JOSH GREEN, M.D.
GOVERNOR
KE KIAʻĀINA

EDWIN H. SNIFFEN
DIRECTOR
KA LUNA HOʻOKELE

Deputy Directors
Nā Hope Luna Hoʻokele
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

STATE OF HAWAIʻI | KA MOKUʻĀINA ʻO HAWAIʻI
DEPARTMENT OF TRANSPORTATION | KA ʻOIHANA ALAKAU
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:

HWY-DS 2.25406

December 18, 2023

TO: MARY ALICE EVANS, ACTING DIRECTOR
OFFICE OF PLANNING AND SUSTAINABLE DEVELOPMENT

FROM: EDWIN H. SNIFFEN
DIRECTOR OF TRANSPORTATION

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (DEA) FOR
HANA HIGHWAY BRIDGE IMPROVEMENTS PROJECT,
MAKAWAO AND HANA, ISLAND OF MAUI, HAWAII

The State of Hawaii Department of Transportation has reviewed the DEA for the Hana Highway Bridge Improvements project and anticipates a Finding of No Significant Impact determination for the proposed project on the island of Maui. Please publish a notice of availability for this project in the next available edition of *The Environmental Notice*.

Should you have any questions, please contact our Project Manager, Mr. Andrew Hirano, at (808) 692-7546, from our Design Branch, Technical Design Services Section or by email at andrew.j.hirano@hawaii.gov.

Enclosure

From: webmaster@hawaii.gov
To: DBEDT OPSD Environmental Review Program
Subject: New online submission for The Environmental Notice
Date: Monday, December 18, 2023 3:49:07 PM

Action Name

Hana Highway Bridge Improvements Project, Route 360, Island of Maui

Type of Document/Determination

Draft environmental assessment and anticipated finding of no significant impact (DEA-AFNSI)

HRS §343-5(a) Trigger(s)

- (1) Propose the use of state or county lands or the use of state or county funds
- (2) Propose any use within any land classified as a conservation district
- (4) Propose any use within any historic site as designated in the National Register or Hawai'i Register

Judicial district

Maui - multiple districts

Tax Map Key(s) (TMK(s))

(2) 2-9-012:041; (2) 2-9-010:001; (2) 2-9-014:001; (2) 2-9-013:015; (2) 1-1-001:036; (2) 1-1-001:042; (2) 1-1-001:054; (2) 1-1-001:022; (2) 1-1-001:052; (2) 1-2-001:003; (2) 1-1-004:005; (2) 1-2-003:005; (2) 1-2-003:001; (2) 1-2-003:005; (2) 1-2-002:020; (2) 1-2-003:023; (2) 1-2-003:001; and Hana Highway right-of-way

Action type

Agency

Other required permits and approvals

Flood Development Permit; Special Management Area Use Permit; Grading, Grubbing, or Stockpiling Permit; NEPA; Section 4(f) of the USDOT Act, Clean Water Act Section 404 Permit, Section 401 Water Quality Certification, and National Pollutant Discharge Elimination System Permit; Section 7 of the ESA; Section 106 of the NHPA; HRS 6E-8 Review; CZM Federal Consistency Review; Disability and Communication Access Board Review; Community Noise Permit; Community Noise Variance; Stream Channel Alteration Permit; and Conservation District Use Permit

Proposing/determining agency

State of Hawaii Department of Transportation

Agency contact name

Andrew Hirano

Agency contact email (for info about the action)

Andrew.j.hirano@hawaii.gov

Email address or URL for receiving comments

tomasz.kubicz@dot.gov

Agency contact phone

(808) 692-7546

Agency address

601 Kamokila Blvd.
#688
Kapolei, Hawaii 96707
United States
Map It

Was this submittal prepared by a consultant?

Yes

Consultant

Federal Highway Administration, Central Federal Lands Highway Division

Consultant contact name

Tomasz Kubicz

Consultant contact email

Tomasz.kubicz@dot.gov

Consultant contact phone

(720) 963-3498

Consultant address

12300 West Dakota Avenue
Suite 380
Lakewood, Colorado 80228
United States
Map It

Action summary

he State of Hawaii Department of Transportation (HDOT) proposes to address existing structural deterioration and sub-standard structural conditions of six bridges on Hana Highway by improving them to be consistent with current standards and guidelines for load capacity, bridge railing and transitions, and seismic and scour standards. At five of the six bridge locations, Kailua Stream Bridge, Makanali Stream Bridge, Puohokamoa Stream Bridge, Ulaino Stream Bridge, and Mokulehua Stream Bridge, the proposed solution is to retain the existing substructure, including the character-defining abutments and piers, and provide a new single-span structure that spans over the existing supports. The concrete superstructures would be designed to match the existing historic features best while also meeting project design criteria. The proposed solution at Kopiliula Stream Bridge is to completely retain the existing bridge and construct a new, off-alignment bridge makai (oceanward) of the existing.

Reasons supporting determination

See Chapter 6 of the Draft EA

Attached documents (signed agency letter & EA/EIS)

- RUSH-HWY-DS-2.25406-Draft-EA-for-Hana-Bridges-part-2-signed.pdf
- RUSH-HWY-DS-2.25406-Draft-EA-for-Hana-Bridges-part-1-signed.pdf
- Draft-EA-Hana-Hwy-Bridges_Volume2_Appendices-reduced.pdf

Action location map

- Hana-Highway-Bridges-Project-Map.zip

Authorized individual

Gregory Badon

Authorization

- The above named authorized individual hereby certifies that he/she has the authority to make this submission.

DRAFT ENVIRONMENTAL ASSESSMENT

Hana Highway Bridge Improvements Project, Route 360, Island of Maui, Hawaii

Submitted Pursuant to Hawaii Revised Statues, Chapter 343

State of Hawaii, Department of Transportation
Highways
869 Punchbowl Street
Honolulu, HI 96813

December 2023

DRAFT ENVIRONMENTAL ASSESSMENT

Hana Highway Bridge Improvements Project, Route 360, Island of Maui, Hawaii

FHWA-CFLHD Project No. HI STP SR 360 (1)

Submitted Pursuant to Hawaii Revised Statutes, Chapter 343

By the:

State of Hawaii, Department of Transportation
Highways
869 Punchbowl Street
Honolulu, HI 96813

December 2023

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Acronyms and Abbreviations

°F	degrees Fahrenheit
AASHTO	American Association of State Highway and Transportation Officials
ABC	accelerated bridge construction
AIS	archaeological inventory survey
AMSL	above mean sea level
APE	area of potential effects
BMPs	best management practices
CFR	Code of Federal Regulations
CIA	cultural impact assessment
CRM	cement rubble masonry
CWA	Clean Water Act
CZM	coastal zone management
DAR	Division of Aquatic Resources
dBA	A-weighted decibels
DLNR	Department of Land and Natural Resources
DOFAW	Division of Forestry and Wildlife
EA	environmental assessment
EDR	Environmental Data Resources Inc.
EFH	essential fish habitat
EMI	East Maui Irrigation
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FHWA-CFLHD	Federal Highway Administration - Central Federal Lands Highway Administration
FIRM	Flood Insurance Rate Map
FRP	fiber-reinforced polymer
General Plan	Maui County General Plan
HAR	Hawaii Administrative Rules
HDOH	State of Hawaii Department of Health
HDOT	State of Hawaii Department of Transportation
HKLD	Hana very stony silty clay loam, 3 to 25 percent slopes
HRS	Hawaii Revised Statutes
IPaC	Information for Planning and Consultation
KBID	Kailua silty clay, 3 to 25 percent slopes
LBP	lead-based paint
LRFD	Load and Resistance Factor Design
makai	oceanward
mauka	mountainward
MASH	Manual for Assessing Safety Hardware
MCCRC	Maui County Cultural Resources Commission

MP	mile post
mph	miles per hour
NCN	no common name
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OHWM	ordinary high-water mark
$PM_{2.5}$	particulate matter smaller than 2.5 microns
Preservation Plan	Hana Highway, Route 360 Bridge Preservation Plan
REC	recognized environmental conditions
rHOD	Honomanu silty clay, 5 to 25 percent slopes
ROW	right-of-way
rRT	rough mountainous land
SHPD	State Historic Preservation Division
SHPO	State Historic Preservation Officer
SMA	special management area
State Plan	Hawaii State Plan
USFWS	U.S. Fish and Wildlife Service

CHAPTER 1 Introduction and Background

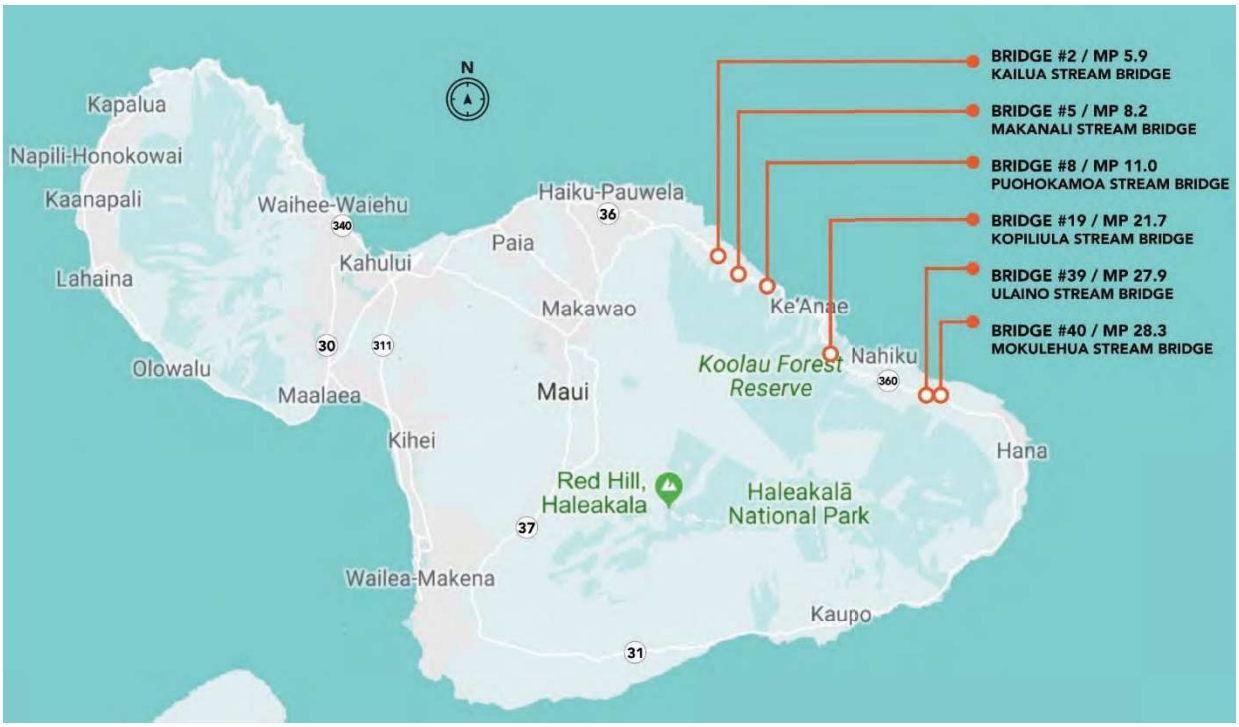
1.1 Introduction

The State of Hawaii Department of Transportation (HDOT), in partnership with the Federal Highway Administration - Central Federal Lands Highway Administration (FHWA-CFLHD), proposes improvements to six of the historic bridges located along Hana Highway (Route 360) on the island of Maui (Figure 1-1). HDOT identified the bridges included in this project as a high priority for improvement. The project proposes improvements to the following bridges:

- Bridge #2—Kailua Stream Bridge (mile post [MP] 5.9)
- Bridge #5—Makanali Stream Bridge (MP 8.2)
- Bridge #8—Puohokamoa Stream Bridge (MP 11.0)
- Bridge #19—Kopiliula Stream Bridge (MP 21.7)
- Bridge #39—Ulaino Stream Bridge (MP 27.9)
- Bridge #40—Mokulehua Stream Bridge (MP 28.3)

The project involves state funding from HDOT and federal funding from the Federal Highway Administration (FHWA). This project is included in a Program of Projects Memorandum of Agreement between HDOT, FHWA-CFLHD, and FHWA-Hawaii Division. Through this partnership, FHWA-CFLHD assists HDOT with engineering program delivery support by providing planning, programming, environmental compliance, permitting, design, right-of-way (ROW) support, construction administration, and other related technical services. FHWA-CFLHD will, therefore, advertise and administer the construction contract for this project if it is approved by both HDOT and FHWA-CFLHD.

Figure 1-1. Project Location Map



The project's purpose is to address existing structural deterioration and sub-standard structural conditions by improving the bridges to be consistent with current standards and guidelines for load capacity, bridge railing and transitions, and seismic and scour standards. The project would improve the six bridges in a context-sensitive manner so they remain functional for highway users and local and regional communities.

At five of the six bridge locations, Bridge #2—Kailua Stream Bridge, Bridge #5—Makanali Stream Bridge, Bridge #8—Puohokamoa Stream Bridge, Bridge #39—Ulaino Stream Bridge, and Bridge #40—Mokulehua Stream Bridge, the proposed solution is to retain the existing substructure, including the character-defining abutments and piers, and provide a new single-span structure that spans over the existing supports. This solution allows the new abutments, which would support the new superstructure, to be concealed behind the existing substructure. By doing this, the existing substructures would remain in place and provide a similar visual appearance to the existing structure. The concrete superstructures would be designed to match the existing historic features best while also meeting project design criteria. The proposed solution at Bridge #19—Kopiliula Stream Bridge is to completely retain the existing bridge and construct a new, off-alignment bridge makai (oceanward) of the existing.

