1921	41	Olowai Stream Bridge	29.18	1914
16	Waiani Stream Bridge	19.39	1926	42	Honomaele Stream Bridge	29.54	1924
17	West Wailuaki Stream Bridge	20.83	1926	---	Culvert No. 5	29.85	unknown
18	East Wailuaki Stream Bridge	21.30	1926	43	Kawaipapa Stream Bridge	33.44	1947
19	Kopiliua Stream Bridge	21.81	1926	---	Culvert No. 6	30.09	unknown
20	Puaakaa Stream Bridge	22.31	1926	---	Culvert No. 8	30.57	unknown
21	Walohue Stream Bridge	22.47	1937	---	Culvert No. 9	33.74	1915
22	Unknown Stream No. 1 Bridge	22.95	1920	---	Culvert No. 10	34.00	1915

How to Use This Report

Section A: Chapter 1 General + Chapter 2 Methodology

Section A: Chapter 3 Summary of Identification Guidelines & Evaluation Methods

Section A: Chapter 4 Design Standards & Guidelines + Chapter 5 Application of Design Standards & Guidelines

Section A: Chapter 6 Related Issues Along the Hana Highway

Section A: Chapter 7 Hana Highway Historic Bridge District: State Bridges

Section B Bridges + **Section C** Culverts

• Regulatory information and literature review of known, long-range community plans are presented first, to provide a foundation for the team's methodology and community outreach.

• Identification of bridge components and evaluation methods per historic guidelines follow the informational foundation, in order to ensure consistency within the team's approach.

• Design standards and guidelines, including public safety issues, form the crux of this preservation plan, balancing present day safety priorities with sensitivity to historic and cultural context.

• This portion addresses several concerns and topics that the team identified while preparing the *Hana Highway, Route 360 Bridge Preservation Plan* (2015). Due to the limited scope of this project, these concerns were not directly addressed, but it is strongly encouraged that these concerns are taken into consideration when planning for future projects.

• A detailed overview of the development of East Maui and the Hana Belt Road can be found in this chapter, with additional historic and cultural context provided in the individual bridge and culvert chapters, and appendices.

• Included in the individual chapters for each particular bridge is relevant cultural, historical, and technical information along with recommended treatment for each bridge presented in Sections B and C of this report.

11

Specific Project Objectives

1 • Study the affected bridges to document each bridge's historic character.

2 • Evaluate each bridge with respect to condition and public safety considerations.

3 • Conduct a community and agency consultation process to ensure that input is received regarding the bridge evaluation and preservation process.

4 • Prepare recommendations for historic preservation for each bridge considering historic qualities, public safety, funding options, and community/agency input.

10

Bridge Designations

Why “exceptional” and “contributing”?

Bridges are divided into 2 categories of significance for the purpose of recognizing those that have exceptional value and merit special treatment efforts.

Exceptional

- Historic date panels
- Best example of type
- Unique features
- Oldest example of type
- Intact condition
- Integrity of original design
- Related to EMI system
- Advanced technological innovation of its time

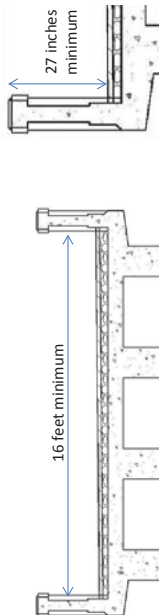
Contributing

- Contributing structure to the historic district
- Many examples of a certain type
- Poor condition/integrity
- Heavily altered

Minimum Requirements & Recommendations for Bridges

Current Bridge Code Requirements & Recommendations by DOT

- Recommendation: Minimum width of a single lane bridge = 16 feet
- Requirement: Minimum height of railings/parapets (including interior rail) = 27 inches
- Requirement: Current code load of 40 tons (existing highway is 10 tons)
- Requirement: Railings/Parapets = TL-2 crash tested (for roadways less than 45 mph)
- Requirement: Approach Wall = TL-2 crash tested, minimum height 27 inches



Recommendation: Minimum Lane Width
The minimum recommended width for a one lane bridge is 16 feet.

Requirement: Minimum Railing/Parapet + Approach Wall Height
The minimum required height for railing/parapet and approach wall along the highway is 27 inches.

Open Picket Railings

Curved Bridges



Bridge 03 Naillilihaele Stream Bridge



Bridge 14 Palauhulu Stream Bridge

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Curved Bridges	4	0	<ul style="list-style-type: none"> Retain railings Add crash-rail inside (wide enough) Convert #14 from 2 lanes to 1 	<ul style="list-style-type: none"> 3 Naillilihaele (Also Exceptional CRM Abutments) 4 Opuola (Also Exceptional CRM Abutments and Natural Rock Foundation) 14 Palauhulu (Also Exceptional Natural Rock Foundation) 17 West Wailuaki

Arched Bridges



Bridge 16 Waiakani Stream Bridge



Bridge 26 Hanawi Stream Bridge

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Arched Bridges	2	0	<ul style="list-style-type: none"> Retain railings Add crash-rail inside (#26 wide enough) Exemption on width for #16 Alternative: add 2-lane bridge for #16 (TBD following discussion with community) 	<ul style="list-style-type: none"> *16 Waiakani (17'-9" wide) 26 Hanawi (20'-9" wide)
	1	0	<ul style="list-style-type: none"> Replace deck and railings with best match TL-2 crash tested railings 	<ul style="list-style-type: none"> 29 Kuliwa (16'-6" wide) (Also Exceptional Natural Rock Foundation)

Distinctive Pier Bridges



Bridge 25 Kapaula Stream Bridge



Bridge 42 Honomalele Stream Bridge

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Distinctive Pier	2	0	<ul style="list-style-type: none">Replace railings with best match TL-2 crash tested railingsReinforce deck to support new railings	<ul style="list-style-type: none">25 Kapaula (Also Exceptional Natural Rock Foundation)42 Honomalele (Also Exceptional Natural Rock Foundation)

Post WWII Bridges



Bridge 43 Kawaipapa Stream Bridge

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Post WWII Type	1	0	<ul style="list-style-type: none">Reinforce deck to support new railings vs. Retain railingsAdd crash-rail inside (wide enough)	<ul style="list-style-type: none">43 Kawaipapa

Distinctive Greek Cross Railing Bridges



Bridge 15 Waioakamilo Stream Bridge



Culvert 25C Waioakamilo Culvert

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Distinctive Parapet/Railing: Greek Cross Design	1	1	<ul style="list-style-type: none">Retain railingsAdd crash-rail inside (wide enough)	<ul style="list-style-type: none">15 WaioakamiloWaioakamilo Culvert

Typical Open Picket Bridges



Bridge 1 Hoalua Stream Bridge

Contributing

Contributing	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
	17	0	<ul style="list-style-type: none">Replace railings with best match TL-2 crash tested railingsReinforce deck to support new railings	<ul style="list-style-type: none">1 Hoalua, *5 Makanali, 6 Kaalea, 27 East Hanawi, 28 Makapipi, 30 Kupukoi, 31 Unnamed Stream, 34 Kakaiki, 35 West Waioni, 36 Waioni, 37 Lanikele, 38 Heleieleleka, 39 Ulaio, 41 Olowai

Typical Open Picket Railings

Typical Open Picket Railings	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
	3	0	<ul style="list-style-type: none">Retain railingsAdd crash-rail inside (wide enough)	<ul style="list-style-type: none">32 Pupape (Exceptional Natural Rock Foundations)20 Puakea2 Kailua (Exceptional CRM Abutments)13 Piinau (Exceptional Natural Rock Foundations)

	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
	0	4	<ul style="list-style-type: none">Widen culvert (verify upstream or downstream)Retain railings and relocate to meet width criteriaAdd crash-rail inside	<ul style="list-style-type: none">Culvert 5, 6, 7, 8

Summary of Recommendations Open Picket Railing

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Curved Bridges	4	0	<ul style="list-style-type: none">Retain railingsAdd crash-rail inside (wide enough)Convert #14 from 2 lanes to 1	<ul style="list-style-type: none">3 (Also Exceptional CRM Abutments)4 (Also Exceptional CRM Abutments and Natural Rock Foundation)14 (Also Exceptional Natural Rock Foundation)17
Arched Bridges	2	0	<ul style="list-style-type: none">Retain railingsAdd crash-rail inside (#26 wide enough)Exemption on width for #16Alternative: add 2-lane bridge for #16 (TBD following discussion with community)	<ul style="list-style-type: none">*16 (17'-9" wide)26 (20'-9" wide)
	1	0	Replace deck and railings with best match TL-2 crash tested railings	29 (16'-6" wide) (Also Exceptional Natural Rock Foundation)
Distinctive Pier	2	0	Replace railings with best match TL-2 crash tested railings	25 (Also Exceptional Natural Rock Foundation)
Distinctive Parapet/Railing: Greek Cross Design	1	1	<ul style="list-style-type: none">Reinforce deck to support new railingsRetain railingsAdd crash-rail inside (wide enough)	42 (Also Exceptional Natural Rock Foundation)
Post WWII Type	1	0	<ul style="list-style-type: none">Reinforce deck to support new railings vs. Retain railingsAdd crash-rail inside (wide enough)	15 Waldkamilo Culvert *43
Total Exceptional	11	1		

*Requesting Exemptions

Summary of Recommendations Open Picket Railing

Contributing	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
	17	0	<ul style="list-style-type: none">Replace railings with best match TL-2 crash tested railingsReinforce deck to support new railingsRetain railings	<ul style="list-style-type: none">1, *5, 6, 27, 28, 30, 31, 34, 35, 36, 37, 38, 39, 4118, 33 (Exceptional CRM Abutments)32 (Exceptional Natural Rock Foundations)
Typical Open Picket Railings	3	0	<ul style="list-style-type: none">Retain railingsAdd crash-rail inside (wide enough)	<ul style="list-style-type: none">202 (Exceptional CRM Abutments)13 (Exceptional Natural Rock Foundations)
	0	4	<ul style="list-style-type: none">Widen culvert (verify upstream or downstream)Retain railings and relocate to meet width criteriaAdd crash-rail inside	<ul style="list-style-type: none">Culvert 5, 6, 7, 8
Total Contributing	20	4		

*Requesting Exemptions

Open Picket Railing Summary

	Bridge Quantity	Culvert Quantity	Bridge Types
Total Exceptional	11	1	<ul style="list-style-type: none">4 Curved Bridges (Exceptional)2 Arched Bridges (Exceptional)1 Greek Cross Bridge (Exceptional)1 WW II Bridge (Exceptional)3 Typical Bridges (Contributing)4 Typical Culverts (Contributing)1 Greek Cross Culvert (Exceptional)
Total Contributing	20	4	<ul style="list-style-type: none">1 Arched Bridges (Exceptional)2 Distinctive Piers (Exceptional)17 Typical Bridges (Contributing)
Total Overall	31	5	<ul style="list-style-type: none">4 Typical Culverts (Contributing)

Solid Parapets

Historic Date Panel Parapet Bridges



Bridge 7 Waikamoi Stream Bridge



Bridge 10 Punalau Stream Bridge (Kolea)

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Distinctive Parapet/Railing: Historic Date Panel	3	0	<ul style="list-style-type: none">Retain downstream parapetAdd crash-rail inside downstream parapetWiden upstream sideReplace upstream side parapet with best matchTL-2 crash tested railings	• 7 Waikamoi, 8 Puohokamoa, 10 Kolea

EMI Bridges



Bridge 19 Kopiliia Stream Bridge

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
EMI	1	0	<ul style="list-style-type: none">Retain parapetsExemption on width, and crash testing to meet TL-1 criteria	• *19 Kopiliia