A summary of the proposed solutions at each bridge is presented in Table 1-1.

Table 1-1. Proposed Action Summary for Each Bridge

Bridge	Proposed Action
Bridge #2—Kailua Stream Bridge	Context-sensitive superstructure replacement; retain existing bridge substructure/foundation
Bridge #5—Makanali Stream Bridge	Context-sensitive superstructure replacement; retain existing bridge substructure/foundation
Bridge #8—Puohokamoa Stream Bridge	Context-sensitive superstructure replacement; retain existing bridge substructure/foundation
Bridge #19—Kopiliula Stream Bridge	Retain existing structure; Construct context-sensitive structure makai of the existing structure
Bridge #39—Ulaino Stream Bridge	Context-sensitive superstructure replacement; retain existing bridge substructure/foundation
Bridge #40—Mokulehua Stream Bridge	Context-sensitive superstructure replacement; retain existing bridge substructure/foundation

1.2 Purpose of this Document

The proposed project requires an environmental review under Chapter 343 of Hawaii Revised Statutes (HRS) because it uses state funds, state lands, and land classified as a conservation district and a historic site designated in the National Register of Historic Places. HDOT is the approving agency responsible for preparing this document, which must comply with Hawaii Administrative Rules (HAR) Title 11, Chapter 200.1.

This environmental assessment (EA) discloses the foreseeable primary, secondary, and cumulative environmental impacts that could result from the proposed project's implementation and commits to specific measures to avoid, minimize, or mitigate adverse environmental impacts. This EA also contains a record of consultation activities conducted to date as part of project planning.

The project would also use federal funds administered by the FHWA-CFLHD. Federal funds subject the project to environmental documentation requirements set forth under the National Environmental Policy Act (NEPA) and its implementing regulations. To comply with NEPA, FHWA-CFLHD is preparing separate environmental documentation for its records, which will be consistent with the findings of this EA. FHWA-CFLHD is also responsible for ensuring compliance with all federal laws, regulations, and executive orders that may be relevant to the proposed project, including but not limited to Section 106 of the National Historic Preservation Act, Section 7 of the Endangered Species Act, and Section 4(f) of the U.S. Department of Transportation Act.

1.3 Project Background

Hana Highway, part of Maui's belt road system and referred to as "Hana Belt Road," is a critical transportation link providing vehicular access for residents and visitors to Hana town and other East Maui communities. The narrow, two-lane road winds around more than 600 curves and over 59 bridges and is famous for its breathtaking scenery, rugged topography, scenic waterfalls, and multiple one-lane bridges. About 42 miles of a historic portion of the road was listed in the National Register of Historic Places (NRHP) as a historic district in 2001 for its state and local significance in engineering, social history, transportation, and commerce. As described in the NRHP nomination (NPS 2001):

> The construction of bridges and a road to Hana 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 Hawaii during the early twentieth century. The completion of an automobile route to Hana in 1926 ended that community's isolation from the rest of Maui. The road opened East Maui to settlement, agricultural enterprises, and tourism. The Hana Belt Road is the best remaining intact example of the old belt road system in Hawaii. The Hana Belt Road retains historic integrity in its original road alignment, narrow lanes, bridges, and spectacular setting along Maui's northeast coast.

The Hana Belt Road Historic District spans approximately 0.2 miles west of MP 3 near Huelo to the south end of Koukouai Bridge near Kipahulu. HDOT maintains approximately 29 miles of Hana Highway in the Hana Belt Road Historic District, including 43 bridges and 12 large culverts, from the Hoalua Stream Bridge near Huelo to Hana town. South of Hana town, the road and its bridges fall under the jurisdiction of the County of Maui.

To further understand public safety and historic preservation considerations along Hana Highway, HDOT developed the *2015 Hana Highway, Route 360 Bridge Preservation Plan* (Preservation Plan) for its state-maintained bridges in the Hana Belt Road Historic District. Development of this plan included historical and engineering review and extensive public and agency outreach. The Preservation Plan provides an inventory of the historic bridges, an evaluation of each structure's historic significance and integrity, and concept-level engineering recommendations for each structure. Also included in the Preservation Plan were recommendations for additional studies and future considerations.

Like all publicly maintained bridges, the Hana Highway bridges are inspected regularly to ensure public safety and so that critical deficiencies can be detected early. Based in part on these inspections, load limitations are sometimes placed on structures if deterioration or damage is present. This information helps inform agency decisions on the need for maintenance, rehabilitation, or replacement actions that may need to be taken.

As part of HDOT's system preservation goals, six bridges along Hana Highway were identified as requiring more immediate attention. These bridges were identified to be among those with the lowest load ratings and greatest maintenance needs among all the bridges on the route and are the focus of this project and EA.

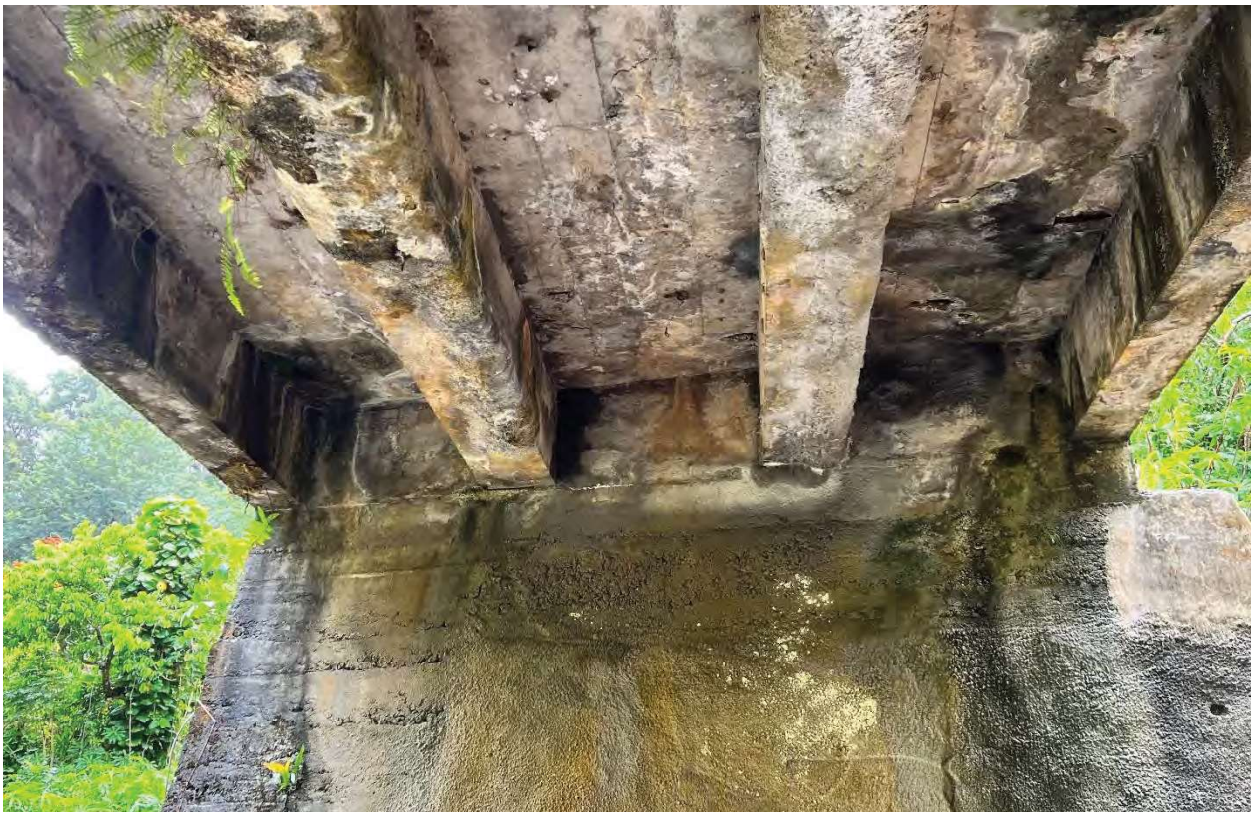
1.4 Project Purpose and Need

The purpose of the project is to address existing structural deterioration and sub-standard structural conditions by improving the bridges to be consistent with current standards and guidelines for load capacity, bridge railings and transitions, and seismic and scour standards. Improvements to the six bridges are needed to remain functional for highway users and local and regional communities. The following issues define the need for the Hana Highway project:

Reliability of the Transportation Network: Hana Highway is the primary connection for the East Maui communities, such as Hana, Wailua, Nahiku, and Keanae, to local and regional services, activity centers, employment centers, and emergency services. The roadway is also a destination in and of itself, drawing visitors to experience the drive and its scenic vistas and experiences and the communities and local vendors along the corridor. Addressing six of the highest-priority aging structures along the route is part of HDOT's goal of maintaining this critical access for residents and businesses, tourism, highway maintenance, and public safety.

Structural Conditions: HDOT routinely inspects its bridges following the National Bridge Inspection Standards. Bridge inspections have revealed evidence of structural degradation on the six bridges included in this project (Photo 1-1). This includes concrete spalling and delamination, exposed reinforcing, visible cracks in concrete and mortar joints, and undermining at isolated bridge supports. In addition to the biennial bridge inspections, additional structural testing was conducted by the design team early in the design phase to understand better each structure's condition, strength, and rehabilitation potential, which included concrete compressive strength and chloride testing, ground penetrating radar scanning, and dimensional verification. These studies revealed elevated chlorides at each structure, generally above the threshold at which corrosion of reinforcing steel is present. Deterioration of the structures will continue if action is not taken.

Photo 1-1. General Degradation and Condition of Structures (Bridge #8—Puohokamoa Stream Bridge)



Load Capacity and Safety: Deficiencies in load capacity and safety were identified as primary issues for the project to address. These can be summarized into three issue statements, each described below.

- The bridges do not meet current load capacity standards.
- The bridges were not designed to current seismic and scour standards.
- Railings do not meet current crashworthiness requirements.

The bridges do not meet current load capacity standards. The original design of the bridge, as well as structural deterioration, influences the loads each bridge can safely accommodate. Load ratings are calculated during bridge inspection to determine a bridge's safe vehicular live load-carrying capacity. In general, the entire Hana Belt Road is load-restricted and posted at ten tons, with some bridges' load rated lower due to structure conditions and degradation. Table 1-2 presents load ratings for the six project bridges. Two types of load ratings are provided for each structure: inventory and operating. Inventory ratings generally correspond to the typical traffic that can pass over the structure through normal operations. In contrast, the operating rating corresponds to the non-typical load that can safely pass over the structure but should not be a normal operational occurrence. A rating factor value of 1.0 indicates that the structure's capacity is adequate to support the bridge design load. A rating factor value of less than 1.0 indicates that the structure is unable to support the bridge design load, with the rating factor value being proportional to the fraction of the design load the structure can support (i.e., a rating factor of 0.5 indicates the structure can carry one-half of the design load).

Table 1-2. Current Load Rating Factors of Six Project Bridges

Bridge	Inventory Load Rating Factor	Operating Load Rating Factor
Bridge #2—Kailua Stream Bridge	0.37	0.47
Bridge #5—Makanali Stream Bridge	0.33	0.42
Bridge #8—Puohokamoa Stream Bridge	0.35	0.45
Bridge #19—Kopiliula Stream Bridge	0.19	0.24
Bridge #39—Ulaino Stream Bridge	0.33	0.43
Bridge #40—Mokulehua Stream Bridge	0.33	0.42

These load ratings are substandard and directly impact the operations of the road. As a result, the Hana Highway is load-restricted and posted at 10 tons near Mile Marker 0. This leads to limits in an operational capacity, and as a result, fuel and water delivery trucks (Photo 1-2) must operate with half loads, concrete trucks make deliveries without water, and on a roadway with landslide risks, the size of vehicles for debris removal, and the loads they can haul, are limited.

Photo 1-2. Oil Truck Crossing, Bridge #2—Kailua Stream Bridge

The bridges also do not meet current seismic standards. The bridges are located within Seismic Zone 2, according to the American Association of State Highway and Transportation Officials (AASHTO) Load and Resistance Factor Design (LRFD) Bridge Design Specifications, Eighth Edition (AASHTO 2017). Seismic Zone 2 equates with an elevated seismic risk and more robust seismic design standards. The existing substructures lack the ability to resist earthquake forces and motions as they were not designed for seismic loading.

Each bridge crosses streams subject to high-velocity, high-flow events, particularly from flash flooding associated with rainfall mauka (mountainward) of the structures. The velocity of the water under the bridges can scour out or eat away at the ground surface around the existing bridge foundations, making the structures susceptible to undermining and loss of structural capacity. The existing bridges are on shallow foundations, meaning they generally rest directly on the ground and are not supported on deep piles extending below into the earth. Because of this, as high-velocity water continues to eat away at the rocks and earthen material supporting the structures, the structures may lose contact with the ground and no longer be able to support the load of the bridge and traffic sufficiently. Two of the structures, Bridge

#8—Puohokamoa Stream Bridge and Bridge #40—Mokulehua Stream Bridge, have documented scour deficiencies noted in the inspection reports, which the structures rated as "Unstable Above Footing" and "Countermeasures," respectively. At Bridge #40—Mokulehua Stream Bridge, the countermeasures appear compromised based on photos taken in March 2022 (Figure 1-2).