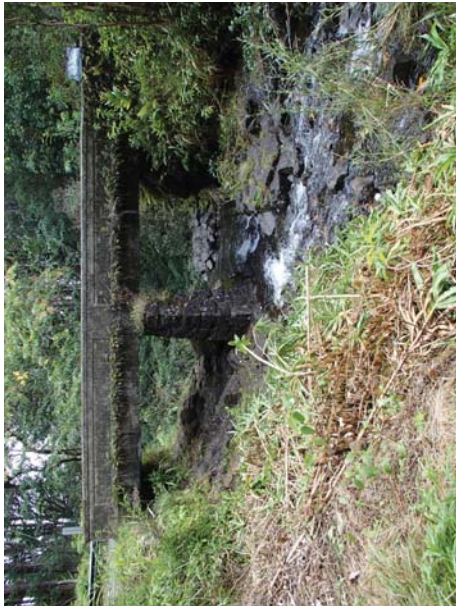
Oldest Bridge



Bridge 40 Mokuiehua Stream Bridge

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Oldest Concrete Bridge on Maui	1	0	<ul style="list-style-type: none">Retain downstream parapetAdd crash-rail inside downstream parapetWiden upstream sideReplace upstream side parapet with best matchTL-2 crash tested railings	• 40 Mokuiehua (Also Exceptional CRM Foundation)

Distinctive Pier Bridges



Bridge 21 Waiohue Stream Bridge

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Distinctive Pier	1	0	<ul style="list-style-type: none">Retain upstream parapetAdd crash-rail inside upstream parapetWiden downstream side with new best matchTL-2 crash tested railing	• 21 Waiohue

Typical Solid Parapet Bridges



Bridge 22 Unknown Stream No. 1



Bridge 9 Hapuaena Stream Bridge

Contributing	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Typical Solid Parapet	4	0	<ul style="list-style-type: none">WidenReplace parapets with best match TL-2 crash tested railingsReinforce deck to support new railingsRetain railingsAdd crash-rail inside	<ul style="list-style-type: none">9 Hapuaena, 22 Unknown Stream no. 1, 23 Unknown Stream no. 2, 24 Unknown stream no. 3
	0	4		<ul style="list-style-type: none">Culvert 1, 2, 3, 4
	0	2	<ul style="list-style-type: none">Widen (verify upstream or downstream side)Retain parapets and relocate to meet width criteriaAdd crash-rail inside both parapets	<ul style="list-style-type: none">East Hanawi CulvertCulvert 10
Hybrid Parapet	1	0	<ul style="list-style-type: none">Upstream side is original solid parapetDownstream side is replacement (date?) open picket railingReplace both railings with best match TL-2 open crash tested railings	<ul style="list-style-type: none">12 Nuaaialua
Unknown Deck	1	0	<ul style="list-style-type: none">Replace entire bridge structure (girders, deck & parapets)(Note: Structurally deficient)	<ul style="list-style-type: none">11 Honomanu
Altered Culvert	0	1	<ul style="list-style-type: none">Install crash-rail inside original upstream parapet (Note: Downstream parapet was replaced and deck was widened in 2014)	<ul style="list-style-type: none">Culvert 9
				29

*Requesting Exemptions

Summary of Recommendations Solid Parapet

Exceptional	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Distinctive Parapet/Railing: Historic Date Panel	3	0	<ul style="list-style-type: none">Retain downstream parapetAdd crash-rail inside downstream parapetWiden upstream sideReplace upstream side parapet with best match TL-2 crash tested railings	<ul style="list-style-type: none">7, 8, 10
	1	0	<ul style="list-style-type: none">Retain parapetsExemption on width, and crash testing to meet TL-1 criteria	<ul style="list-style-type: none">*19
	1	0	<ul style="list-style-type: none">Retain downstream parapetAdd crash-rail inside downstream parapetWiden upstream sideReplace upstream side parapet with best match TL-2 crash tested railings	<ul style="list-style-type: none">40 (Also Exceptional CRM Foundation)
Oldest Concrete Bridge on Maui	1	0		
Distinctive Pier	1	0	<ul style="list-style-type: none">Retain upstream parapetAdd crash-rail inside upstream parapetWiden downstream side with new best match TL-2 crash tested railing	<ul style="list-style-type: none">21
Total Exceptional	6	0		

Summary of Recommendations Solid Parapet

Contributing	Bridge Quantity	Culvert Quantity	Proposed Action	Bridge / Culvert #s
Typical Solid Parapet	4	0	<ul style="list-style-type: none">WidenReplace parapets with best match TL-2 crash tested railingsReinforce deck to support new railingsRetain railingsAdd crash-rail inside	<ul style="list-style-type: none">9, 22, 23, 24
	0	4		<ul style="list-style-type: none">Culvert 1, 2, 3, 4
	0	2	<ul style="list-style-type: none">Widen (verify upstream or downstream side)Retain parapets and relocate to meet width criteriaAdd crash-rail inside both parapets	<ul style="list-style-type: none">East Hanawi CulvertCulvert 10
Hybrid Parapet	1	0	<ul style="list-style-type: none">Upstream side is original solid parapetDownstream side is replacement (date?) open picket railingReplace both railings with best match TL-2 open crash tested railings	<ul style="list-style-type: none">12
Unknown Deck	1	0	<ul style="list-style-type: none">Replace entire bridge structure (girders, deck & parapets)(Note: Structurally deficient)	<ul style="list-style-type: none">11
Altered Culvert	0	1	<ul style="list-style-type: none">Install crash-rail inside original upstream parapet (Note: Downstream parapet was replaced and deck was widened in 2014)	<ul style="list-style-type: none">Culvert 9
Total Contributing	6	7		

Solid Parapet Summary

Total Exceptional	Bridge Quantity	Culvert Quantity
	6	0
Total Contributing	6	7
Total Overall	12	7

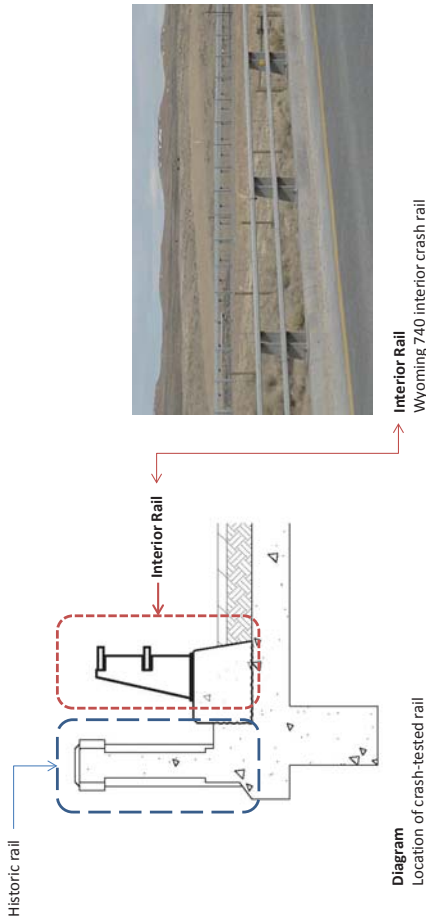
	Bridge Quantity	Culvert Quantity	Bridge Types
Rehabilitate / Retain Existing Parapets	1	7	<ul style="list-style-type: none">1 EMI Bridge (Exceptional)6 Typical Culverts (Contributing)1 Altered Culvert (Contributing)
	10	0	<ul style="list-style-type: none">3 Historic Date Panels (Exceptional)1 Oldest Concrete Bridge on Maui (Exceptional)1 Distinctive Pier Bridge (Exceptional)1 Hybrid Parapet Bridge (Contributing)4 Typical Solid Parapet Bridges (Contributing)
	1	0	<ul style="list-style-type: none">1 Unknown Deck (Contributing)
Replace	1	0	
Total Widen (of Rehabilitate)	9	2	<ul style="list-style-type: none">3 Historic Date Panel Bridges (Exceptional)1 Oldest Concrete Bridge on Maui (Exceptional)1 Distinctive Pier Bridge (Exceptional)4 Typical Bridges (Contributing)2 Typical Culverts (Contributing)

Treatment Recommendations

Treatment of Character-Defining Features

Railings

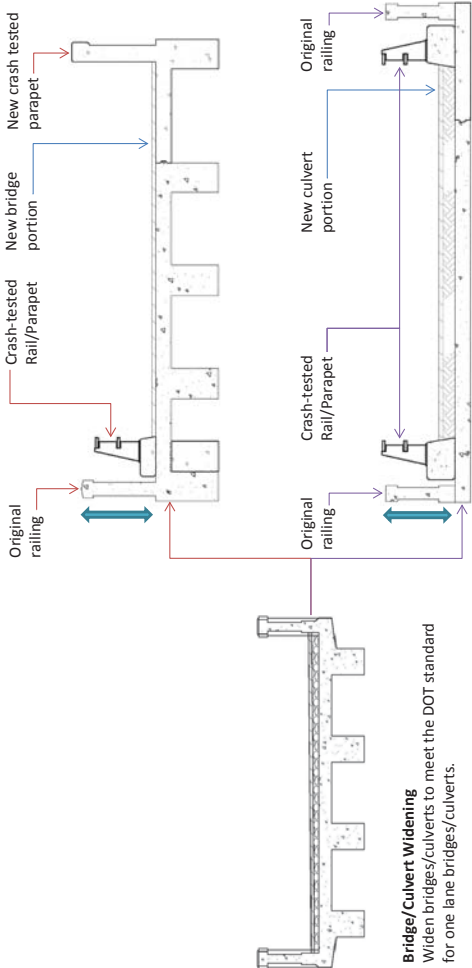
Preserve historic railing in place.



Treatment of Character-Defining Features

Bridge/Culverts

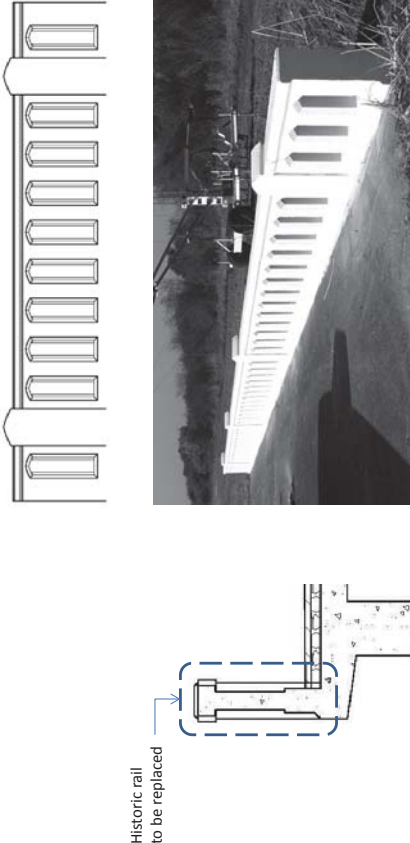
Bridge/Culvert widening.



Treatment of Character-Defining Features

Railings

Replacement of open picket rails with compatible design.

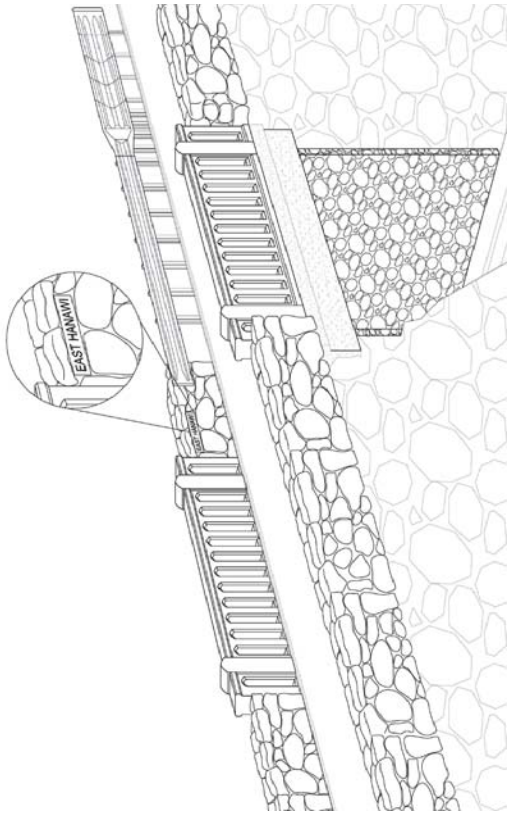


Example 2: C-411

This railing is a 42-inch high continuous concrete railing that has 6-inch wide windows spaced every 18 inches center to center. Its minimum height after maintenance overlays is 30 inches. (Right top: test example; Right bottom: Lihue Mill Bridge on Kauai.)

Treatment of Character-Defining Features

Railings



Bridge Example
Bridge 27 East Hanawi Stream Bridge

Treatment of Character-Defining Features

Parapet

Replacement of solid parapet with compatible design.

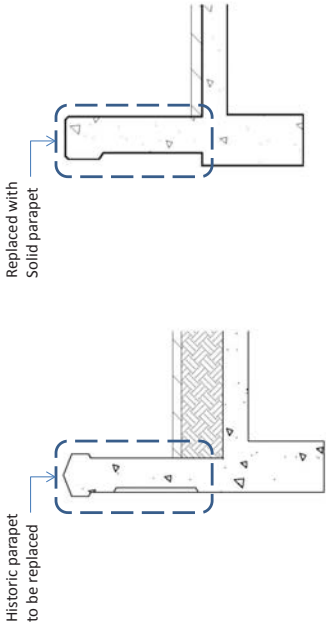


Diagram
Location of rail replacement

Example 2: Solid Parapet Rail

Treatment of Character-Defining Features

Parapet

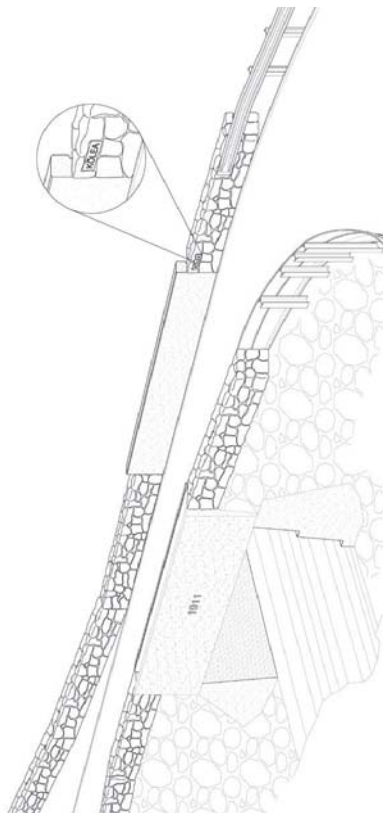
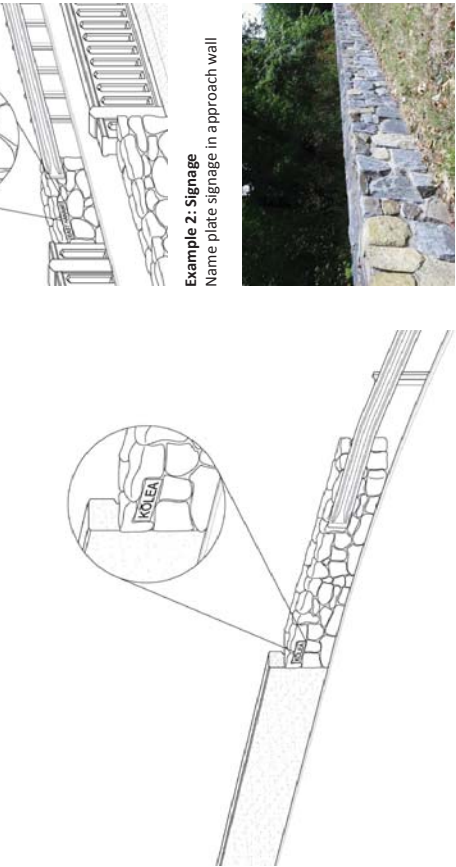


Diagram
Location of rail replacement

Treatment of Character-Defining Features

Approach Walls

Replacement of approach walls.



Example 2: Signage
Name plate signage in approach wall

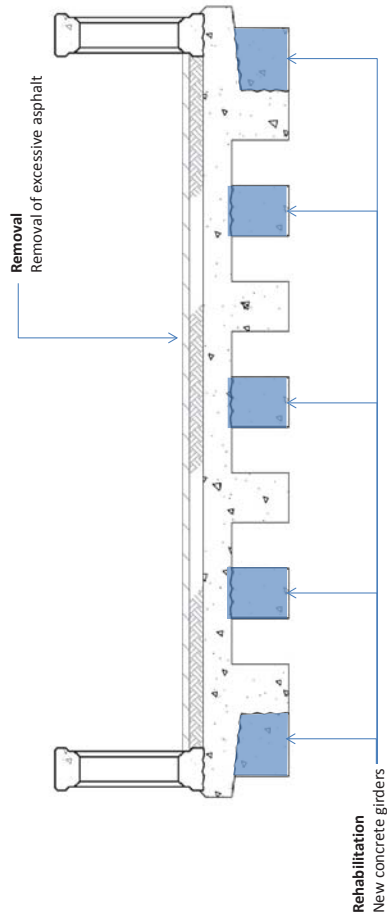
Example 1: Signage
Name plate signage in approach wall

Example 3: TL-3 Rated Approach Wall
Stone Masonry Guardwall

Treatment of Character-Defining Features

Structure

Structural reinforcement of bridge, deck, and/or beams.

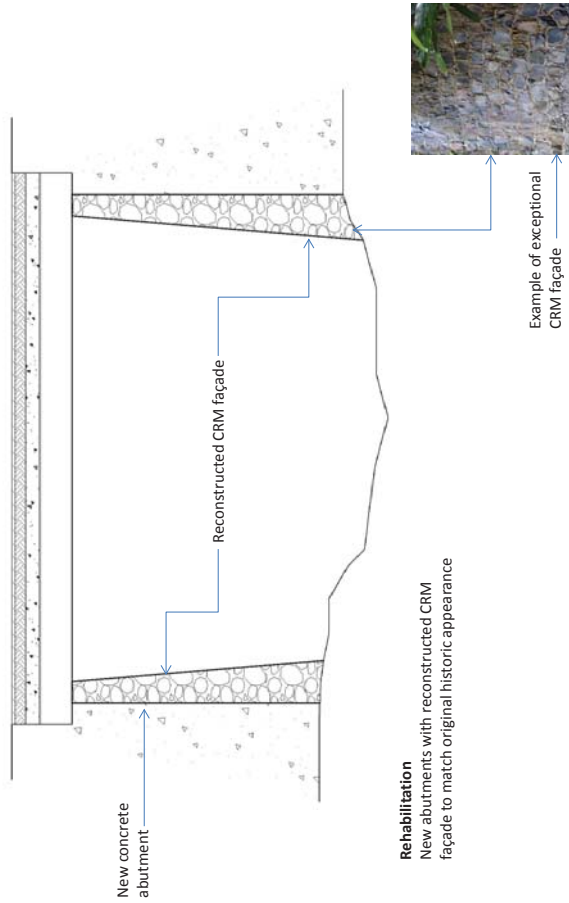


41

Treatment of Character-Defining Features

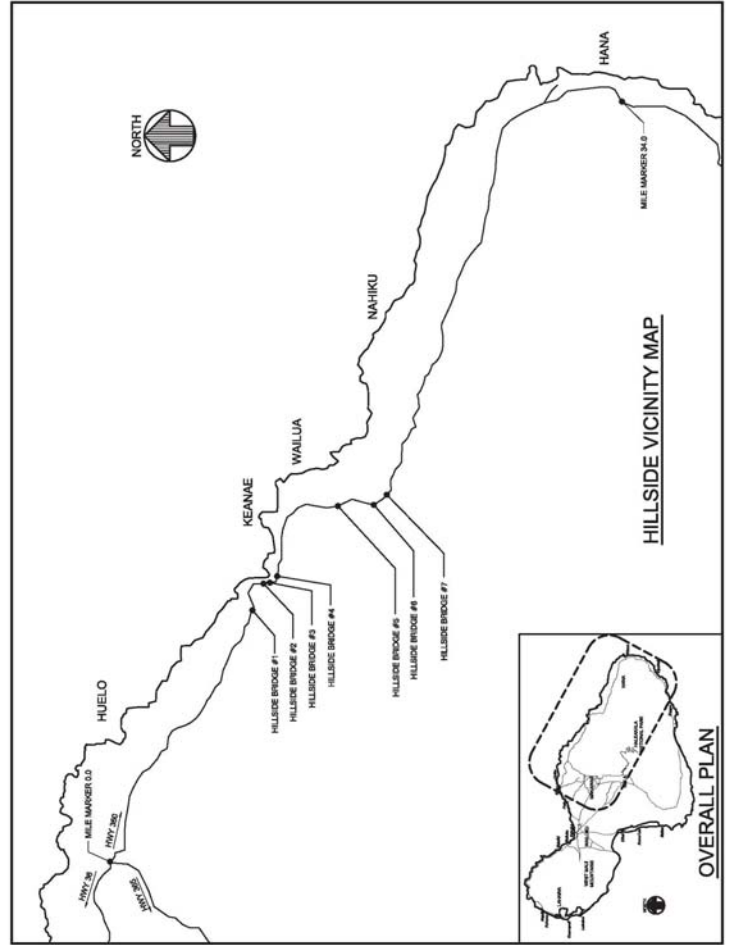
Structure

Structural reinforcement of bridge components.



42

Hillside Bridges



44



Hillside Bridges

- Total of 7 bridges built between 2001 and 2004
- All have been constructed to meet current codes and standards
- No rehabilitation recommendations for these bridges



45

Found Culverts

Found Culverts

- Total of 45 "found" culverts along the Hana Highway
- Most of the culverts are functioning as drainage structures
- Recommendations are to strengthen the culverts for load carrying and vehicular safety purposes



47

Pre-Final Draft

Hana Highway, Route 360 Bridge Preservation Plan Pre-Final Draft can be reviewed by contacting:

- DOT Highways Maui District Office 873-3535
- Hana Council District Office 248-7513
- Hana Public and School Library 248-4848
- Hana Cultural Center and Museum 248-8622

Hana Highway, Route 360 Bridge Preservation Plan Pre-Final Draft available to download from the internet via:

- <ftp://public@ftp.nagamineokawa.com>
- Username: Public
- Password: hana2015

48

Contacts

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305 High Street, Suite 104
Wailuku, Hawaii 96793

Phone: (808) 244-2015

49

Comment Due Dates

Hana Advisory Committee Meeting

- Meeting Date: September 14th 2015
- Comments Due: September 18th 2015

50

Questions?

Comments?