Figure 1-2. Undermining at Bridge #40—Mokulehua Stream Bridge and Bridge #8—Puohokamoa Stream Bridge

The existing bridge railings do not meet the current Manual for Assessing Safety Hardware (MASH) 2016 for strength and occupancy safety for a roadside barrier system intended to prevent vehicle road departure from the roadway adjacent to a drop-off.

CHAPTER 2 Project Description and Alternatives

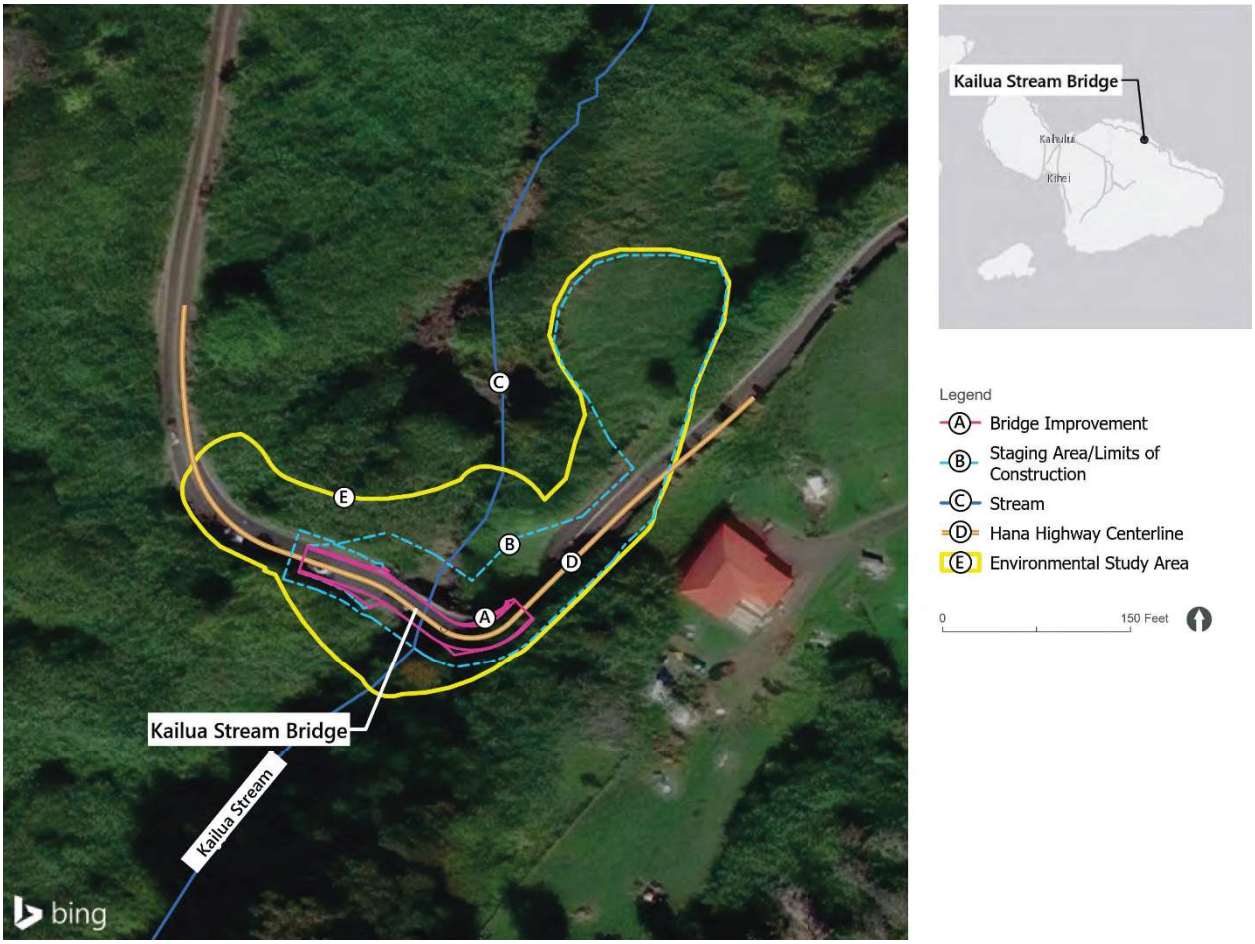
2.1 Project Site Description and Surrounding Land Uses

The project area (also referred to as the Environmental Study Area) includes six bridges at various MPs on Hana Highway on the island of Maui. The six project bridges and its MP location include the following: Bridge #2—Kailua Stream Bridge (MP 5.9), Bridge #5—Makanali Stream Bridge (MP 8.2), Bridge #8—Puohokamoa Stream Bridge (MP 11.0), Bridge #19—Kopiliula Stream Bridge (MP 21.7), Bridge #39—Ulaino Stream Bridge (MP 27.9) and Bridge #40—Mokulehua Stream Bridge (MP 28.3). This section of the Hana Highway is classified as a rural collector and is the primary route between central and east Maui, providing access to communities of Kailua, Keanae, Wailua, Nahiku, Honomaele, Kaeleku, and Hana. The Hana Highway provides access to many wayside attractions and is a destination unto itself as a popular tourism draw for Maui. The Waiku-Hana Hawaiian Home Land is southwest of Kaeleku, and the Keanae-Wailua Hawaiian Home Land is southwest of Wailua and Keanae; the Hana Highway can access both. Several state parks, including Puaa Kaa State Wayside Park, Wailua Valley State Wayside Park, Waianapanapa State Park, and Kaumahina State Wayside Park, overlap or are accessed by Hana Highway. Haleakala National Park is on the southeast part of the island and can be accessed by Hana Highway or Piilani Highway.

2.1.1 Bridge #2—Kailua Stream Bridge

The proposed project would require work at Bridge #2—Kailua Stream Bridge. The project area for this bridge is 1.45 acres and includes the area used to analyze direct and indirect effects on natural and social resources due to the proposed bridge improvements. As shown in Figure 2-1, the project limits, inclusive of temporary construction parcels, extend approximately 500 feet along Hana Highway and extend up to approximately 20 feet beyond the existing ROW for a total area of 0.88 acres at this location. The permanent work, within the limits described above, is contained within the existing ROW and is limited to approximately 200 feet along the Hana Highway. The permanent construction area is approximately 0.2 acres and is largely comprised of an area already developed for the existing Hana Highway.

Figure 2-1. Bridge #2—Kailua Stream Bridge



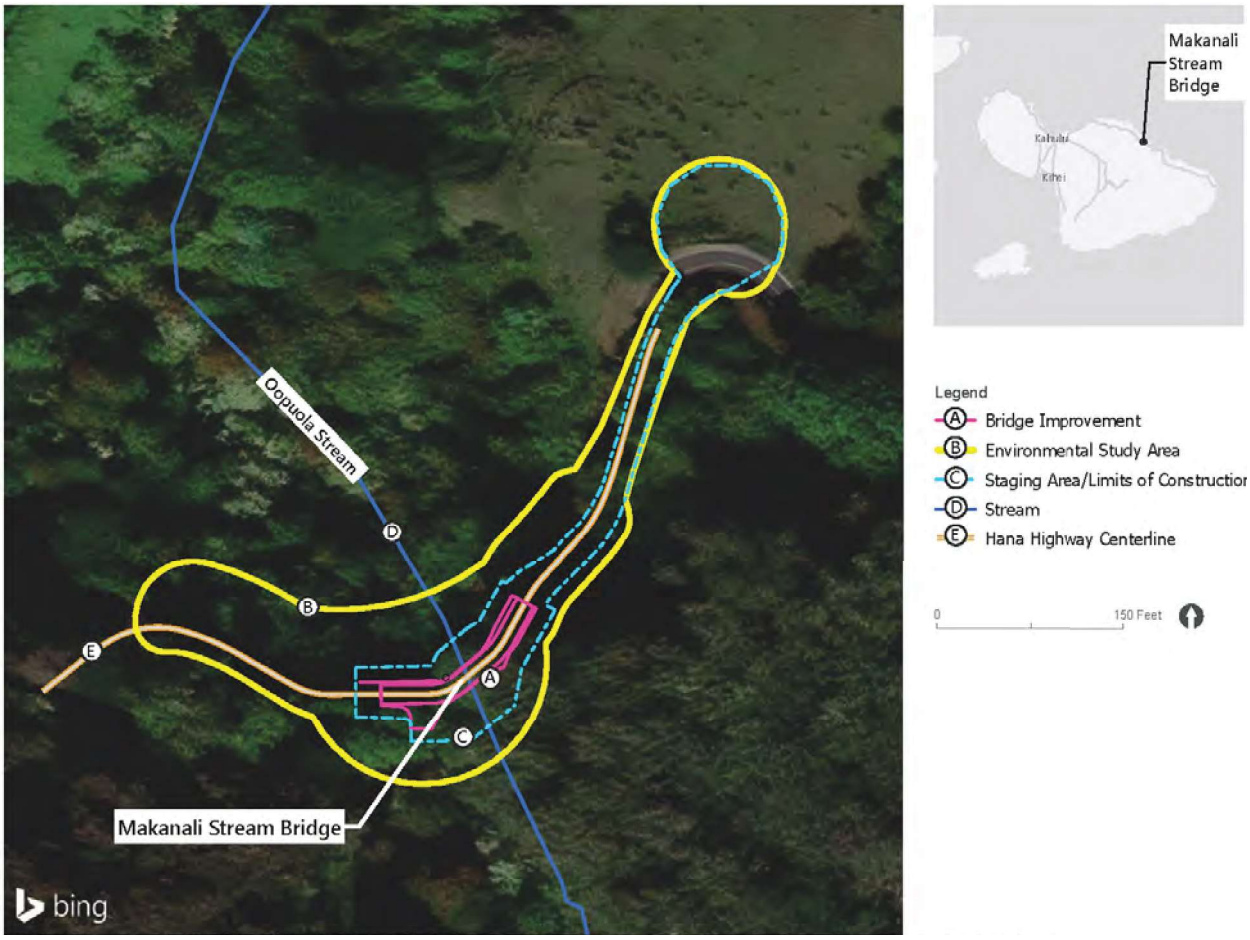
The land surrounding Bridge #2—Kailua Stream Bridge is largely undeveloped. Kailua Stream is a perennial stream in the Kailua watershed where the bridge crosses over. On the northern and southern sides of the bridge is dense vegetation cover. Further to the north of the bridge is the Kailua residential community, and to the east is a denser vegetation cover.

The lands surrounding Bridge #2—Kailua Stream Bridge are classified as mostly Agricultural and Conservation Districts.

2.1.2 Bridge #5—Makanali Stream Bridge

The proposed project would require work at Bridge #5—Makanali Stream Bridge. The project area for this bridge is 1.35 acres and includes the area used to analyze direct and indirect effects on natural and social resources due to the proposed bridge improvements. As shown in Figure 2-2, the project limits, inclusive of temporary construction parcels, extend approximately 300 feet along Hana Highway and extend up to approximately 30 feet beyond the existing ROW for a total area of 0.83 acres at this location. The permanent work, within limits described above, is contained within the existing ROW and is limited to approximately 175 feet along the Hana Highway. The permanent construction area is approximately 0.15 acres and is largely comprised of an area already developed for the existing Hana Highway.