APPENDIX 9

ISSUES MANAGEMENT MATRIX

Final Plan Stage
(July to August 2015)

Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District
ISSUES MANAGEMENT MATRIX
Third Cycle of Community Meetings (July to September 2015)

No.	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
1	HANA TOWN MEETING (Presentation at a publicly announced meeting on July 30, 2015)					
1(a)	D. Lono	Is the 40 ton criteria regulated by Federal Law?	Other	HDOT	<i>P. Santo explained that it is a HDOT standard. As far as posting of the load, it will remain at the 10 ton limit until all the bridges are upgraded.</i>	7/30/15
1(b)	B. Benton	If for the first ten (10) years, the bridges will be designed for 40 ton limits, then will the future ones be designed to 50 tons?	Other	HDOT	<i>P. Santo stated that it will not make sense to increase the loading with the previous ones designed at a lesser load. Posting can still remain at the 10 ton limit.</i>	7/30/15
1(c)	D. Atay	Recommends leaving the 10 ton limit since people will ignore the signs.	Other	HDOT	<i>Recommendation acknowledged.</i>	7/30/15
1(d)	S. Sinenci	How many yards of cement will be detrimental to the bridges?	Other	HDOT	<i>.P. Santo responded that would be 4 to 5 cubic yards for a 10 ton loading.</i>	7/30/15
1(e)	T. Bacon	What is the rest of the road posted at?	Other	HDOT	<i>P. Santo responded that the entire historic Hana Highway will be designed for the same truck loading</i>	7/30/15
1(f)	D. Lono	How much will the crash tested interior rail narrow the bridge?	Traffic	HDOT, NOEI, FAI	<i>A. Chiu stated that it will vary. P. Santo added that where bridges will remain single lane, the clear distance will not be less than 16 feet.</i>	7/30/15
1(g)	D. Lono	Asked if there will be a replacement of the capped top rails with a flat top rail?	Architectural, Aesthetic	NOEI, FAI	<i>C. Aihara explained the need to use a crash tested design which only comes with a flat top rail.</i>	7/30/15
1(h)	T. Bacon	Is it possible to put a cap on the railings?	Architectural, Aesthetic	NOEI, FAI	<i>C. Aihara stated that the Federal Highway Administration (FHWA) provides that there should not be an altered design, but there is an exemption process.</i>	7/30/15
1(i)	D. Lono	Commented that she believes historic districts allow exemptions and that the design exception should be granted now instead of at the construction phase.	Historic, Aesthetic	NOEI, FAI	<i>Comment acknowledged.</i>	7/30/15
1(j)	D. Lono	Noted that guardrail approaches to bridges are unattractive, rusted, and are not durable.	Aesthetic, Other	NOEI, FAI	<i>C. Aihara explained the process of numbering and photographing rocks to reinstall them to its original configuration.</i>	7/30/15

* Categories: Archaeological, Historic, Cultural, Architectural, Traffic, Aesthetic, Environmental, Legislative, Other
 ** Responsible Teams:
 ATA Austin Tsutsumi & Associates, Inc.
 CSH Cultural Surveys of Hawaii
 FAI Fung Associates Inc.
 HDOT Hawaii Department of Transportation
 MH Munekeyo Hiraga
 NOEI Nagamine Okawa Engineers, Inc.
 RNSH Ronald N.S. Ho & Associates, Inc.

Note: Italicized verbiage are responses provided by the presenters at each meeting. Verbiage noted in regular red text are responses/actions developed after further evaluation of bridge sites and preliminary recommendations were formulated.

**Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District
ISSUES MANAGEMENT MATRIX**

Third Cycle of Community Meetings (July to September 2015)

No.	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
1(k)	D. Aiy	Stated that the bridge name tells the story and incorrect use of diacritical marks may change its meaning.	Other	NOEL, FAI	<i>C. Aihara emphasized the need to give comments of the Bridge/Stream Name chart in the Appendix. D. Lono proposed using stream names.</i>	7/30/15
1(l)	D. Lono	Expressed that there is excessive asphalt waste material when repaving work is undertaken without removing old asphalt before placing the new overlay.	Other	HDOT	<i>P. Santo stated that designers will need to correct the situation.</i>	7/30/15
1(m)	S. Sinenci	Commented that less paving over bridges will minimize oil in concrete drain holes getting into the streams and watersheds.	Other	HDOT	<i>P. Santo replied that he prefers concrete decks without asphalt overlays for easier inspections.</i>	7/30/15
1(n)	D. Lono	Suggested that instead of repaving, concrete be utilized even if the initial cost is more expensive. She suggested asking the Hana Advisory Committee on whether asphalt or concrete is preferred.	Other	HDOT	<i>Suggestion acknowledged.</i>	7/30/15
1(o)	S. Sinenci	Suggested to use TURNOUT signs to help tourist recognize areas to pull over and let traffic pass. He provided a large printed out example. B. Carroll stated that District Engineer Ferdinand Cajigal has a list of pullouts that they have been paving.	Traffic	HDOT, ATA	<i>Suggestion acknowledged and presented to the Traffic Engineer – T. Fujiwara for future consideration.</i>	7/30/15
1(p)	B. Benton	She noticed that mile markers appear to be incorrect and off by about a mile. She also recommended leaving out diacritical marks.	Other	HDOT	<i>Her observations and recommendation were acknowledged.</i>	7/30/15
1(q)	D. Lono	Suggests long term maintenance considerations to use appropriate ground cover that does not have to be sprayed with herbicide.	Other	HDOT	<i>Suggestion acknowledged.</i>	7/30/15
2	CULTURAL RESOURCES COMMISSION (Presentation at a publicly announced meeting on August 6, 2015)					
2(a)	J. Six	Pointed out that bridges back in 1901 were built when asphalt was not available.	Historic	FAI	<i>V. Murison stated that it was a macadam (oil and rock) surface until about the 1960s.</i>	8/6/15
2(b)	B. Mowat	Asked when the total of seven (7) hillside bridges were built?	Historic	NOEI	<i>C. Aihara clarified the period as being between 2001 and 2004.</i>	8/6/15

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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

Third Cycle of Community Meetings (July to September 2015)

No.	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
2(c)	Ray Hutaff (Testifier)	He has a tour company (Valley Isle Excursions) that conducts about 3,000 van tours a year. He has observed that one-lane bridges are about sixteen (16) feet wide, it appear to drivers that its clear for two-way traffic and results in accidents. Bridges maintained at ten (10) would appear as one-lane and be safer.	Traffic	NOEI, FAI, ATA	<i>T. Moy explained that 16 feet wide bridges will still remain one-lane. Existing twelve (12) feet wide bridges will be widened. Curved bridges that are wider than sixteen (16) feet will have interior rails to narrow them.</i>	8/6/15
2(d)	Ray Hutaff	The standard 42" high bridge rail/walls have gotten lower with asphalt overlays. The taller rails obstructs tourist's views for photo taking which results in them stopping on the bridges and exiting their vehicle to take photos, creating a safety problem.	Traffic	NOEI, FAI, ATA	<i>Observation acknowledged.</i>	8/6/15
2(e)	Ray Hutaff	We should try to preserve any historic value of bridges and should not improve on it.	Historic	NOEI, FAI	<i>Recommendation acknowledged.</i>	8/6/15
2(f)	B. Mowat	Complimented the team on a very thorough plan. Stated that she is still evaluating the need for diacritical marks. Finally, she believes all bridges should be one-way, to better enable speed management, thereby allowing drivers to be mindful of others travelling on the road.	Traffic, Other	NOEI, FAI	<i>Compliment and statements acknowledged.</i>	8/6/15
2(g)	J. Six	Cited the problem of people disregarding signage indicating that a bridge is only one-lane.	Traffic	NOEI, ATA	<i>C. Aihara stated that some one-lane signed bridges have YIELD signs but the pavement striping does not match. The plan recommends addressing the inconsistent markings to make one-lane bridge conditions clearer to drivers.</i>	8/6/15
2(h)	J. Six	Asked if replacement walls will be stamped rock?	Aesthetic	NOEI, FAI	<i>C. Aihara confirmed that the plans are recommending to use genuine rock material.</i>	8/6/15

* Categories: Archaeological, Historic, Cultural, Architectural, Traffic, Aesthetic, Environmental, Legislative, Other
 ** Responsible Teams: ATA Austin Tsutsumi & Associates, Inc. MH Munekeyo Hiraga
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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

Third Cycle of Community Meetings (July to September 2015)

No.	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
2(i)	J. Six	She has seen tourists standing on the railings and asked if there is any style of railing to discourage standing.	Other	NOEI	C. Aihara recounted a resident's thought that the existing capped railing design would discourage standing. However, the crash tested railing accepted by Federal Highway Administration (FHWA) has a flat top and FHWA discourages deviations due to liability concerns. Future designers could still propose to FHWA later, a capped design as an exception request.	8/6/15
2(j)	J. Six	Stated that features such as a bridge name embossed backwards does add to its historical charm but the importance of maintaining historical accuracies should be recognized, as well.	Historic	NOEI, FAI	Recommendation acknowledged.	8/6/15
2(k)	B. Mowat	She stressed that the main concern is to have bridge name spellings correct	Other	NOEI, FAI	Recommendation acknowledged.	8/6/15
2(l)	T. Bailey	Asked what was the source of the ahupuaa maps?	Other	MH	C. Shibuya explained the source noted at the bottom of the map is off a website. She acknowledged that the boundaries along the east end are generally correct but that the Wailuku district is a little different from the ones on file with Office of Hawaiian Affairs and other sources. However, since the other maps had many ahupuaa shown and was quite dark, the team used this lighter shade map in the report that could clearly show an overlay of the historic district limits across the east side ahupuaa.	8/6/15
2(m)	T. Bailey	He pointed out many old time County maintenance workers would be good consultation resources.	Other	NOEI, FAI, MH	The team explained the extensive outreach that was done but no one of this background came forward. C. Shibuya added that historic bridge inspection reports were extensively reviewed on past records of repair work.	8/6/15
2(n)	T. Bailey	He also pointed out that bridges on the County side were built with an initial intent that is now different from how it is used to be. Who will be responsible for the Programmatic Agreement that addresses concerns of the community and impacts to facilities?	Other	NOEI, FAI	T. Moy clarified that the Federal Highway Administration, State Historic Preservation Division, CRC, and HDOT will become legal signatories to the Programmatic Agreement. Invited parties will be sent letters if they want to be part of the process.	8/6/15

* Categories: Archaeological, Historic, Cultural, Architectural, Traffic, Aesthetic, Environmental, Legislative, Other
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Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District
ISSUES MANAGEMENT MATRIX
Third Cycle of Community Meetings (July to September 2015)

No.	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
2(o)	T. Bailey	Asked if the preservation plan was federally funded?	Legislative	NOEI, FAI	<i>T. Moy answered that the plan it is State funded but most bridge projects are federally funded and the Programmatic Agreement will cover all the bridges.</i>	8/6/15
3	HANA ADVISORY COMMITTEE (HAC) (Presentation at a scheduled meeting on September 14, 2015)					
3(a)	W. Mardfin	Asked when Kepa Maly will be hired and whether HAC will be consulted before Mr. Maly finishes his research?	Cultural	FAI	<i>T. Moy responded that Kepa Maly will be hired within the next year and both HAC and CRC will be participants in the preparation of the Programmatic Agreement.</i>	9/14/15
3(b)	G. Notestone	Works for the Fire Department and noted a bridge done by Koki Beach has a difficult alignment for fire trucks to negotiate. He asked who are the engineers that will design the bridges?	Traffic	NOEI, ATA	<i>C. Aihara responded that the plan is a preservation plan with recommendations for future designers selected for each project. She added that there is a 40 ton criteria to accommodate fire trucks and Emergency Medical Service (EMS) vehicles. She also pointed out that Koki Beach bridge to be under the County's jurisdiction.</i>	9/14/15
3(c)	G. Notestone	Questioned whether there will be road closures during construction?	Traffic	NOEI, ATA	<i>C. Aihara confirmed that the plan recommends providing temporary bridge detours in all cases.</i>	9/14/15
3(d)	J. Blumer - Buell	Asked if every bridge that is replaced or rehabilitated will require an Environmental Assessment (EA)?	Environmental	NOEI	<i>C. Aihara responded that an EA or Environmental Impact Statement, if possible, to address all of the bridges at once, is intended by HDOT.</i>	9/14/15
3(e)	J. Blumer - Buell	Suggests that the preservation plan consider the bridges in a Hawaiian cultural context expression of the water "wai" or "wai wai".	Cultural	NOEI, FAI	<i>Suggestion acknowledged.</i>	9/14/15
3(f)	J. Blumer - Buell	Asked if bridges with interior railings will narrow the bridge to less than sixteen (16) feet?	Other	NOEI, FAI	<i>C. Aihara responded that in those cases, there is the option of replacing the historic rail with a crash tested in-kind rail to maintain the bridge's width.</i>	9/14/15

* Categories: Archaeological, Historic, Cultural, Architectural, Traffic, Aesthetic, Environmental, Legislative, Other
 ** Responsible Teams:
 ATA Austin Tsutsumi & Associates, Inc.
 CSH Cultural Surveys of Hawaii
 FAI Fung Associates Inc.
 HDOT Hawaii Department of Transportation
 MH Munkioy Hiraga
 NOEI Nagamine Okawa Engineers, Inc.
 RNSH Ronald N.S. Ho & Associates, Inc.