Figure 2-2. Bridge #5—Makanali Stream Bridge



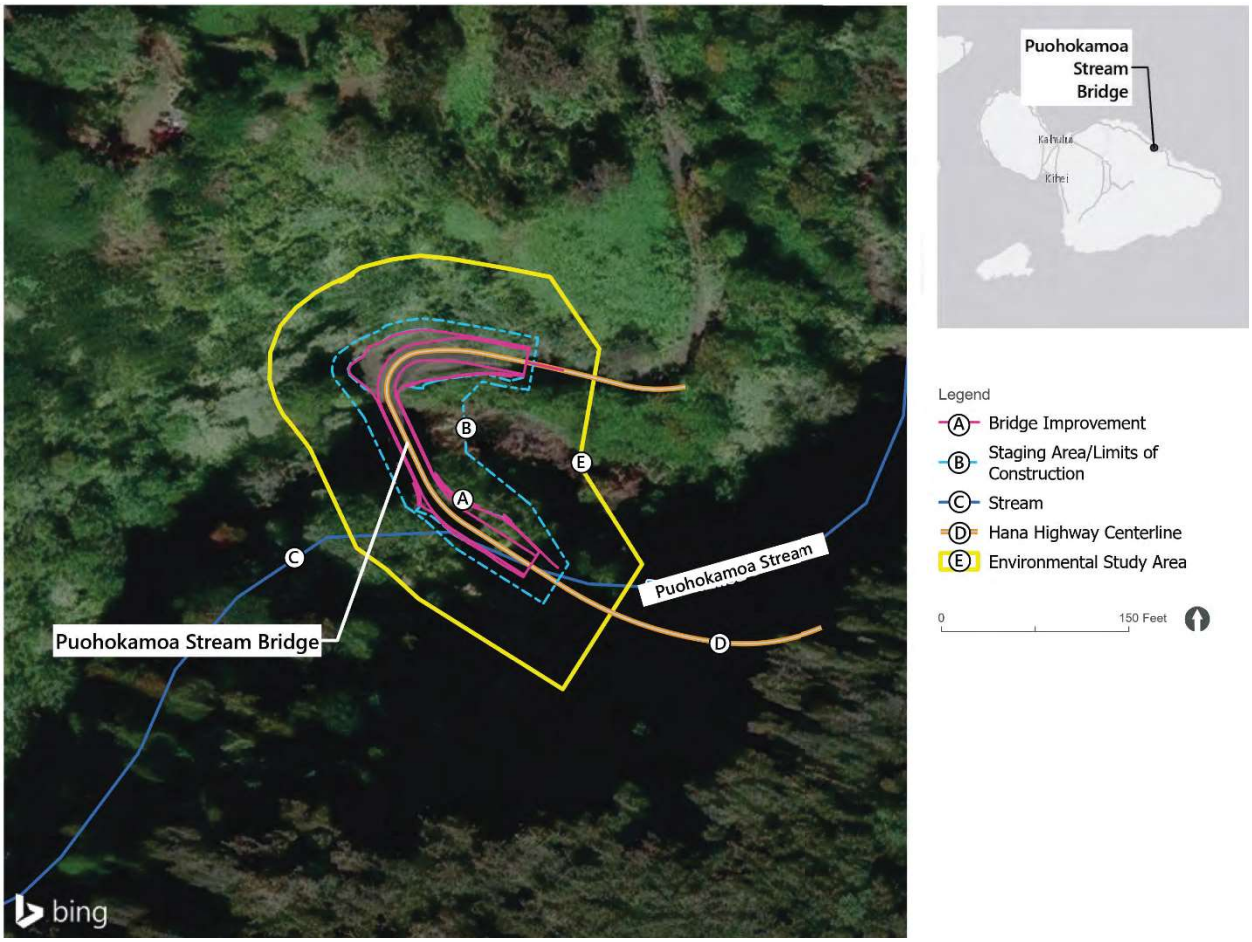
The land surrounding Bridge #5—Makanali Stream Bridge is largely undeveloped. Makanali Stream is an intermittent stream listed as a tributary of the perennial stream, Oopuola, and within the Oopuola watershed. The bridge crosses over the Makanali Stream. Dense vegetation surrounds the bridge in all cardinal directions.

The lands surrounding Bridge #5—Makanali Stream Bridge are classified as Agricultural and Conservation Districts.

2.1.3 Bridge #8—Puohokamoa Stream Bridge

The proposed project would require work at Bridge #8—Puohokamoa Stream Bridge. The project area for this bridge is 1.50 acres and includes the area used to analyze direct and indirect effects on natural and social resources due to the proposed bridge improvements. As shown in Figure 2-3, the project limits, inclusive of temporary construction parcels, extend approximately 400 feet along Hana Highway and extend up to approximately 45 feet beyond the existing ROW for a total area of 0.47 acres at this location. The permanent work, within the limits described above, is contained within the existing ROW and is limited to approximately 325 feet along the Hana Highway. The permanent construction area is approximately 0.3 acres and is largely comprised of an area already developed for the existing Hana Highway.

Figure 2-3. Bridge #8—Puohokamoa Stream Bridge



The land surrounding Bridge #8—Puohokamoa Stream Bridge is largely undeveloped. Puohokamoa Stream is a perennial stream within the Puohokamoa watershed that the bridge crosses over. To the west of the bridge is a residential area. Kaumahina State Wayside Park is approximately 1-mile northeast of the bridge. Hana Highway passes directly through the state park.

The lands surrounding Bridge #8—Puohokamoa Stream Bridge are classified as mostly Agricultural and Conservation Districts.

2.1.4 Bridge #19—Kopiliula Stream Bridge

The proposed project would require work at, and adjacent to, Bridge #19—Kopiliula Stream Bridge. The project area for this bridge is 1.14 acres and includes the area used to analyze direct and indirect effects on natural and social resources due to the proposed bridge improvements. As shown in Figure 2-4, the project limits near the bridge, inclusive of temporary construction parcels and areas of ROW transfer between the Department of Land and Natural Resources (DLNR) and HDOT, extend approximately 600 feet along Hana Highway and extend up to approximately 55 feet beyond the existing ROW for a total area of 0.54 acres at this location near the bridge. The permanent work, within the limits described above, extends outside the existing ROW to the makai side up to approximately 50 feet. The permanent work is limited to approximately 400 feet along the Hana Highway. The permanent construction area is approximately 0.4 acres, with approximately 0.15 acres on previously undeveloped land.

Along the Hana Highway on the Hana side of the bridge, two construction parcels are anticipated for contractor staging and laydown areas. These temporary construction parcels are approximately 0.25 acres each (0.5 acres total).

Figure 2-4. Bridge #19—Kopiliula Stream Bridge

The land surrounding Bridge #19—Kopiliula Stream Bridge is largely undeveloped. Kopiliula Stream is a perennial stream within the Kopiliula watershed that the bridge crosses over. The entire bridge is surrounded by dense vegetation, and less than a mile west of the bridge is the Puaa Kaa State Wayside Bridge, which the Hana Highway passes directly through. Northwest of the bridge is Nahiku, a community encompassed with scattered residences.

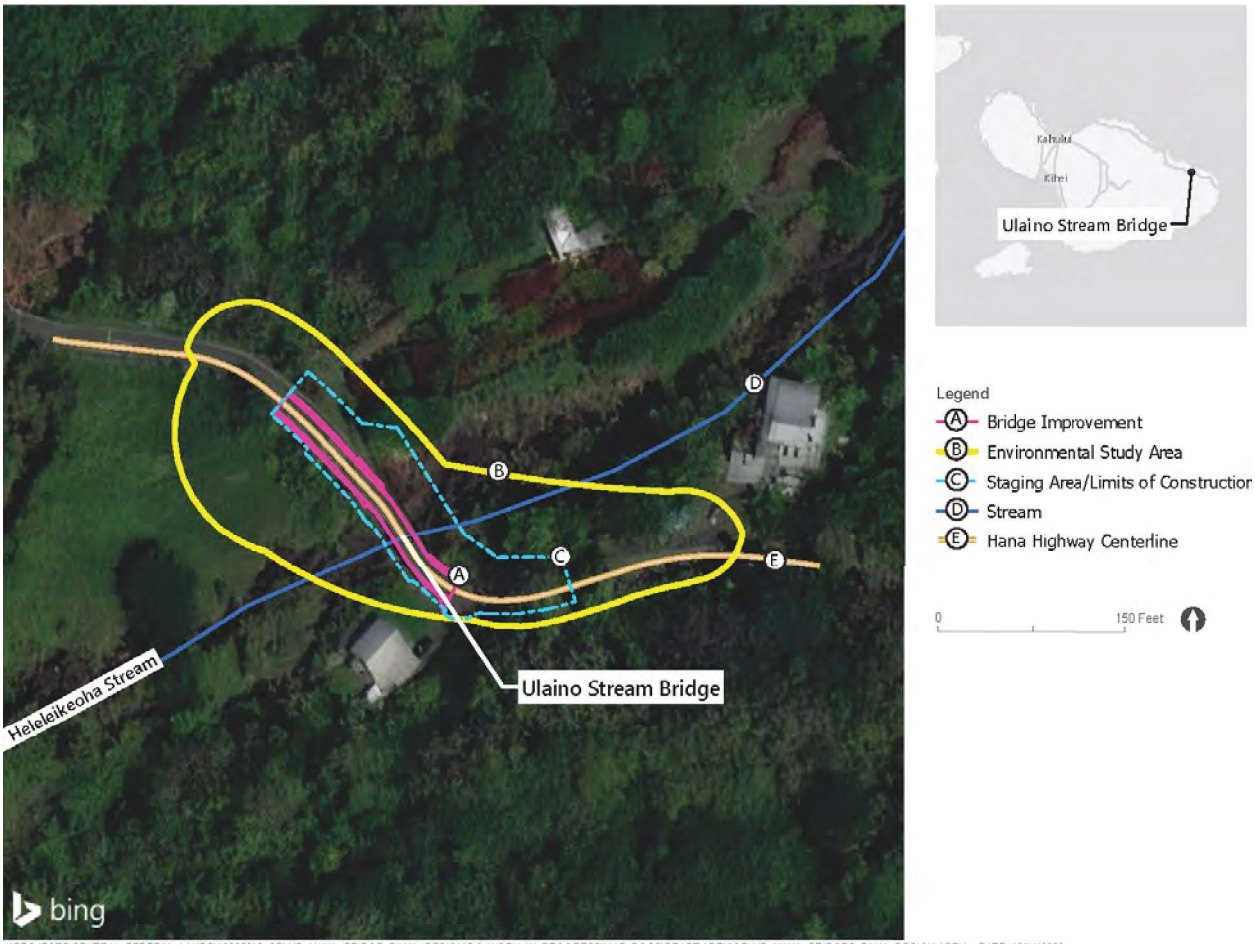
The lands surrounding Bridge #19—Kopiliula Stream Bridge are classified as mostly Conservation District.

2.1.5 Bridge #39—Ulaino Stream Bridge

The proposed project would require work at Bridge #39—Ulaino Stream Bridge. The project area for this bridge is 1.46 acres and includes the area used to analyze direct and indirect effects on natural and social resources due to the proposed bridge improvements. As shown in Figure 2-5, the project limits, inclusive of temporary construction parcels, extend approximately 325 feet along Hana Highway and extend up to approximately 20 feet beyond the existing ROW for a total area of approximately 0.36 acres at this location. The permanent work, within the limits described above, is contained within the existing ROW

and is limited to approximately 225 feet along the Hana Highway. The permanent construction area is approximately 0.2 acres and is largely comprised of an area already developed for the existing Hana Highway.

Figure 2-5. Bridge #39—Ulaino Stream Bridge



The land surrounding Bridge #39—Ulaino Stream Bridge is largely undeveloped. Heleleikeoha Stream is a perennial stream within the Heleleikeoha watershed and descends a broad slope near the bridge. Surrounding the bridge are scattered residences in all cardinal directions. Northwest of the bridge is the community of Nahiku, and northwest of the bridge is Honomaele. The community of Kaeleku is east of the bridge along the Hana Highway.

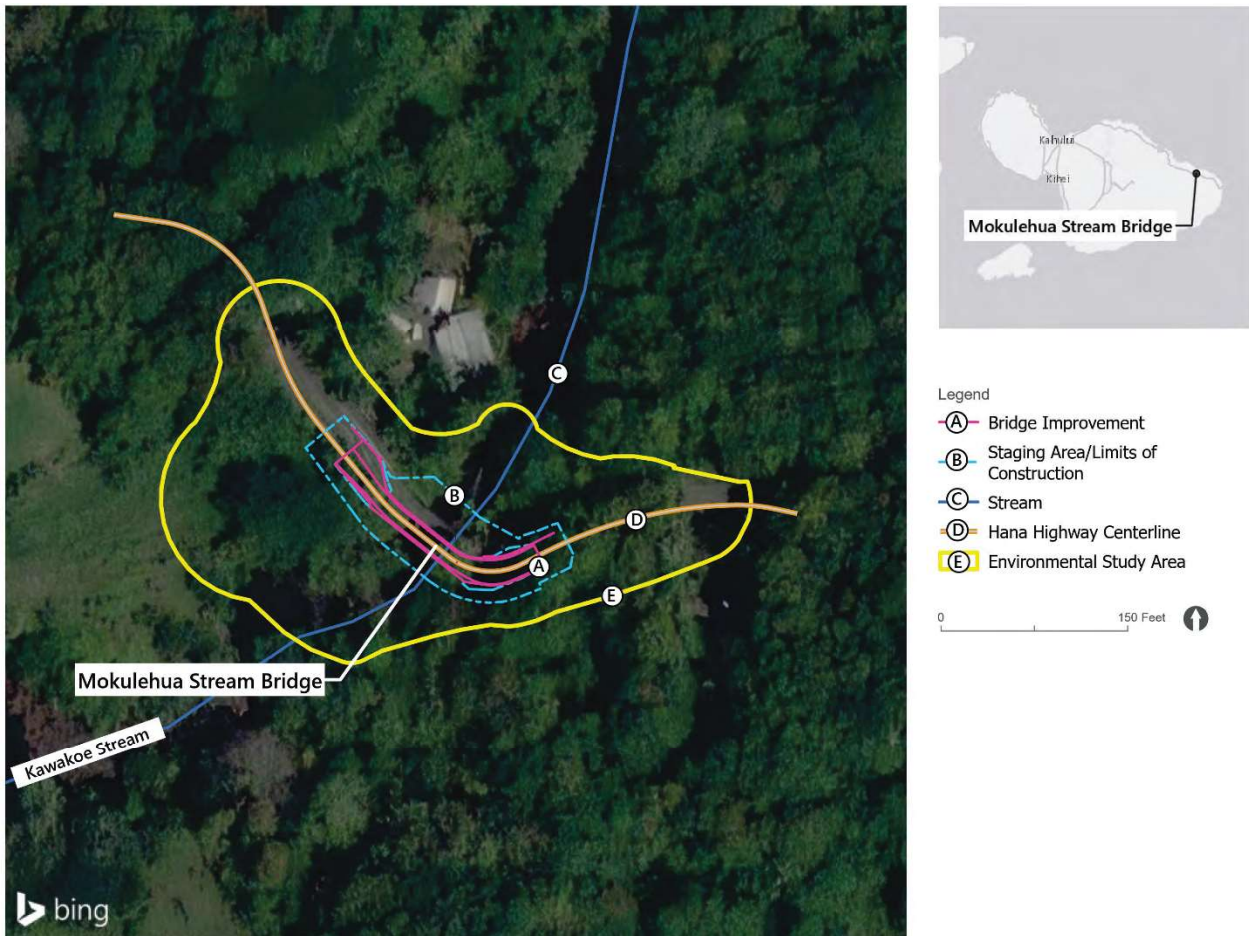
The lands surrounding Bridge #39—Ulaino Stream Bridge are classified as mostly Agricultural District.