Note: Italicized verbiage are responses provided by the presenters at each meeting. Verbiage noted in regular red text are responses/actions developed after further evaluation of bridge sites and preliminary recommendations were formulated.

**Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District
ISSUES MANAGEMENT MATRIX**

Third Cycle of Community Meetings (July to September 2015)

No.	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
3(g)	J. Blumer - Buell	Asks that the document recommend use of other materials and methods, such as injected epoxies and running electricity through the bridges to keep the bridges from deteriorating. He further noted that Oregon DOT's approved use of Fiber Wrapped Polymers (FRP) is discouraged in this bridge plan.	Other	NOEI	C. Aihara explained HDOT's concern with FRP's is that it is a fairly new product with uncertainty on its long term performance. The team did consider and evaluate the method of applying electricity through the bridges but noted its high cost further complicated by the lack of adequate electrical lines necessary to feed the system. She pointed out the disclaimer at the beginning of the plan that states the recommendations are not absolute and encourages exploring other feasible materials or methods that may be an option for the future design team.	9/14/15
3(h)	W. Mardfin	Notes that the plan mentions scraping the roadway. After C. Aihara clarified the process, W. Mardfin agreed with concrete only on the bridge decks. J. Blumer-Buell also agrees with the removal of asphalt on the bridges to eliminate the possibility of oils getting into the streams.	Other	NOEI	C. Aihara clarified that excess asphalt on the bridges are proposed to be removed to reduce the overburden weight and asphalt on the approaches will also be removed for a smooth transition. T. Moy brought up a resident's concern with asphalt oils getting into the streams.	9/14/15
3(i)	J. Blumer - Buell	Expressed concern with the road not being wide enough, such as at Wailuanui. "No Parking" signs are not complied with resulting in ten (10) cars at times restricting the passage to only a one-lane road. G. Notestone added that their fire trucks have experienced the same problem with parked cars constricting their passage. A. Hoopai-Waikoloa has experienced the same problem with parked cars constricting the road and suggested signs with more enforcement.	Traffic	NOEI, ATA	C. Aihara explained that HDOT was open to TURNOUT signs instead of designating parking areas which open the department to liability. C. Aihara pointed out Chapter 6 recommendations for brochures to educate tourists on road etiquette.	9/14/15
3(j)	J. Blumer - Buell	Questioned what is the realistic time frame for the preservation plan to be accomplished?	Other	NOEI, FAL, HDOT	T. Moy stated that HDOT believes the plan to span at least fifty (50) years.	9/14/15
3(k)	W. Mardfin	Asked if the engineers looked at a priority listing of which bridges are in most danger of failure to prompt immediate work?	Other	NOEI, FAL, HDOT	C. Aihara explained that from an engineering perspective, all the bridges are in need of upgrading its carrying capacity. Therefore, the logical approach is to address the bridges in the sequence that you traverse the Hana Highway into Hana. From a historical perspective, those bridges with characteristic features in poor condition would be considered higher priorities. T. Moy added that HDOT already has a priority based on the lowest loading capacity.	9/14/15
3(l)	W. Mardfin	As an economist, he commented that doing a cluster of the same bridge design at once and in a sequence that would allow consecutive reuse of the temporary bridge, is a method that would be the most economical.	Other	NOEI	Comment acknowledged.	9/14/15

* Categories: Archaeological, Historic, Cultural, Architectural, Traffic, Aesthetic, Environmental, Legislative, Other
 ** Responsible Teams:
 ATA Austin Tsutsumi & Associates, Inc.
 CSH Cultural Surveys of Hawaii
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 HDOT Hawaii Department of Transportation
 MH Munekeyo Hiraga
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Note: Italicized verbiage are responses provided by the presenters at each meeting. Verbiage noted in regular red text are responses/actions developed after further evaluation of bridge sites and preliminary recommendations were formulated.

Hana Highway, Route 360 Bridge Preservation Plan within the Hana Highway Historic District

ISSUES MANAGEMENT MATRIX

Third Cycle of Community Meetings (July to September 2015)

No.	Person	Issue Description	Category*	Responsible Team**	Action/Response	Date Answered
3(m)	W. Mardfin	On his previously submitted Errors list, he noted that the facts presented by the team does clarify the locations of Puakaa Bridge and Waiohue Bridge near Puakaa Park. He recommends using the bridge name Puakaa versus Puakaa but acknowledged that Kepa Maly could verify the spellings. He also pointed out that the recently done structure at Holoinawawae stream is not named.	Historical	NOEI	C. Aihara showed W. Mardfin a picture of the outside of the mauka bridge parapet.	9/14/15
3(n)	J. Blumer - Buell	Expressed concern that the FALLING ROCK signs present more of a liability to HDOT and suggested using DRIVE SLOWLY WATCH FOR ROCKS instead.	Traffic	HDOT	Suggestion acknowledged.	9/14/15
3(o)	W. Mardfin	Clarified that the other 1,400 pages of the report that the committee members have not specifically discussed does not imply that the members are in full agreement with the plan. HAC wants to retain the rights on any individual situation that will come back before the committee to be able to address it in the future.	Other	NOEI, FAI	T. Moy acknowledged this comment as one of the reason why the construction projects will need to undergo consultations with the community, which will address HAC's concern.	9/14/15

* Categories: Archaeological, Historic, Cultural, Architectural, Traffic, Aesthetic, Environmental, Legislative, Other
 ** Responsible Teams: ATA Austin Tsutsumi & Associates, Inc. MH Munekeyo Hiraga
 CSH Cultural Surveys of Hawaii NOEI Nagamine Okawa Engineers, Inc.
 FAI Fung Associates Inc. RNSH Ronald N.S. Ho & Associates, Inc.
 HDOT Hawaii Department of Transportation
 Note: Italicized verbiage are responses provided by the presenters at each meeting. Verbiage noted in regular red text are responses/actions developed after further evaluation of bridge sites and preliminary recommendations were formulated.

APPENDIX 9

ADDENDUM

ADDENDUM

The *Hana Highway Bridge Preservation Plan* (2015) final draft was submitted to all meeting participants and governmental review agencies on October 5, 2015 for a final 30-day review and comment period. No comments were received by the team at the time of the comments closing period.

Comments received by stakeholders and interested parties following the submittal and review period are included in this section.

This Addendum should be considered an integral part of the *Hana Highway Bridge Preservation Plan* (2015) and additional comments provided by stakeholders should be referenced and integrated into future bridge projects where applicable and feasible.

DAVID Y. IGE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
FIRST DEPUTY

JEFFREY T. PEARSON
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT

ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAOLOAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

November 18, 2015

LOG: 2015.02616
DOC: 1511JLP07

Paul Santo
Department of Transportation
Highways Division
Design Branch
869 Punchbowl Street
Honolulu, Hawaii 96813-5067

RE: Section: Section 106 Cultural Resources Management and Chapter 6E-8 Historic Preservation Review
Agency: Federal Highways Administration (FHWA)
Report Name: Preservation Plan Project for State Bridges within the Hana Belt Road Historic District
Location: multiple

Aloha Mr. Santo,

Thank you for the opportunity to review the Preservation Plan Project for State Bridges within the Hana Belt Road Historic District (Preservation Plan) received by the Hawai'i State Historic Preservation Division (SHPD) on July 7, 2015. The Hawai'i State Historic Preservation Division (SHPD) has reviewed the Preservation Plan and determined that the scope of work is consistent with recommendations from SHPD during consultation meetings. SHPD has the following questions:

- Approach walls are intended to receive new natural rock façade. Can the existing rock be salvaged and reused for the construction of the new approach walls? Can salvage and reuse of existing materials be added as a preferred alternative? If salvage of existing materials is not possible, can the TL-3 Stone Masonry Wall Application serve as the approved alternative?
- Can the preferred alternative for all new abutments be salvage and reuse of existing CRM rocks? It appears within the Preservation Plan that there may be abutments identified for replacement that are currently constructed using CRM rock but salvage of the rock for reuse as a façade treatment has not been identified.
- A number of bridges that exceed the 16'-0" requirement for single lane bridges have been identified for replacement. SHPD is concerned with the overall number of bridges identified for replacement and the effect replacement of these bridges may have on the integrity of the Hana Highway Historic District. Is it possible for any additional bridges that exceed the 16'-0" single lane bridge requirement be preserved and brought up to current load bearing and crash test safety requirements without replacing the existing bridge? Are there any addition exemptions for bridge width that can be applied for bridges that will not meet the 16'-0" single lane bridge requirement once safety upgrades have been made to bridges that have been identified for replacement?

The FHWA and HDOT are the offices of record for this undertaking. You are therefore asked to maintain a copy of this letter with your environmental review record for this undertaking. If you have any questions or if the scope of work changes in any way, please contact Jessica Puff, Architectural Historian, at (808) 692-8023 or by email at jessica.l.puff@hawaii.gov.

Mahalo,

A handwritten signature in black ink, appearing to read "Alan Downer", is written over a horizontal line.

Dr. Alan Downer
Deputy State Historic Preservation Officer

DAVID Y. IGE
GOVERNOR



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

FORD N. FUCHIGAMI
DIRECTOR

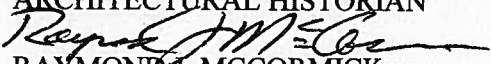
Deputy Directors
JADE T. BUTAY
ROSS M. HIGASHI
EDWIN H. SNIFFEN
DARRELL T. YOUNG

IN REPLY REFER TO:
HWY-DB 2.1008

December 8, 2015

TO: ALAN S. DOWNER, PH.D.
ADMINISTRATOR AND DEPUTY STATE HISTORIC PRESERVATION OFFICER
STATE HISTORIC PRESERVATION DIVISION

ATTN: JESSICA PUFF
ARCHITECTURAL HISTORIAN

FROM: 
RAYMOND J. MCCORMICK
HIGHWAYS ADMINISTRATOR

SUBJECT: PRESERVATION PLAN PROJECT FOR STATE BRIDGES WITHIN THE
HANA BELT ROAD HISTORIC DISTRICT

Thank you for your letter dated November 18, 2015, in response to our request for your review of the subject project report. The following are our responses to your questions:

1. *Approach walls are intended to receive new natural rock facade. Can the existing rock be salvaged and reused for the construction of the new approach walls? Can salvage and reuse of existing materials be added as a preferred alternative? If salvage of existing materials is not possible, can the TL-3 Stone Masonry Wall Application serve as the approved alternative?*

Response: Existing approach walls to the bridges are in varying degrees of condition and material integrity. The team identified examples of exemplary historic craftsmanship and existing condition at the approach walls to four bridges – these are: #19 Kopiliula Stream Bridge, #38 Heleleikeoha Stream Bridge, #39 Ulaino Stream Bridge, and #40 Mokulehua Stream Bridge. At these locations, it is recommended that the existing Cement Rubble Masonry (CRM) configuration be carefully documented, recorded, and disassembled for later re-use in reconstructing the facades.

For remainder approach walls, it is preferred to salvage and reuse materials if possible. However, in the event that it may not be cost effective nor feasible to re-use the CRM rocks, we have recommended that the appearance of the reconstructed CRM façades shall closely match that of the original historic craftsmanship along Hana Highway, using the above noted examples as a reference. It is recommended that new approach walls be constructed with tight joints, minimal exposed mortar, and varied rock sizes for a natural, rustic appearance.

The TL-2 stone masonry guardwall was selected as a preferred alternative because it allows the CRM to be used in reconstruction to create a very similar, rustic aesthetic that helps define the character of the historic district, and also allows for the addition of the bridge name detail (see Chapter 5 of the report), which was the foremost concern received during community consultation.

2. *Can the preferred alternative for all new abutments be salvage and reuse of existing CRM rocks? It appears within the Preservation Plan that there may be abutments identified for replacement that are currently constructed using CRM rock but salvage of the rock for reuse as a façade treatment has not been identified.*

Response: Similarly, bridges that were identified as having exemplary abutments are recommended to have thorough documentation, disassembly, and reconstruction of the CRM rocks.

For remainder CRM abutments, it is preferred to salvage and reuse materials if possible. However, in the event that it may not be cost effective nor feasible to re-use the CRM rocks, we have recommended that the appearance of the reconstructed CRM façades shall closely match that of the original historic craftsmanship along Hana Highway.

Where simple concrete abutments exist and require structural upgrades, it is recommended that they be replaced in-kind.

3. *A number of bridges that exceed the 16'-0" requirement for single-lane bridges have been identified for replacement. State Historic Preservation Division (SHPD) is concerned with the overall number of bridges identified for replacement and the effect replacement of these bridges may have on the integrity of the Hana Highway Historic District. Is it possible for any additional bridges that exceed the 16'-0" single-lane bridge requirement be preserved and brought up to current load bearing and crash-test safety requirements without replacing the existing bridge? Are there any additional exemptions for bridge width that can be applied for bridges that will not meet the 16'-0" single-lane bridge requirement once safety upgrades have been made to bridges that have been identified for replacement?*

Response: There are several single-lane bridges that do not meet the 16'-0" minimum width criteria. However, only one bridge #11 Honomanu is undergoing significant work that would qualify as replacement, due to the fact that the structural condition of the deck and superstructure cannot be confirmed, and the existing bridge deck and girders are structurally deficient.

Since all the bridges do not meet crash-testing, a 19'-0" to 20'-0" total width for a single-lane bridge is required to put the interior crash-tested railings, including necessary deflection spacing. As we had discussed at the meetings, and through community input, the team solution was to keep these bridges close to 16 feet wide at their current width,

rather than widen them to put the crash-tested railing. This occurs at 24 bridges. Many in the community agreed that replacement of the railings was a better solution than widening, replacing one side, adding a guardrail, etc.

Also, the team had developed the exceptional bridge list throughout the process of meetings with various groups. Within this list, three bridges are getting width exemptions: #05 Makanali Stream Bridge, #16 Waikani Stream Bridge, and #19 Kopiliula Stream Bridge. Of the 17 exceptional bridges identified, it is recommended that historic railings are kept at all bridges, though five solid parapet bridges will need to be widened and a new crash-tested railing be added at the original railing.

Additionally, there are four bridges that are currently *categorized* as a two-lane bridge, but are being *utilized* as a one-lane bridge. In order to retain the historic railings, it was recommended that these bridges be reclassified as one-lane bridges, thus avoiding the need for railing replacement. These bridges are: #02 Kailua Stream Bridge, #03 Naililihaele Stream Bridge, #13 Piinaau Stream Bridge, and #20 Puaakaa Stream Bridge.

Should you have any questions, please call Paul Santo at (808) 692-7611 or email Paul.Santo@hawaii.gov, Bridge Design Section, Design Branch, Highways Division.

APPENDIX 10

Hawaiian Place
Names Research

PREFACE

As identified in Section A, Chapter 6. ii. *Programmatic Agreement* and Section A, Chapter 6. viii. *Signage: Hawaiian Bridge Names*, all Hawaiian bridge names shall be verified through additional scholarly research and community input, and confirmed to be consistent with HDOT signage policy prior to application at individual bridges. Each bridge name shall be verified through a process to be determined during future development of a PA between the ACHP, SHPD, FHWA, and HDOT, including other concurring parties. A number of discussions were held on this subject during the course of the project; preliminary research is presented here as a reference starting point for future projects and should be confirmed through additional sources.

Hawaiian Place Names Research

	MP	Bridge/Stream	Hawaiian Name	Year	Ahupuaa	Possible Meanings - to be confirmed		
						Hawaii Heritage Center Report (1990)	Team Research 1	Team Research 2
1.00	5.09	Hoalua Stream Bridge		1929	West Hanawana and Hanehoi	(---)	(---)	Bay, fishing site, landing
2	5.86	Kailua Stream Bridge		1929	Puuomaile and Papaaea	"Kai-lua" means 'two streams'	"Two seas"	Lit., two seas/currents
3	6.22	Naililihaele Stream Bridge	Nā'ilī'iilihā'eie	1930	Papaaea and Papaaea Nui	"Na-ili'iili'haele" means 'to do a pebble dance'	"Traveling pebbles"	Lit., walking pebbles
4	7.94	Oopuola Stream Bridge	O'opuola	1925	East Makaiwa and West Makaiwa	"O'o-pu-ola" means 'life maturing'	"Live mud fish" ?	A stroke in lua fighting, Lit., alive
5	8.24	Makanali Stream Bridge	Makanali	1928	East Makaiwa	"Ma-ka-na-le" means 'bright vision'	(---)	(---)
6	8.57	Kaaiea Stream Bridge	Ka'aiea	1928	East Makaiwa and Mooloa	(---)	Aiea = (Nothocestrum) tree	Lit., Nothocestrum tree (hardwood species)
7	9.88	Waikamoi Stream Bridge	Waikamoi	1911	Kolea	"Wai-aka-mo'i" means 'waters of the kings'	"Water of the (moi) taro" or "Water acquired by the threadfish"	Lit., water of the moi taro
8	10.97	Puohokamoa Stream Bridge	Puohokamoa	1912	Kolea and Loiloa	"Pu-oho-ka-moa" means 'sudden awakening'	"The chicken awakes or is startled"	Lit., the fowl was startled
9	11.44	Haipua'ena Stream Bridge	Haipua'ena	1912	Keopuka	"Hai-pue-na" means 'glowing hearts'	(---)	Lit., broken wildflower
10	13.16	Kolea (Punalau Stream) Bridge	Kōlea	1911	Honomanu	"Puna-lau" means 'many springs'	(---)	Lit., plover
11	13.71	Honomanu Stream Bridge	Honomanū	1911	Honomanu	"Hono-manu" means 'bird valley'	(---)	Lit., shoulders puffed with fatness
12	15.39	Nuaailua Stream Bridge	Nua'ailua	1911	Kearae and Honomanu	"Nu'a-'ailua" means 'large abundance'	(---)	Stream and point in Ke'anae quadrant
13	16.60	Piinaau Stream Bridge (Pi-na-aa is correct name of stream? Verify)	Pi'ina'au	1916	Kearae	"Pi-na-aa" means 'kind-hearted'	(---)	(---)

Hawaiian Place Names Research

	MP	Bridge/Stream	Hawaiian Name	Year	Ahupuaa	Possible Meanings - to be confirmed		
						<i>Hawaii Heritage Center Report (1990)</i>	<i>Team Research 1</i>	<i>Team Research 2</i>
14	16.77	Palauhulu Stream Bridge	Palauhulu	1916	Keanae and Pahoa	"Pa-lauhulu" means 'leaf sheltered'	"To take all of a fish catch for a chief instead of dividing it" Stream begins at junction of Hauoi Wahine Stream to Kano Stream, joins Piinau Stream to Keanae Stream	Banana leaf enclosure
15	18.07	Waiokamilo Stream Bridge	Waiokamilo	1921	Pauwalu and Wailuanui	"Wai-o-ka-milo" means 'whirling waters'	"Water of the milo tree" Flows to sea	Lit., Kamilo's water
16	19.39	Waikani Stream Bridge	Waikani	1926	Wailuanui	"Waikani" means 'sounding water'	(---)	Lit., sound of the water
17	20.83	West Wailuaiki Stream Bridge	West Wailuaiki	1937	Wailua Nui and Wailua Iki	"Wai-lua-iki" means 'diminishing waters'	"Small wailua (two waters)" Flows to Wailuaiki Bay	Little Wailua (Wailua = Lit., spirit or ghost)
18	21.30	East Wailuaiki Stream Bridge	East Wailuaiki	1926	Wailua Iki and Kaliae	"Wai-lua-iki" means 'diminishing waters'	"Small wailua (two waters)" Flows to Wailuaiki Bay	Little Wailua (Wailua = Lit., spirit or ghost)
19	21.81	Kopiliula Stream Bridge	Kopili'ula	1926	Kaliae and Kekuapawela	"Ko-pi-li-ula" means 'sacred ceremony'	"Thin, red tapa made of mulberry bark" Between Kaliae and Kekuapawela	A red birth gift
20	22.31	Puakaa Stream Bridge	Pua'aka'a	1926	Kekuapawela and Waiohue	"Pu'a-aka-a" means 'open laughter'	"Rolling pig" Joins Kopiliula Stream. Between Kekuapawela and Waiohue	Lit., rolling pig
21	22.47	Waiohue Stream Bridge	Waiohue	1937	Waiohue and Nakapehu	"Wai-o-hu-e" means 'deceptive waters'	(---)	Water of Hue
22	22.95	Waiohuo'lua Stream Br. (Unknown Stream #1)		1920	Puakea	(---)	(---)	(---)
23	23.00	Unknown Stream #2		1920	Puakea	(---)	(---)	(---)
24	23.01	Unknown Stream #3 (Paakea)		1920	Puakea and Paakea	(---)	Pa'akea = "coral bed/ limestone"	(---)

Hawaiian Place Names Research

	MP	Bridge/Stream	Hawaiian Name	Year	Ahupuaa	Possible Meanings - to be confirmed		
						Hawaii Heritage Center Report (1990)	Team Research 1	Team Research 2
25	23.39	Kapaula	Kapā'ūla	1926	Kapaula and Puuhaehae	"Ka-pa-'ūla" means 'to hold- secret ' sacred'	"Red enclosure, red kapa (bark cloth)" Flows to sea.	<i>Lit.</i> , the red enclosure
26	23.99	Hanawi	Hanawī	1926	Hopenui	"Hana-wi" means 'whistling wind'	(---)	<i>Lit.</i> , seeking freshwater shellfish
27	24.16	East Hanawi	East Hanawī	1926	Hopenui	"Hana-wi" means 'whistling wind'	(---)	<i>Lit.</i> , the red enclosure [East]
28	24.98	Makapipi	Makapipi	1926	Honolulu Iki and Makapipi	"Ma-ka-pi-pi" means 'desire for blessings'	(---)	<i>Lit.</i> , sprinkled eyes
29	25.20	Kuhiwa Stream Bridge	Kūhiwa	1926	Makapipi and Kuhiwa	"Ku-hiwa" means 'precious love'	"A special taboo made by a chief" Flows to sea	Special taboo made by a chief
30	25.42	Kupukoi	Kupukoi	1926	Kuhiwa	"Ku-pu-koi" means 'claiming tribute'	(---)	(---)
31	25.95	(Unnamed Bridge) Kahalaowaka Stream	Kahalaowaka	1926	Waiahole and Maino	(---)	(---)	(---)
32	26.48	Pupape-Manawaikae Stream Bridge	Pupape	1926	Maino and Puupaipala	"Pu-a-pa-pe" means 'baptismal'	(---)	(---)
33	26.60	Kahawaihapapa Stream Bridge	Kahawaihapapa	1922	Puupaipala and Keaa	"Ka-ha-wai-ha-pa-pa" means 'extensive valley'	"Shallow stream"	Shallow aqueduct
34	26.77	Keaaiiki Stream Bridge	Kea 'āiki	1921	Keaa	"Ke-a-a-iki" means 'burning star (Sirius)'	"Small Keaa" ?	Small Kea'ā (<i>Lit.</i> , the scoria lava)
35	26.94	West Waioni Stream Bridge	West Waioni	1920	Keaa	"Wai-oni" means 'ruffled waters'	(---)	Waioni = moving water
36	27.01	Waioni Stream Bridge	Waioni	1920	Keaa	"Wai-oni" means 'ruffled waters'	(---)	Moving water
37	27.76	Lanikele Stream Bridge	Lanikele	1917	Heleleikeoho and Ulaino	"Lani-ke-le" means 'heavenly mist'	(---)	Watery heaven or watery sky
38	27.92	Heleleikeoha Stream Bridge	Helele'ike'ōhā	1917	Ulaino	"He-le-le-i-ke-o-ha" means 'extending sorrow'	"The taro sprout falls"	<i>Lit.</i> , to become a garland of spreading vines or roots
39	27.98	Ulaino Stream Bridge	Ula'ino	1914	Ulaino	"Ula-i-no" means 'intense sorrow'	"Stormy red"	<i>Lit.</i> , red sin or red evil
40	28.31	Mokulehua Stream Bridge	Mokulehua	1908	Ulaino and Makapuu	"Moku-lehua" means 'solemn feast'	(---)	Solemn feast after the cutting (moku) of an 'ōhi'a log for a temple image; or cluster of lehua trees