2.1.6 Bridge #40—Mokulehua Stream Bridge

The proposed project would require work at Bridge #40—Mokulehua Stream Bridge. The project area for this bridge is 1.77 acres and includes the area used to analyze direct and indirect effects on natural and social resources due to the proposed bridge improvements. As shown in Figure 2-6, the project limits, inclusive of temporary construction parcels, extend approximately 275 feet along Hana Highway and extend up to approximately 20 feet beyond the existing ROW for a total area of 0.29 acres at this location. The permanent work, within the limits described above, is contained within the existing ROW and is limited to approximately 200 feet along the Hana Highway. The permanent construction area is

approximately 0.15 acres and is largely comprised of an area already developed for the existing Hana Highway.

Figure 2-6. Bridge #40—Mokulehua Stream Bridge



The land surrounding Bridge #40—Mokulehua Stream Bridge is largely undeveloped. Kawakoe Stream is an intermittent stream with Mokulehua Stream as a tributary within the Kawakoa Gulch watershed. The confluence of Kawakoe Stream and Mokulehua Stream occurs upstream of the bridge and flows through the project area as Kawakoe Stream. Surrounding the bridge are scattered residences and vegetation cover. Northwest of the bridge is the town of Honomaele. The Hana Airport is northeast of the bridge, past Honomaele.

The lands surrounding Bridge #40—Mokulehua Stream Bridge are classified as Agricultural District.

2.2 Existing Bridge Description

Information on the six bridges included in this document is listed below in Table 2-1. Each structure carries a single traffic lane, and the bridge decks (superstructures) are concrete. The bridge substructures and foundations vary by bridge, either through concrete construction or cement rubble masonry (CRM) construction.

Table 2-1. Existing Bridge Conditions

Bridge	Year Constructed	Span Configuration	Substructure Material	Bridge Railing Type
Bridge #2—Kailua Stream Bridge	1929	1-span	CRM abutments	Concrete open picket
Bridge #5—Makanali Stream Bridge	1928	1-span	CRM abutments	Concrete open picket
Bridge #8—Puohokamoa Stream Bridge	1912	2-span	Concrete abutments and piers on CRM base	Solid concrete
Bridge #19—Kopiliula Stream Bridge	1914 Or 1926	2-span	Concrete abutments and pier	Solid concrete
Bridge #39—Ulaino Stream Bridge	1914	2-span	CRM abutments; concrete pier	Concrete open picket
Bridge #40—Mokulehua Stream Bridge	1908	3-span	CRM abutments; concrete piers	Solid concrete

Bridge significance and integrity information developed in the 2015 Preservation Plan has been integral to the project development and design process. The 2015 Preservation Plan classified each structure along the state-maintained portion of the Hana Belt Road Historic District as either "exceptional" or "contributing." The exceptional structures maintain the significance of the historic district, and the contributing structures maintain the significance of the historic district but not to the level of the exceptional structures. The following describes the criteria considered in the 2015 Preservation Plan to classify each structure as either exceptional or contributing:

- Exceptional Bridges
  - Exhibit unique character-defining features,
  - Have an exceptionally pleasing aesthetic feature or significant setting,
  - Have an exceptional history to be noted or physically preserved,
  - Have a high degree of historic integrity, or
  - Remain in an intact condition.
- Contributing Bridges
  - May be one of several examples of the same bridge type,
  - May exhibit compromised condition/integrity, and
  - May appear to have been heavily altered from the historic design.

Three project bridges are classified in the 2015 Preservation Plan as "exceptional." The bridges and its respective character-defining features include the following:

- Bridge #8—Puohokamoa Stream Bridge
  - Concrete tee beam bridge
  - CRM abutments with CRM base
  - CRM wingwalls
  - Concrete pier wall with CRM base

  - Concrete solid parapets with cap and panel detail
  - Inset inscription "A.D. 1912" on two panels, downstream parapet

- Bridge #19—Kopiliula Stream Bridge
  - Concrete girder and floor beam system
  - Reinforced concrete pier columns
  - CRM wingwalls
  - Concrete solid parapets with East Maui Irrigation (EMI) gears attached
  - EMI irrigation system, dam, and sluice gate below

- Bridge #40—Mokulehua Stream Bridge
  - Concrete slab bridge
  - CRM abutments
  - CRM wingwalls
  - Concrete pier walls with rounded cutwater profile
  - Concrete solid parapets

Three project bridges are classified in the 2015 Preservation Plan as "contributing" to the Hana Belt Road Historic District. These include Bridge #2—Kailua Stream Bridge, Bridge #5—Makanali Stream Bridge, and Bridge #39—Ulaino Stream Bridge, listed below, along with each structure's character-defining features.

- Bridge #2—Kailua Stream Bridge
  - Concrete tee beam bridge
  - Concrete open vertical railings
  - CRM abutments
  - CRM wingwalls
  - Natural rock formations
  - Unusually long, non-arched single-span bridge

- Bridge #5—Makanali Stream Bridge
  - Concrete slab bridge
  - CRM abutments
  - CRM wingwalls
  - Concrete open vertical railings (also referred to as concrete open picket)

- Bridge #39—Ulaino Stream Bridge
  - Concrete tee beam bridge
  - CRM abutments
  - CRM wingwalls
  - Reinforced concrete pier cap and columns on a concrete pier wall
  - Concrete open vertical railings

2.3 Proposed Action

The proposed action or project, also referred to in this EA as the Build Alternative, is described in this section. The proposed action would address the structural deficiencies described in Section 1.4.

Proposed improvements to five of the six bridges are generally similar and are described in Section 2.3.1. Proposed improvements to Bridge #19—Kopiliula Stream Bridge are described in Section 2.3.2.

The proposed action addresses the purpose and need of the project. Specifically, the proposed action is based on project-specific design criteria developed to balance current design loading and capacity requirements with stakeholder and public input. The proposed action includes key design features that address the load and capacity deficiencies noted in Section 1.4, such as:

- Capable of withstanding extreme event demands (seismic and flooding/scour) correcting current conditions in which the bridges do not meet current seismic and scour standards
- Meets AASHTO and HDOT Design Criteria for Bridge Design Loading correcting current conditions in which the bridges do not meet load capacity standards
- Meets MASH 2016 requirements for bridge railing installations correcting current conditions in which railings do not meet current crashworthy requirements
- Installs bridge improvements with 75+ year design life
- Includes minor stormwater drainage improvements near the bridge approaches

The proposed action also incorporates the following key features based on stakeholder and public input

- Maintains low speed and geometric characteristics of the existing Hana Highway
- Does not allow for larger commercial vehicles than currently utilize the roadway
- Maintains single-lane bridges
- Retains the existing bridge foundations and substructures to the maximum extent practicable while addressing necessary design and safety requirements
- Maintains the natural and cultural character of the bridge and the surrounding Hana Highway

Anticipated effects on the stream, both temporary and permanent, are minimized to the extent practicable and are described in further detail in Sections 2.3.1 and 2.3.2.

2.3.1 Replacement on Existing Alignment

At five of the six structures (Bridge #2—Kailua Stream Bridge; Bridge #5—Makanali Stream Bridge; Bridge #8—Puohokamoa Stream Bridge; Bridge #39—Ulaino Stream Bridge; and Bridge #40 Mokulehua Stream Bridge), the bridge would be replaced with in-kind, one lane, superstructures designed to span over the existing substructures, which would be retained in place. The new bridge decks would closely match the shape and material of the existing bridge decks. For example, Bridge #2—Kailua Stream Bridge is a concrete tee girder bridge with 4 girder lines and concrete overhangs outside the fascia girders. The new bridge deck at Bridge #2—Kailua Stream Bridge would also be a concrete tee girder bridge with 4 girder lines and overhangs. This approach of closely matching the existing structure at each location is proposed for the five bridges discussed in this section.

New pile-supported abutments would be installed behind the existing abutments and buried, or concealed, such that the visual aesthetic and character of the roadway are maintained along with the retained substructure and foundation elements. This results in the proposed scale of the bridge

improvements closely matching the scale of the existing bridges. Figure 2-7 through 2-11 depict the proposed renderings of proposed improvements at five of the six structures. Appendix A contains detailed preliminary design schematics for the proposed improvements. With the retention of the existing substructure and foundation elements, no permanent improvements in the streams are anticipated for these five bridges. No permanent stream improvements are anticipated for the proposed action covered in this section as they span over existing substructure elements. Temporary supports and installation of best management practices (BMPs) may be placed below the streams' ordinary high-water mark (OHWM) to facilitate construction and protect water quality. However, temporary impacts will be avoided where practical and minimized where necessary for construction. Generally, stream impacts at each site will be less than 0.10 acres. Anticipated temporary stream impacts and associated mitigation measures are described further in Section 3.3.

The bridges would incorporate specially designed, crash-analyzed approach railings and crashworthy bridge railings, which comply with modern safety standards. The appearance of the existing bridge span would be similar to the existing structure, as shown in Figure 2-12. For existing bridges with open picket-style concrete railings, the proposed railing is a crashworthy open picket railing specially detailed to closely match the existing railing. Similarly, for existing bridges with solid concrete railings, the proposed railing is a crashworthy solid concrete railing specially detailed to closely match the existing railing.

Figure 2-7. New In-Kind Superstructure at Bridge #2—Kailua Stream Bridge

Rendering of Bridge #2—Kailua Stream Bridge on new foundation behind CRM Abutment to remain

Rendering of Bridge #2—Kailua Stream Bridge from the Hana side approach

Figure 2-8. New In-Kind Superstructure at Bridge #5—Makanali Stream Bridge

Rendering of Bridge #5—Makanali Stream Bridge from the Hana side approach

Figure 2-9. New In-Kind Superstructure at Bridge #8—Puohokamoa Stream Bridge

Rendering of Bridge #8 - Puohokamoa Stream Bridge from the Haiku side approach

Figure 2-10. New In-Kind Superstructure at Bridge #39—Ulaino Stream Bridge

Rendering of Bridge #39 - Ulaino Stream Bridge from the Haiku side approach

Figure 2-11. New In-Kind Superstructure at Bridge #40—Mokulehua Stream Bridge

Proposed Typical Section for Bridge #40 – Mokulehua Stream Bridge. Note: Concrete Slab Bridge layout is similar to the existing concrete slab bridge section.

Figure 2-12. Photo of Existing Open Picket Concrete Railing and Proposed Elevation of Bridge with Compliant Open Picket Railing—(Bridge #5–Makanali Bridge shown)

2.3.2 New Structure on Adjacent Alignment

At Bridge #19 – Kopiliula Stream Bridge, a new bridge using similar materials and construction techniques as the structures listed in Section 2.3.1, would be constructed on an adjacent alignment makai of the existing bridge. The existing "exceptional" structure attached to an EMI gate and weir structure would be retained in place and closed for vehicular use. This location provided a unique opportunity to retain the existing structure while providing a new structure makai. This decision resulted from a comparative analysis between off-alignment and on-alignment alternatives at each bridge site. While the other bridge sites yielded online improvements as the preferred approach, at Bridge #19 – Kopiliula Stream Bridge, the analysis yielded a new bridge on a new alignment due to several factors, including approach roadway geometry, ROW considerations, site topography, and cultural and natural resource preservation considerations. The new structure would be a two-span structure, similar to the existing bridge, and feature a concrete deck with CRM approach barriers and solid concrete bridge railing, similar to the existing structure and consistent with the site's existing character.

After the construction of the new structure is complete, the existing bridge will be closed to vehicular use and the public. The bridge approach geometry would be slightly modified to tie into the new bridge. Access to the existing retained bridge would be provided for authorized personnel only (i.e., HDOT and EMI maintenance and operations staff). Design details for access will be identified as the project development process advances. Figure 2-13 shows an aerial and driver's perspective rendering of the new structure at Bridge #19–Kopiliula Stream Bridge.

Minimal permanent stream impacts below the OHWM are anticipated for the proposed actions covered in this section to provide adequate scour protection for the new structure. The new foundations for the new structure were positioned to minimize these permanent effects to the extent practical. Permanent stream impacts are anticipated to be less than 0.05 acres. Temporary stream impacts would also be required to facilitate construction. However, temporary impacts will be avoided where practical and minimized where necessary for construction. Temporary stream impacts are anticipated to be less than 0.10 acres, and BMPs for maintaining stream flow and water quality will be employed. Anticipated permanent and temporary stream impacts and associated mitigation measures are described further in Section 3.3.