Hawaiian Place Names Research

	MP	Bridge/Stream	Hawaiian Name	Year	Ahupuaa	Possible Meanings - to be confirmed		
					Hana Highways Bridge Preservation Plan (2015)	Hawaii Heritage Center Report (1990)	Team Research 1	Team Research 2
41	29.18	Oilowai Stream Bridge		1914	West Honomaele	"O-i-lo-wai" means 'first sprouting'	"Seedling/Sprout/Young"	Lit., seedling water
42	29.54	Honomaele Stream Bridge	Honomā'ele	1924	West Honomaele and East Honomaele	"Hono-ma-'e-le" means 'land of deep love'	"Numb bay" Flows to sea	Lit., numb bay
43	33.44	Kawaipapa Stream Bridge	Kawaipapa	1947	Kawaipapa	(---)	"The stratum stream" Flows to Hana Bay	Lit., the shallow water or the stratum stream

Hana Highway Bridge Discrepancies Potential Name Corrections/Changes

General Notes:

- Based on geographical research, it is recommended that where a bridge crosses a gulch instead of a named stream, the bridge be renamed to “_____ Gulch Bridge” in the HDOT database, consistent with the HDOT convention of naming a bridge based on its feature crossed.
- Refer to final pages of individual Bridge Chapters for historic drawings, where available.
- Bridge name should be determined pending historic and geographical research in addition to confirming the stream names at each location.

Br #	Current Name (HDOT Inventory Database)	Discussion	Team Recommendation	Reason
10	Kolea (Punalau Stream) Bridge	<p>*note: Bridge name is typically the stream name, which is the feature crossed</p> <ul style="list-style-type: none"> Spans Punalau Stream Kolea defined as “plover. Land section, Koolau, Maui” Kolea Ahupuaa is named for the endemic plant, <i>Kolea lau lili</i>, found in East Maui Punalau defined as “many springs” 	Retain current bridge name pending further research.	The reason for this bridge having two different names is unknown at this time.
16	Waikani Stream Bridge	<ul style="list-style-type: none"> Spans Wailua Nui Stream Near Waikani Falls, at the head of Wailuanui Valley 	Rename to “ Waikani Bridge ” in HDOT database.	The bridge is one of the most recognizable bridges on this route, and it is widely known by the name Waikani. Unless experts disagree, it is recommended to retain the name “Waikani ” but take out the “Stream” since the feature crossed is Wailua Nui Stream.
20	Pua[a]kaa Stream Bridge	<ul style="list-style-type: none"> Based on community comments and geographical research, the team added an ‘a’ for correct spelling within the Hana Highway Bridge Preservation Plan HDOT database shows “Pua`a Ka`a Stream Bridge,” with two words and okinas 	<p>Rename to “Puaakaa Stream Bridge” in HDOT database.</p> <p>Pending further Hawaiian language research, it may be determined if “Puaa Kaa Stream Bridge” is appropriate or preferred.</p>	“Puaakaa Stream Bridge” correlates with additional geographical and historical sources.

Hana Highway Bridge Discrepancies Potential Name Corrections/Changes

22	Unnamed Stream #1 (Waiohuolua)	<ul style="list-style-type: none"> The historic drawing labels this bridge as “Puakea (West)” Bridge The bridge spans an unnamed stream in Puakea Ahupuaa There is no geographic evidence for Waiohuolua, and no definition could be located for the Hawaiian word <i>waiohuolua</i> 	Rename to “Puakea (West) Bridge” in HDOT database. Additional research is necessary to determine the origin of the word <i>waiohuolua</i> .	Bridge title on historic drawing, c. 1912.
23	Unnamed Stream #2	<ul style="list-style-type: none"> The historic drawing labels this bridge as “Puakea” Bridge The bridge spans an unnamed stream, which is a branch of the Puakea Gulch, within Puakea Ahupuaa 	Rename to “Puakea Bridge” in HDOT database. Pending further geographical and expert research, it may be determined if “Puakea Gulch Bridge” is appropriate or preferred.	Bridge title on historic drawing, c. 1912.
24	Unnamed Stream No. 3 (Paakea) Bridge	<ul style="list-style-type: none"> The historic drawing labels this bridge as “Puakea (East)” Bridge; however, this appears to be incorrect based on further research Bridge spans Paakea Gulch, which divides Puakea Ahupuaa and Paakea Ahupuaa 	Rename to “Paakea Gulch Bridge” in HDOT database.	Geographic research indicates the bridge spans Paakea Gulch; name change is recommended for consistency with HDOT naming conventions.
25	Kapaula Stream Bridge	<ul style="list-style-type: none"> Bridge spans Kapaula Gulch 	Rename to “Kapaula Gulch Bridge” in HDOT database.	Geographic research indicates the bridge spans Kapaula Gulch; name change is recommended for consistency with HDOT naming conventions.

Hana Highway Bridge Discrepancies Potential Name Corrections/Changes

31	Kahalaowaka Stream Bridge	<ul style="list-style-type: none"> The historic drawing labels this bridge as “Kahalaowaka” Bridge Bridge spans Kalepalehua Gulch No translation of the Hawaiian word <i>kahalaowaka</i> could be determined at this time 	<p>Rename to “Kahalaowaka Bridge” in HDOT database.</p> <p><i>Alternative Option:</i> Rename to “Kalepalehua Gulch Bridge” in HDOT database.</p> <p>Additional research is necessary to determine the origin of the word <i>kahalaowaka</i>. Additional research is recommended to identify the stream name at this location within the Kalepalehua Gulch.</p>	<p>Historic drawing, c. 1925.</p> <p><i>Alternative Option Reasoning:</i> Geographic research indicates the bridge spans Kalepalehua Gulch; name change may be recommended for consistency with HDOT naming conventions.</p>
32	Pupape Stream Bridge	<ul style="list-style-type: none"> Spans Manawaikeae Stream No translation of the Hawaiian word <i>pupape</i> could be determined at this time 	<p>Retain current bridge name pending further research.</p> <p><i>Alternative Option:</i> Rename to “Manawaikeae Stream Bridge” in HDOT database.</p> <p>Additional research is necessary to determine the origin of the word <i>pupape</i>.</p>	<p>Historic drawing, c. 1924.</p> <p><i>Alternative Option Reasoning:</i> Geographic research indicates the bridge spans Manawaikeae Stream; name change may be recommended for consistency with HDOT naming conventions.</p>

Hana Highway Bridge Discrepancies Potential Name Corrections/Changes

37	Lanikele Stream Bridge	<ul style="list-style-type: none"> Bridge spans Heleleikeoho Stream The historic drawing labels this bridge as “Heleleikeoho” Bridge 	<p>Retain current bridge name pending further research.</p> <p><i>Alternative Option:</i> Rename to “Heleleikeoho Stream Bridge” in HDOT database.</p> <p>Additional research is necessary to determine the discrepancy of <i>Heleleikeoho</i> vs. <i>Heleleikeoha</i>.</p>	<p><i>Alternative Option Reasoning:</i> Geographic research indicates the bridge spans Heleleikeoho Stream; name change may be recommended for consistency with HDOT naming conventions.</p>
38	Heleleikeoha Stream Bridge	<ul style="list-style-type: none"> Bridge spans Kakamalaole Stream 	<p>Retain current bridge name pending further research.</p> <p><i>Alternative Option:</i> Rename to “Kakamalaole Stream Bridge” in HDOT database.</p>	<p><i>Alternative Option Reasoning:</i> Geographic research indicates the bridge spans Kakamalaole Stream; name change may be recommended for consistency with HDOT naming conventions.</p>
40	Mokulehua Stream Bridge	<ul style="list-style-type: none"> Bridge spans Mokulehua Gulch 	<p>Rename to “Mokulehua Gulch Bridge” in HDOT database.</p>	<p>Geographic research indicates the bridge spans Mokulehua Gulch; name change is recommended for consistency with HDOT naming conventions.</p>
41	Oilowai Stream Bridge	<ul style="list-style-type: none"> Bridge spans Oilowai Gulch 	<p>Rename to “Oilowai Gulch Bridge” in HDOT database.</p>	<p>Geographic research indicates the bridge spans Oilowai Gulch; name change is recommended for consistency with HDOT naming conventions.</p>

Hana Highway Bridge Discrepancies Potential Name Corrections/Changes

42	Honomaele Steam Bridge	<ul style="list-style-type: none"> Bridge spans Honomaele Gulch 	Rename to “ Honomaele Gulch Bridge ” in HDOT database.	Geographic research indicates the bridge spans Honomaele Gulch; name change is recommended for consistency with HDOT naming conventions.
43	Kawaipapa Stream Bridge	<ul style="list-style-type: none"> Bridge spans Kawaipapa Gulch 	Rename to “ Kawaipapa Gulch Bridge ” in HDOT database.	Geographic research indicates the bridge spans Kawaipapa Gulch; name change is recommended for consistency with HDOT naming conventions.

APPENDIX 11

Glossary

GLOSSARY

Abutment – Part of bridge substructure at either end of the bridge which transfers loads from superstructure to foundation and provides lateral support for the approach roadway embankment.

Ahupuaa – Land section, usually extending from the uplands to the sea.

Akeake – Hawaiian mythological hero who defeats a shark-man at Wailua, Pauwalu.

Ala – Round or oval, as a smooth stone.

Ala Loa – “Long road.”

Alteration – An act or process that changes any portion of the physical appearance of a structure or object, including but not limited to construction, reconstruction, or removal of a feature or design of the structure or object.

Approach Roadway Alignment – Item identifies those bridges which do not function properly or adequately due to the alignment of the approaches. The basic criteria is how the alignment of the roadway approaches to the bridge relate to the general highway alignment for the section of highway the bridge is on.

Approach Wall – A wall that is visible above the roadway immediately before and after the bridge structure.

Apron – A reinforced concrete slab placed on the approach embankment adjacent to and usually resting upon the abutment backwall; the function of the approach slab is to carry wheel loads on the approaches directly to the abutment, thereby transitioning any approach roadway misalignment due to approach embankment settlement.

Auwai – Ditch, canal.

Bent – A substructure unit made up of two or more column or column-like members connected at their topmost ends by a cap, strut, or other member holding them in their correct positions.

Box Culvert – A culvert of rectangular or square cross-section.

Bridge – A structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet between undercopings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening.

Bridge Inspector’s Reference Manual (BIRM) – A comprehensive FHWA manual on programs, procedures and techniques for inspecting and evaluating a variety of in-service highway bridges.

Cantilever – A structural member that has a free end projecting beyond a support, length of span overhanging the support.

Certified Local Government (CLG) – A certified local government is a local government (e.g., a City or County) officially certified to carry out some of the purposes of the National Historic Preservation Act, as amended. CLGs are granted authority for reviewing various cultural resources projects which might otherwise require federal review. In addition, CLGs may receive special grants for cultural resources activities.

Clear Span – The unobstructed space or distance between support elements of a bridge or bridge member.

Concrete Deck Bridge – A concrete bridge in which the supporting members are all beneath the roadway.

Concrete Rubble Masonry – See *Rubble Masonry*.

Concrete Slab Bridge – A bridge having a superstructure composed of a reinforced concrete slab constructed either as a single unit or as a series of narrow slabs placed parallel with the roadway alignment and spanning the space between the supporting substructure units.

Concrete Tee Beam – “T” shaped section of reinforced concrete; cast-in-place monolithic deck and beam system.