Figure 2-13. Renderings of New Bridge Makai of Existing Kopiliula Bridge to Remain. Note EMI Canal Structure, an Exceptional Character Defining Feature, on the Mauka Side of Existing Bridge to Remain

2.3.3 Construction Activities

Equipment and materials are anticipated to be staged in each bridge project area and at three potential locations identified and analyzed as part of the proposed action. One potential staging area is located northeast of Bridge #5–Makanali Stream Bridge and is approximately 6,700 square feet, with two additional potential staging areas located in disturbed roadside areas near Bridge #19–Kopiliula Stream Bridge. Both construction staging areas are located northeast of the existing bridge and are approximately 9,700 square feet.

Maintenance of Traffic During Construction

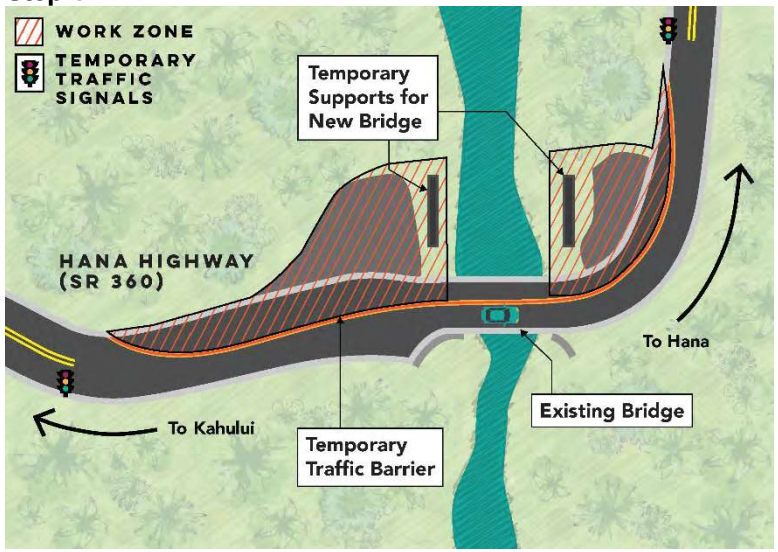
At Bridge #19–Kopiliula Stream Bridge, the existing bridge would be retained in its entirety, and a new bridge would be constructed makai of the existing structure (as described in Section 2.1.4). This allows the existing bridge to remain in service for traffic while the new bridge is being constructed. After the construction of the new bridge and approaches is complete, traffic can be routed across the new structure.

For the remaining five structures noted in Section 2.1, accelerated bridge construction (ABC) techniques are anticipated to minimize impacts on the traveling public on Hana Highway. Temporary bypass bridges during construction, typical for local bridge projects, were considered during the design process. However, due to the geometric and constructability constraints at each site, ROW challenges, risks, and increased costs, ABC techniques were determined to be the preferred construction method. The ABC technique anticipated is the lateral bridge slide technique, where the new superstructure is built parallel to the existing on temporary supports and then slid into place. As part of a historic mitigation strategy, the new superstructures would be slightly longer than the existing bridges to preserve the existing substructures and foundation elements. Construction of the substructure elements behind each existing abutment is anticipated using overnight roadway closures. The work areas could be plated during the daytime to allow traffic to operate normally.

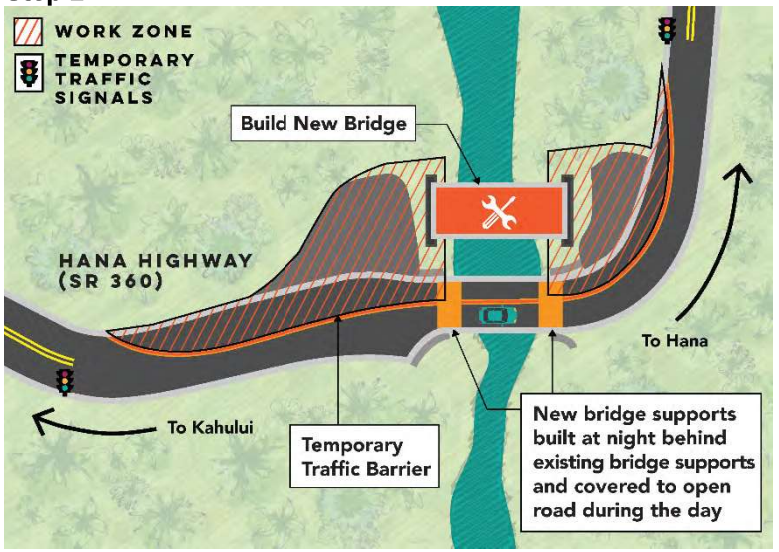
Once the new superstructure is complete and the on-alignment substructure is installed, the roadway will be shut down to allow for the slide installation procedure. It is anticipated that this shutdown will last up to 4 days. The public would be notified in advance of closures. Advanced communication and coordination with local emergency services and critical users such as local service providers and schools are critical during the closure (See Section 3.12 for more information about communication and coordination during closures). Coordination of slide activities across several structures may be required to minimize the closure times of the Hana Highway. To minimize traffic impacts, methods will allow for one-lane operations once the superstructure is slid into place. The generalized procedure for the potential use of the bridge slide technique for the project is presented in Figure 2-14. Phasing of the bridge construction is not fully known at this time.

Figure 2-14. Lateral Bridge Slide ABC Technique for Hana Highway Bridges

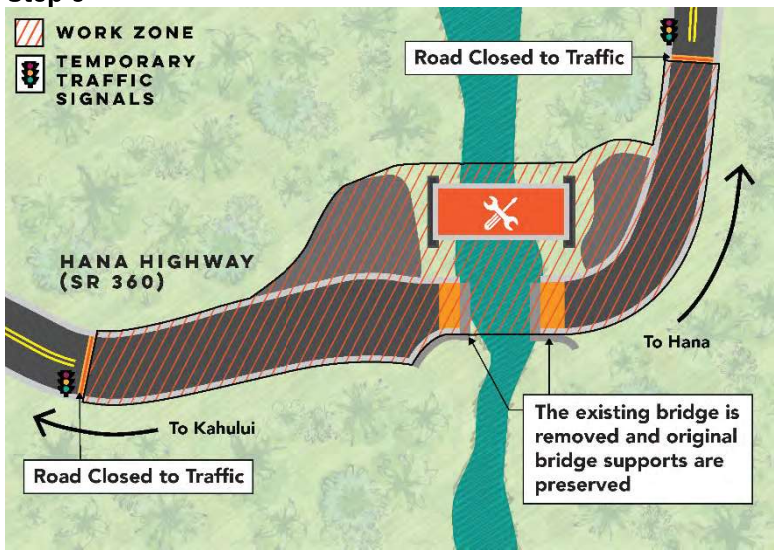
Step 1



Step 2



Step 3



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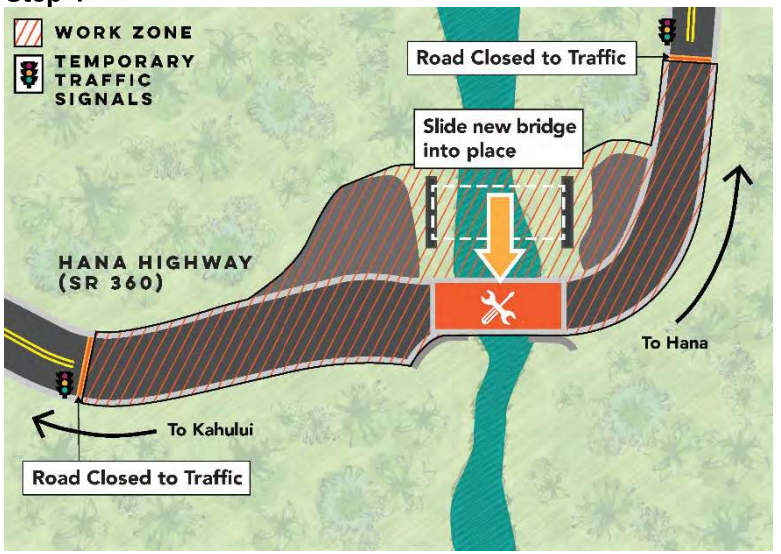

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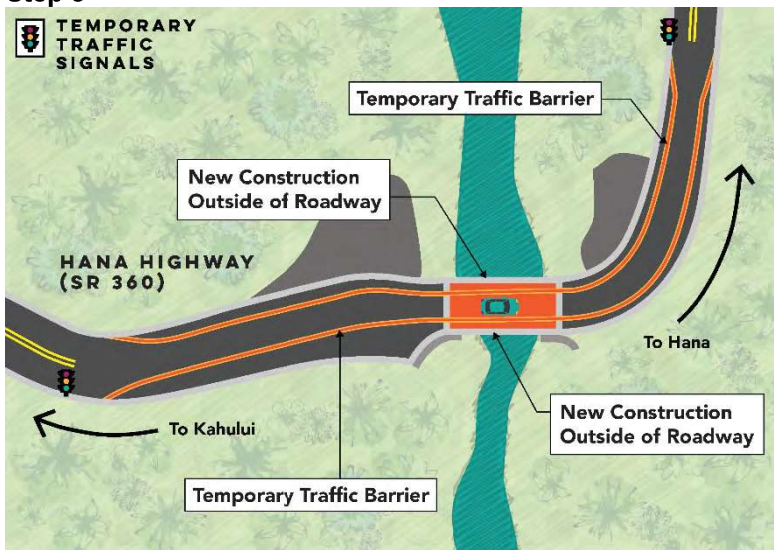

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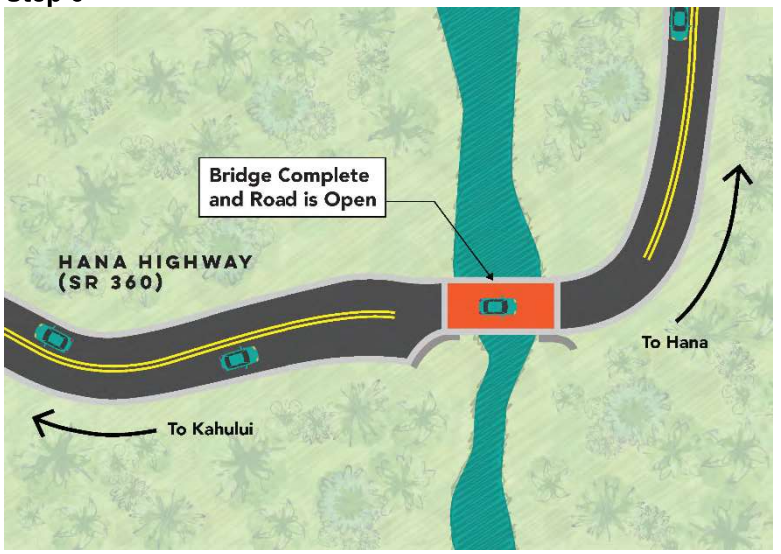


2.3.4 Properties Affected by the Project

Several small construction easements are required to construct the bridge improvements. The proposed project would require one permanent ROW acquisition to be acquired through a land transfer between state entities (DLNR to HDOT). The proposed project would not require fee acquisition of any private property. Table 2-2 presents the ROW needs for the project.

Table 2-2. Right-of-Way Needs

Tax Map Key	Land Use (Tax Class)	Estimate of Area Needed (acre)	Project Requirement (temporary or permanent easement, ROW acquisition)
Bridge #2—Kailua Stream Bridge			
(2) 2-9-012: 041	Agricultural	0.096	Temporary Construction Easement
(2) 2-9-010: 001	Agricultural	0.045	Temporary Construction Easement
(2) 2-9-014: 001	Conservation	0.083	Temporary Construction Easement
(2) 2-9-013:015	Agricultural	0.423	Temporary Construction Easement
Bridge #5—Makanali Stream Bridge			
(2) 1-1-001: 036	Agricultural/Conservation	0.203	Temporary Construction Easement
(2) 1-1-001: 042	Conservation	0.093	Temporary Construction Easement
Bridge #8—Puohokamoa Stream Bridge			
(2) 1-1-001: 054	Agricultural	0.035	Temporary Construction Easement
(2) 1-1-001: 022	Agricultural	0.037	Temporary Construction Easement
(2) 1-1-001: 052	Agricultural	0.095	Temporary Construction Easement
Bridge #19—Kopiliula Stream Bridge			
(2) 1-2-001: 003	Agricultural/Conservation	0.202	ROW Acquisition

Tax Map Key	Land Use (Tax Class)	Estimate of Area Needed (acre)	Project Requirement (temporary or permanent easement, ROW acquisition)
(2) 1-2-001: 003	Agricultural/Conservation	0.224	Temporary Construction Easement
(2) 1-1-004: 005	Agricultural	0.223	Temporary Construction Easement
Bridge #39—Ulaino Stream Bridge			
(2) 1-2-003: 005	Conservation/Owner-Occupied/Homeowner	0.142	Temporary Construction Easement
(2) 1-2-003: 001	Owner-Occupied/Homeowner	0.033	Temporary Construction Easement
Bridge #40—Mokulehua Stream Bridge			
(2) 1-2-003: 005	Conservation/Owner-Occupied/Homeowner	0.036	Temporary Construction Easement
(2) 1-2-002: 020	Conservation	0.061	Temporary Construction Easement
(2) 1-2-003: 023	Non-Owner-Occupied/Residential	0.021	Temporary Construction Easement
(2) 1-2-003: 001	Owner-Occupied/Homeowner	0.028	Temporary Construction Easement
Total Area of Temporary Construction Easements	**1.878 Acres**		
Total Area of ROW Acquisition	**0.202 Acres**		

2.4 No Build Alternative

The No Build Alternative does not meet the project purpose and need as it does not address the substandard structural condition at each bridge, nor does it address the three key aspects of the load and capacity deficiencies, namely, the bridges do not meet current load capacity standards, current extreme event (seismic and scour) design standards, nor bridge railing crashworthiness standards (Section 1.4 *Project Purpose and Need*). The No Build Alternative is therefore not proposed but is described in this EA as a baseline for comparing the consequences of the Build Alternative. Under the No Build scenario, no action would be taken to rehabilitate or replace the deteriorated bridges or bridge elements. The existing structural deficiencies and load limitations would persist and, in the future, may require additional weight restrictions or even closure. The bridges would continue to have substandard safety barriers and lack seismic resistance.

2.5 Alternatives Development Process

The alternative development process began with validating past findings from the 2015 Preservation Plan and collecting additional environmental and engineering data. Each bridge's historic significance and integrity information was closely reviewed for a complete understanding of each bridge's character-defining features. Site-specific environmental surveys were performed to understand better existing conditions, such as the presence and limits of aquatic resources, sensitive plant and animal habitats, and archaeological and cultural resources. Additional engineering studies were also performed on each bridge to understand such factors as concrete strength and bridge foundation geotechnical conditions to determine rehabilitation potential and ability to meet seismic codes and understand existing hydraulic and scour conditions. Lastly, public and agency meetings were held to obtain input on purpose and need, evaluation criteria, and design concepts and provide a forum to identify other critical issues. To date, three rounds of public meetings have been held for the project (see Chapter 7).

2.5.1 Evaluation Criteria

To provide a consistent methodology by which to evaluate each alternative, evaluation criteria were informed by the broader project purpose and need and included discrete variables related to the criterion. The evaluation criteria were presented to the public and project stakeholders to solicit input and ensure alignment with the overall project purpose and need. The criteria were then used to evaluate, further refine, and advance alternatives for the project. Evaluation criteria developed for the Hana Highway bridges and considerations or goals related to each criterion are as follows:

- Construction Impacts & Constructability
  - Minimize detours and closures
  - Expedite construction impacts
  - Minimize traffic impacts
- Historic Character
  - Maintain the character of the existing historic roadway and bridge elements
- Construction Cost
  - Minimize construction costs
  - Minimize maintenance costs
  - Maximize project efficiencies
- Environmental Resources
  - Streams
  - Wetlands
  - Plants and animals
  - Cultural resources
  - Hydrology/hydraulics
- Design Standards
  - 75-year design life
  - Meet design vehicle load
  - Meet current seismic criteria
  - Meet crashworthiness standards for railings
  - Provide a solution that withstands scour

Below is a brief synopsis of each evaluation criteria and its sub-criteria.

Construction Impacts and Constructability

This criterion assesses the difficulty of construction and construction time for each bridge. Sub-criteria include:

- **Minimization of Traffic Impacts and ABC potential:** Consideration of suitability for ABC techniques that will reduce the duration of construction.
- **Local Availability:** Consideration of whether an alternative can be sourced in Hawaii or if it needs to be brought from the mainland, resulting in increased lead times, cost, and logistical challenges.
- **Complexity Risk:** Consideration of the difficulty of field implementation. This metric specifically applies to specialized, complex detailing, which will be required to construct the bridge once all the materials and equipment are available at the site. Non-standard structural detailing and details that require specialized skill sets to construct will increase the complexity risk of a given alternative.
- **Constructability:** Consideration of how challenging it may be to deliver materials and equipment to the site. This criterion also evaluates the available area at the site to store and maintain necessary materials and equipment for the construction of a given alternative.

Historic Character

Historic character considers how well each alternative provides context-sensitive solutions at each bridge. Given the eligibility of Hana Belt Road under Section 106 of the National Historic Preservation Act, each alternative was evaluated based on its ability to retain the historic character of the roadway and bridge. The following gives the two bridge elements considered under the historic character criteria for each alternative.

- **Superstructure:** Considers how the superstructure's historic character will be maintained and considers the character of the roadway itself as users approach and cross the structure.
- **Substructure:** Considers each alternative's ability to maintain the historic character of the substructure units.

Construction Cost

Costs include initial costs for materials and construction of the permanent structure.

- **Construction Cost:** Considers the direct and indirect costs of construction activities.

Environmental Resources

Consideration of impacts on the physical environment around the bridge.

- **Hydraulic Opening Impacts:** Considers the effects an alternative will have on the hydraulics and hydrology of the site.
- **Resource Impacts:** Considers impacts on sensitive resources

Design Standards

Each alternative is evaluated by its ability to incorporate the requirements outlined in the project structural design criteria, including seismic capacity, railing compliance, scour, and service life. It should be noted that an alternative was only considered feasible if it could meet vehicular loading requirements of the HDOT Design Criteria for Bridges and Structures and AASHTO LRFD Bridge Design Specifications.

- **Seismic:** Considers the structure's ability to withstand a seismic event (i.e., "earthquake") along with the effort required to detail the structure to withstand a seismic event adequately. For this area of Maui, the bridges fall into Seismic Zone 2 (on a scale of 1 to 4, with 1 being the least risk and 4 being the highest risk) based on current AASHTO LRFD Bridge Design Specification guidance.
- **Railings:** Rates the structural alternative's ability and level of effort to provide and incorporate an AASHTO MASH TL-2 railing on the bridge.
- **Scour:** Considers the structure's ability to withstand design scour along with the effort required to detail the structure to withstand scour adequately.
- **Service Life:** Considers the differences in expected service life between each alternative and the anticipated magnitude of maintenance activities that may be required during the alternative's service life to maintain the bridge in a state of good repair.

2.5.2 Alternatives Considered and Dismissed

Several alternatives for each bridge location were considered and evaluated against the five criteria based on the overall project purpose and need. This process led to eliminating some alternatives because they involved greater or unacceptable environmental impacts, presented increased construction risks, or involved increased costs with less design life. A number of rehabilitation alternatives were analyzed. The evaluation of bridge rehabilitation alternatives began with concept recommendations presented in the 2015 Preservation Plan. Recommendations from the 2015 Preservation Plan include the rehabilitation or reuse of the existing substructures where feasible based on further engineering analysis or replacement where further engineering analysis yields that reuse is not feasible. Recommended superstructure and rail recommendations were also analyzed and incorporated into rehabilitation alternatives.

Replacement alternatives were evaluated after rehabilitation analysis revealed that the existing foundations are insufficient to carry the rehabilitated bridges' design loading and would require reconstruction or encapsulation by a structurally suitable material to meet seismic and scour design standards. This new information led to considerations of alternative opportunities to meet the project purpose and need that may have less construction risk and stream involvement and could preserve character-defining substructural elements. Rehabilitation and replacement alternatives evaluated and dismissed from further analysis are described below.

Dismissed Bridge Rehabilitation Alternatives

Multiple rehabilitation alternatives were developed for each bridge, all of which involved superstructure rehabilitation combined with substructure replacement or, at some bridges, major substructure modifications with new cantilevered substructures over the existing ones. Alternatives for superstructure rehabilitation included different methods depending on structure type, including adding fiber-reinforced polymer (FRP), adding girders, increasing existing girder widths, increasing slab depths, and increasing deck thickness. At Kopiliula Stream Bridge, new transverse beams with increased transverse beam sections were also analyzed.

As described above, foundation investigation revealed that partial or full reconstruction of the substructures would be required, which includes character-defining features such as exceptional or good intact examples of CRM abutments, wingwalls, pier walls, natural rock features, and EMI features. Therefore, rehabilitation alternatives assumed best-match replacement options or facing new or encapsulated abutments with salvaged or similar materials. For example, CRM abutments would be disassembled, new abutments built, and then faced with salvaged materials or similar appearance materials.

The rehabilitation alternatives were evaluated against the five criteria and were not recommended for advancement. Partial or full reconstruction of substructure bridge elements introduces constructability challenges and additional costs and risks. Temporary supports would be required in each stream to hold up the superstructure while the piers and abutments are being reconstructed, many of which are narrow and susceptible to flash flooding. This introduces a bigger risk to the historic superstructures, streams, and traveling public. It's also acknowledged that while original materials can be salvaged and used as facing for substructural elements, the unique character of integrated natural rock-bearing formations and other unique stylistic features would be difficult to re-create. Lastly, while this alternative does retain the superstructures, they would still be altered through concealment with FRP or additional concrete for necessary strengthening, and it is challenging to connect crashworthy rails.

The rehabilitation would also involve increased costs and a much shorter design life (approximately 25 years). While the rehabilitation would address the existing structural conditions and increase the load capacity of the existing bridges, it does not meet the needs to the same extent as the proposed solution, and the shorter design life of the rehabilitation does not satisfy the purpose and need relative to the reliability of the transportation network, as continued maintenance and short-to-medium term replacement or major rehabilitation would be required in the future. Additionally, the complexity of the rehabilitation techniques introduces numerous schedule and cost risks to the project, and the preliminary construction cost of the rehabilitation does not represent a meaningful reduction relative to the proposed solution. Due to these factors, the life-cycle costs of the rehabilitation relative to the proposed solution will be higher. For these reasons, HDOT and FHWA-CFLHD determined that this alternative was not prudent to carry forward as the proposed action for any of the six project bridges.

Specific rehabilitation alternatives evaluated and dismissed included the following:

Bridge #2—Kailua Stream Bridge

- Superstructure rehabilitation with FRP and new cantilever substructure over the existing CRM.
- Superstructure rehabilitation with increased existing girder width, with the addition of supplemental FRP and new cantilever substructure over the existing CRM.
- Superstructure rehabilitation with additional interior girders, supplemental FRP, and a new cantilever substructure over the existing CRM.
- Superstructure rehabilitation with increased deck thickness at the top, with the addition of FRP and a new cantilever substructure over the existing CRM.

Bridge #5—Makanali Stream Bridge

- Superstructure rehabilitation with increased slab depth at the top, supplemental FRP, and a new cantilever substructure over the existing CRM.
- Superstructure rehabilitation with increased slab depth at the bottom, with the addition of FRP to the existing superstructure and new cantilever substructure over the existing CRM.

Bridge #8—Puohokamoa Stream Bridge

- Superstructure rehabilitation with increased girder width, with the addition of FRP, widening bridge with exterior girder, replacing substructure concrete abutments and pier in-kind.
- Superstructure rehabilitation with increased deck thickness at the top, with supplemental FRP, widening bridge with exterior girder, replacing substructure concrete abutments and pier in-kind.
- Superstructure rehabilitation with FRP, widening bridge with exterior girder, replacing substructure concrete abutments and pier in-kind.
- Superstructure rehabilitation with adding interior girders, supplemental FRP, widening bridge with exterior girder, replacing substructure concrete abutments and pier in-kind.

Bridge #19—Kopiliula Stream Bridge

- Superstructure rehabilitation with increased transverse beam section, adding new transverse beams between existing and supplemental FRP, replacing substructure concrete abutments and pier in-kind.
- Superstructure rehabilitation with the addition of FRP, replace substructure concrete abutments and pier in-kind.

Bridge #39—Ulaino Stream Bridge

- Superstructure rehabilitation with the addition of FRP, new cantilever substructure over existing CRM, and replacement of the concrete pier in-kind.
- Superstructure rehabilitation with increased girder width, supplemental FRP, new cantilever substructure over existing CRM, and replacing concrete pier in-kind.
- Superstructure rehabilitation with additional interior girders, adding FRP, new cantilever substructure over existing CRM, and replacing concrete pier in-kind.
- Superstructure rehabilitation with increased deck thickness at the top, adding FRP, new cantilever substructure over existing CRM, and replacing concrete pier in-kind.

Bridge #40—Mokulehua Stream Bridge

- Superstructure rehabilitation with FRP, widening bridge with slab, new substructure behind existing abutment, and replacing concrete piers in-kind.
- Superstructure rehabilitation with increased slab depth at the bottom, with supplemental FRP, widening bridge with slab, new substructure behind existing abutment, and replacing concrete piers in-kind.
- Superstructure rehabilitation with increased slab depth at the top, adding FRP, widening bridge with slab, new substructure behind existing abutment, and replacing concrete piers in-kind.

Dismissed Bridge Replacement Alternatives (On-Alignment)

Alternatives that would replace the existing bridges on alignment were developed and evaluated. These primarily involved different structure type considerations at each location (e.g., prestressed bridge plank, inverted tee, reinforced concrete tee-beam), with considerations of being supported on new abutments in the same location as the existing or being supported on new abutments built behind the existing.

On-alignment replacement alternatives dismissed included those that placed new abutments in the same location as the existing ones. While this alternative would more closely match the structural dimensions of the existing, it does not have the advantage of preserving historic character-defining substructure

elements, nor does it minimize stream involvement as much as other alternatives. These structures would have removed most existing structures and would have been very challenging to construct while maintaining traffic access along the Hana Highway during construction.

All on-alignment replacement alternatives for Bridge #19—Kopiliula Stream Bridge were dismissed because an alternative to preserve the existing bridge and build a new bridge makai was identified and deemed preferable from a resource impact perspective.