Condition Rating – A judgment of a bridge component condition in comparison to its original as-built condition. Deck, superstructure, and substructure elements are assigned a descriptive condition rating of “good,” “fair,” “poor,” or “critical” based on the physical deficiencies found on the individual element. The following guidelines are used in establishing an element’s condition rating:

- Good* – Element is limited to only minor problems,
- Fair* – Structural capacity of element is not affected by minor deterioration, section loss, spalling, cracking, or other deficiency,
- Poor* – Structural capacity of element is affected or jeopardized by advanced deterioration, section loss, spalling, cracking, or other deficiency, and
- Critical* – Major deterioration or section loss present in critical structural components, or obvious vertical or horizontal movement affecting structure stability.

Continuous Bridge – A bridge designed to extend without joints over one or more interior supports.

Contributing – A contributing building, site, structure, or object adds to the historic associations, architectural qualities, or archaeological values for which a property is significant.

Crack – A break without complete separation of parts; a fissure.

Culvert – A drainage structure beneath an embankment (e.g., corrugated metal pipe, concrete box culvert).

Curb-to-Curb – Minimum distance between curbs or rails on the structure roadway.

Cutwater – A wedge-shaped projection on the pier of a bridge, which divides the flow of water and prevents debris from becoming trapped against the pier.

Dead Load – A static load due to the weight of the structure itself.

Deck – The portion of a bridge which provides direct support for vehicular and pedestrian traffic, supported by a superstructure.

Deck Geometry – Reflect the width of the bridge, the minimum vertical clearance over the bridge, the ADT, the number of lanes carried by the structure, whether two-way or one-way traffic is serviced, and the functional classification of the structure. Deck geometry rating is based in part on the difference between the actual width of the structure and the current design standard for the width of the structure with the same characteristics as the bridge being rated.

Delamination – Surface separation of concrete into layers.

Design Load – The force for which a structure is designed; the most severe combination of loads.

Ea – An infection.

Efflorescence – A deposit on concrete or brick caused by crystallization of carbonates brought to the surface by moisture in the masonry or concrete.

Functionally Obsolete – A bridge that has deck geometry, load carrying capacity, clearance or approach roadway alignment that no longer meets the criteria for the system of which the bridge is a part.

Guardrail – A safety feature element intended to re-direct an errant vehicle.

Guniting – The process of blowing Portland cement mortar or concrete onto a surface using compressed air.

Historic American Engineering Record (HAER) – A nationwide documentation program producing a permanent collection of architectural, engineering and landscape documentation at the Library of Congress consisting of measured and interpretive drawings, large-format black and white and color photographs, written historical and descriptive data, and original field notes.

Headwall – A concrete structure at the ends of a culvert to retain the embankment slopes, anchor the culvert, and prevent undercutting.

Heiau – An ancient place of worship.

Hillside Bridge – A bridge with a portion of its roadway width on embankment and a portion of it cantilevered off the side of the embankment.

Historic District – A significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

In-Kind – Refers to the preferred type of repair or replacement of historic building material, whereby the new section is completed with the same type of material, design, dimensions, surface finish, texture, details, and overall appearance to match the item that was repaired/replaced and adjacent materials and components.

Integrity – Authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's historic or prehistoric period.

Inventory Rating – The capacity of a bridge to withstand loads under normal service conditions based on 55% of yield strength.

Ka wai ola – The waters of life.

Kahuna – Priest, sorcerer, master of an art.

Kahu – Honored attendant, guardian, caretaker.

Kaiwi o Pele – The Bones of Pele (a landmark).

Kalo – Taro.

Kapa – Bark cloth. See *Tapa*.

Kapu – Taboo, prohibition. See *Tapu*.

Kauila – A species of hard reddish wood.

Kino lau – Many forms taken by a supernatural body.

Koa ia – Fishing shrine.

Live Load – A temporary dynamic load such as a vehicular traffic that is applied to a structure; also accompanied by vibration or movement affecting its intensity.

Load Rating – The determination of the live load carrying capacity of a bridge using bridge plans and supplemented by information gathered from a field inspection.

Loi – Irrigated terrace.

Loi Kalo – Irrigated terrace for taro.

Makai – A directional term indicating towards the ocean.

Mauka – A directional term indicating towards the mountains.

Mile Marker – A unit of measurement used in select context throughout this report, per measurement data provided in the National Register Nomination.

Mile Point – A unit of measurement based on HDOT straight-line map data; this is the typical unit of measurement used throughout the *Hana Highway Historic Bridge Preservation Plan* (2015) for accuracy in bridge and culvert locations consistent with measurements in the HDOT bridge database. It may also be known as the “Route Mile,” the actual distance from the start point of a route.

Mile Post – See *Mile Marker*.

Moku – District. *Lit.* to cut, break, divide in two.

Moolelo – Story, myth, history, tradition, or legend.

National Register of Historic Places – The official list of recognized properties of national, state and local significance in American history, architecture, archeology, engineering, and culture, maintained and expanded by the National Park Service on behalf of the Secretary of the Interior.

Noio – Hawaiian noddy tern (*Anous tenuirostris melanogenys*).

Non-Contributing – A non-contributing building, site, structure, or object does not add to the historic associations, architectural qualities, or archaeological values for which a property is significant.

Operating Rating – The capacity of a bridge to withstand loads based on 75% of yield strength; the maximum permissible live load to which the structure may be subjected for the load configuration used in the rating.

Paaaoa – Latent childhood disease.

Parapet – A low solid wall along the outmost edge of the roadway of a roadway of a bridge to protect vehicles and pedestrians; i.e., a solid concrete parapet within the context of this report document.

Paries – Steep cliffs.

Period of Significance – The length of time when a property was associated with important events, activities, or persons, or attained the characteristics which qualify it for listing on the National Register of Historic Places.

Pier – A substructure unit that supports the spans of a multi-span superstructure at an intermediate location between its abutments.

Pier Cap – The topmost horizontal portion of a pier that distributes loads from the superstructure to the vertical pier elements.

Piko – The Hawaiian word for “belly-button.”

Preservation – Preservation places a premium on the retention of all historic fabric through conservation, maintenance and repair. It reflects a building's continuum over time, through successive occupancies, and the respectful changes and alterations that are made.

Prestressed Concrete – Concrete with strands, tendons, or bars that are stressed before the live load is applied.

Railing – A fence-like construction built at the outermost edge of the roadway or the sidewalk portion of a bridge to protect pedestrians and vehicles; i.e., an open-picket railing within the context of this report document.

Rehabilitation – The process of returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving those portions and features of the property that are significant to its historic, architectural, and cultural values. Rehabilitation emphasizes the retention and repair of historic materials, but more latitude is provided for replacement of individual components because it is assumed the property is more deteriorated prior to work. (Both Preservation and Rehabilitation standards focus attention on the preservation of those materials, features, finishes, spaces, and spatial relationships that, together, give a property its historic character.)

Reinforced Concrete – Concrete with steel reinforcing bars embedded in it to supply increased tensile strength and durability.

Restoration – Restoration focuses on the retention of materials from the most significant time in a property's history, while permitting the removal of materials from other periods.

Riprap – Stones, blocks of concrete, or other objects placed upon river and stream beds and banks, lake, tidal or other shores to prevent scour by water flow or wave action.

Rubble – Rough stones of irregular shapes and sizes; often used in rough, uncoursed work in the construction of walls, foundations, and paving.¹

Rubble Concrete – Any type of concrete in which large stones are placed. This type of concrete is most often used in constructing dams, lock walls, breakwaters, retaining walls, and bridge piers.²

Rubble Masonry – Stone masonry built of rubble. Undressed or roughly dressed stones are laid in a suitable mortar. Joints are not of uniform thickness. See *Rubble*.

Scour – Removal of a streambed or bank area by stream flow; erosion of streambed or bank material due to flowing water; often considered as being localized around piers and abutments of bridges.

Scour Critical – Scour critical bridges are bridges “with a foundation element that has been determined to be unstable for the observed or evaluated scour condition.”³

Secretary of the Interior's (SOI) Standards for the Treatment of Historic Properties – Intended to promote responsible preservation practices that help protect our Nation's irreplaceable cultural resources.

Significance – Historic significance is the importance of a property to the history, architecture, archaeology, engineering, and/or culture of a community, State, or the nation.

Skewback – The inclined support at each end of an arch.

Slab Bridge – A bridge having a superstructure composed of a reinforce concrete slab constructed either as a single unit or as a series of narrow slabs placed parallel with the roadway alignment and spanning the space between the supporting substructure units.

Soffit – Underside of a bridge deck.

Spall – A surface depression in concrete caused by a separation of a portion of the surface concrete, revealing a fracture parallel with or slightly inclined to the surface.

Span – The distance between the supports of a beam; the distance between the faces of the substructure elements; the complete superstructure of a single span bridge or a corresponding integral unit of a multiple span structure.

Structural Stability – The ability of a structure to maintain its normal configuration, not collapse or tip in any way, under existing and expected loads.

Structurally Deficient – Bridges where 1) significant load carrying elements are found to be in poor or worse condition due to deterioration and/or damage or, 2) the adequacy of the waterway opening provided by the bridge is determined to be extremely insufficient to the point of causing intolerable traffic interruptions.

Structure Inventory & Appraisal (SI&A) Sheet – The graphic representation of the data recorded and stored for each NBI record in accordance with this Guide.

¹ Cyril M. Harris, *Illustrated Dictionary of Historic Architecture* (New York: Dover Publications, Inc.), 1977.

² James C. et al., *Cyclopedia of Architecture, Carpentry, and Building: A General Reference Work* (Brunauer Press), 2007.

³ U.S. Department of Transportation, Federal Highway Administration, Bridge Inspector's Reference Manual, BIRM vol. 1-2, publication no. FHWA-NHI-12-049 (Moon Township: Michael Baker, Jr., Inc., 2002, 2006, 2012).

Substructure – The abutments and piers built to support the span of a bridge superstructure.

Sufficiency Rating – A calculated numeric value used to indicate the sufficiency of a bridge to remain in service.

Superstructure – The entire portion of a bridge structure that primarily receives and supports traffic loads and in turn transfers these loads to the bridge substructure.

Tapa – Bark cloth. See *Kapa*.

Tapu – Taboo, prohibition. See *Kapu*.

Treatment – Treatment of an historic property refers to the course of action that is deemed most appropriate for the historic structure, site, or district. The SOI Standards for the Treatment of Historic

Properties are: Preservation, Rehabilitation, Restoration, and Reconstruction.

Undermining – The scouring away of stream and supporting foundation material from beneath the substructure footing.

Wahi pana – Legendary place.

Waterway Adequacy – Item appraises the waterway opening with respect to passage of flow through the bridge.

Wingwall – A retaining wall extension of an abutment intended to restrain and hold in place the side slope material of an approach roadway embankment.

Workmanship – Quality of integrity applying to the physical evidence of the crafts of a particular culture, people, or artisan.

Note: All structural terms are referenced from the following sources:

- 1) Bridge Inspection Reference Manual, Dec. 2012,
- 2) Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, Dec. 1995 with erratas, and
- 3) 2010 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance.

Note: All Hawaiian terms were defined using the following sources:

- 1) Ulukau: The Hawaiian Electronic Library, 2009 (<http://ulukau.org/>).

Note: All historic preservation terms are referenced from the following sources:

- 1) The Secretary of the Interior's Standards for the Treatment of Historic Properties, and
- 2) Guidelines for Completing National Register of Historic Places Forms, Part A: How to Complete the National Register Registration Form, U.S. Department of the Interior, National Park Service, 1977.

SECTION H

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“23 CFR §774 – Parks, Recreation Areas, Wildlife and Waterfowl Refuges, and Historic Sites (Section 4(f)).” United States Government Publishing Office, Code of Federal Regulations, United States of America. <http://www.gpo.gov/fdsys/pkg/CFR-2011-title23-vol1/pdf/CFR-2011-title23-vol1-part774.pdf> (accessed September 17, 2015).

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