Specific on-alignment replacement alternatives evaluated and dismissed included the following:

Bridge #2—Kailua Stream Bridge

- Prestressed Inverted Tee on new, pile-supported abutments behind existing CRM abutment
- Prestressed Bridge Plank on new, pile-supported abutments behind existing CRM abutment
- Prestressed Inverted Tee on newly constructed abutments with stone façade
- Prestressed Bridge Plank on newly constructed abutments with stone façade
- Reinforced Concrete T-beams on newly constructed abutments with stone façade

Bridge #5—Makanali Stream Bridge

- Prestressed Bridge Plank on new pile-supported abutments behind existing CRM abutment
- Reinforced Concrete Slab on newly constructed abutments with stone façade
- Prestressed Bridge Plank on newly constructed abutments with stone façade

Bridge #8—Puohokamoa Stream Bridge

- Prestressed Inverted Tee on new, pile-supported abutments behind existing abutment
- Prestressed Bridge Plank on new, pile-supported abutments behind existing abutment
- Prestressed Inverted Tee on newly constructed abutments
- Prestressed Bridge Plank on newly constructed abutments
- Reinforced Concrete T-beams on newly constructed abutments

Bridge #19—Kopiliula Stream Bridge

- Prestressed AASHTO Type III Girders on new pile-supported abutments behind existing abutment
- Reinforced Concrete Through-Girders on new pile-supported abutments behind existing abutment
- 2 span Prestressed Bridge Planks on new pile-supported abutments behind existing abutment
- Prestressed AASTHO Type III Girders on newly constructed abutments
- Reinforced Concrete Through-Girders on newly constructed abutments
- 2 span Prestressed Bridge Planks on newly constructed abutments

Bridge #39—Ulaino Stream Bridge

- Prestressed Inverted Tee on new, pile-supported abutments behind existing abutment

- Prestressed Bridge Plank on new, pile-supported abutments behind existing abutment
- Reinforced Concrete Through-Girders on new pile-supported abutments behind existing CRM abutment
- Prestressed Inverted Tee on newly constructed abutments with stone façade
- Prestressed Bridge Plank on newly constructed abutments with stone façade
- Reinforced Concrete T-beams on newly constructed abutments with stone façade
- Reinforced Concrete Through-Girders on newly constructed abutments with stone façade

Bridge #40—Mokulehua Stream Bridge

- Prestressed Inverted Tee on new, pile-supported abutments behind existing abutment
- Reinforced Concrete T-beams on new, pile-supported abutments behind existing abutment
- Prestressed Inverted Tee on newly constructed abutments with architectural façade
- Prestressed Bridge Plank on newly constructed abutments with architectural façade

Dismissed Bridge Replacement Alternatives (Off-Alignment)

Each bridge location was also evaluated for full avoidance to build a bridge on a new or parallel alignment. While this opportunity exists due to site conditions at Bridge #19—Kopiliula Stream Bridge, all other bridge locations would require more extensive and costly roadway realignments with substantial cuts/fills and potential retaining structures, as well as increased environmental and ROW impacts. For these reasons, new off-alignment bridges for the other five bridges were dismissed from further analysis.

2.6 Project Cost and Schedule

In 2023, the proposed project was estimated to cost approximately $40 million. Construction is anticipated to begin in 2025 after the final design is completed and all necessary permits and approvals are secured. Construction is expected to last approximately two to three years.

2.7 Anticipated Permits and Approvals

Table 2-3 lists approvals and permits that are anticipated to be required for the proposed project's construction. Some of the below-listed permits are only required should the contractor employ specific means and methods. Coordination and approvals are ongoing.

Table 2-3. List of Permits and Approvals by Agency

Agency	Permit or Approval
Federal	
FHWA-CFLHD	NEPA Evaluation, Section 4(f) of the U.S. Department of Transportation Act
U.S Army Corps of Engineers, Honolulu District	Clean Water Act (CWA), Section 404, Rivers and Harbors Act, Section 10
U.S. Fish and Wildlife Service	Section 7 of the Endangered Species Act

Agency	Permit or Approval
State	
State of Hawaii, Department of Business, Economic Development, and Tourism, Office of Planning	Coastal Zone Management (CZM) Federal Consistency Review
State of Hawaii, Department of Health (HDOH), Clean Water Branch	National Pollutant Discharge Elimination System Permit, and CWA Section 401 Water Quality Certification
HDOH, Disability and Communication Access Board	Disability and Communication Access Board Review
HDOH, Indoor Air and Radiological Branch	Community Noise Permit, and Community Noise Variance
HDOH, Solid and Hazardous Waste Branch	Solid Waste Disclosure Form/Hazardous Waste Determination
State of Hawaii, DLNR, State Historic Preservation Division (SHPD)	HRS, Chapter 6E-8 Review, and Section 106 of the National Historic Preservation Act (NHPA)
DLNR, Commission on Water Resources Management	Stream Channel Alteration Permit
DLNR, Office of Conservation and Coastal Lands	Conservation District Use Permit
County	
County of Maui	Flood Development Permit, Special Management Area (SMA) Use Permit and Grading, Grubbing, or Stockpiling Permit

CHAPTER 3 Affected Environment, Potential Impacts, and Proposed Mitigation

This chapter describes the project site's existing environmental conditions, the proposed project's potential impacts, and the proposed mitigation measures to avoid, minimize, or mitigate potential impacts. Each section within this chapter analyzes a specific environmental or social discipline and presents both direct and indirect impacts, as applicable. Direct impacts are effects that are caused by the action and occur at the same time and place. Indirect (or secondary) impacts are effects caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable.

Cumulative impacts are discussed in Section 3.15. Cumulative impacts are defined as the results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes the other actions. Cumulative impacts can result from individually minor but collectively significant actions over time.

3.1 Topography, Geology, and Soils

3.1.1 Existing Conditions

Hana Highway traverses steep terrain and numerous drainage ravines. The six bridges this project addresses are located at various mileposts along the route, with differing elevations ranging from 551 feet above mean sea level (AMSL) to 1,275 AMSL. The approximate elevation of each existing bridge deck is as follows:

- Bridge #2—Kailua Stream Bridge: 696 feet AMSL
- Bridge #5—Makanali Stream Bridge: 705 feet AMSL
- Bridge #8—Puohokamoa Stream Bridge: 567 feet AMSL
- Bridge #19—Kopiliula Stream Bridge: 1,275 feet AMSL
- Bridge #39—Ulaino Stream Bridge: 636 feet AMSL
- Bridge #40—Mokulehua Stream Bridge: 551 AMSL

The island of Maui, which is the second largest island in the state, was formed through the merging of two volcanoes—the more recent East Maui volcano, or Haleakala, and the older West Maui volcano (Foote et al. 1972). The project is located on the eastern portion of the island. The Isthmus of Maui is a narrow, gently sloping plain between the two volcanoes. The East Maui volcano is represented by the older rocks of the Honomanu volcanic series, buried beneath younger volcanic deposits. The Kula volcanic series overlaps the Honomanu series, consisting of thick lava flows with embedded ash and cinder materials. Between the end of the Kula volcanic series and the beginning of the Hana volcanic series was a long period of deep erosion and sediment deposition. The formed Hana series generally consists of the youngest lava flows and cinder cones presently encountered at the East Maui ground surface (Geolabs, Inc. 2020).

The Natural Resources Conservation Service (NRCS) identifies the following soil types in the project limits (NRCS 2023):

- **rough mountainous land (rRT):** This soil type was mapped at Bridge #2—Kailua Stream Bridge, portions of the Bridge #5—Makanali Stream Bridge project area, Bridge #8—Puohokamoa Stream Bridge, and Bridge #19—Kopiliula Stream Bridge (NRCS 2023). This soil occurs in mountainous areas

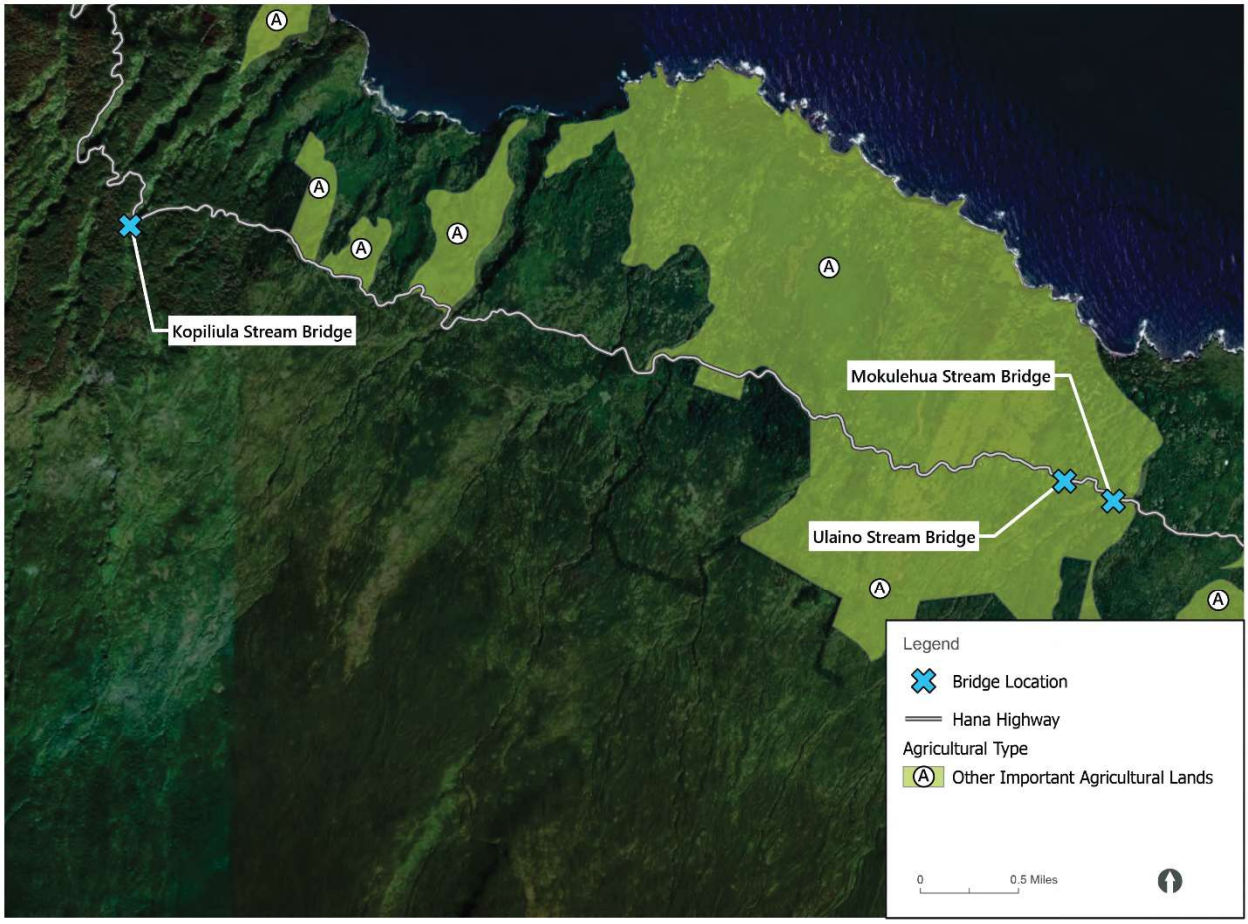
on the island where the land surface is dominated by deep, V-shaped valleys with extremely steep side slopes and narrow ridges between the valleys. Elevations of this soil type range from nearly sea level to more than 6,000 feet, and the annual rainfall amounts range from 70 to more than 400 inches. The soil mantle is very thin, ranging from 1 inch to 10 inches in thickness over saprolite (Foote et al. 1972).

- **Kailua silty clay, 3 to 25 percent slopes (KBID):** This soil type was mapped at portions of the Bridge #5—Makanali Stream Bridge project area and the potential staging area near Bridge #19—Kopiliula Stream Bridge (NRCS 2023). The Kailua series consists of well-drained soils on uplands on the island of Maui that developed in volcanic ash. Elevations range from 200 to 2,000 feet, and annual rainfall amounts to 90 to 160 inches. The permeability of this soil type is moderately rapid. Runoff is slow, and the erosion hazard is slight (Foote et al. 1972).
- **Hana very stony silty clay loam, 3 to 25 percent slopes (HKLD):** This soil type was mapped at Bridge #39—Ulaino Stream Bridge and Bridge #40—Mokulehua Stream Bridge (NRCS 2023). The Hana series consists of well-drained soils on uplands on the island of Maui that developed in volcanic ash. Elevations range from nearly sea level to 1,200 feet, and the annual rainfall amounts to 80 to 150 inches. This soil type occurs on smooth, low mountain slopes and small, steep areas near cinder cones. The permeability of this soil type is moderately rapid. Runoff is slow to medium, and the erosion hazard is slight to moderate (Foote et al. 1972).

While the above-mapped soils are not considered of the quality deemed prime to grow agricultural crops, the State Department of Agriculture has classified lands surrounding Bridge #39—Ulaino Stream Bridge, Bridge #40—Mokulehua Stream Bridge, and a small portion of the Bridge #5—Makanali Stream Bridge project area as “Other Important Agricultural Land” (Figures 3-1 and 3-2).

Figure 3-1. Agricultural Lands of Importance to the State of Hawaii (Bridges #2, #5, #8)

Figure 3-2. Agricultural Lands of Importance to the State of Hawaii (Bridges #19, #39, #40)



Preliminary analyses of the site and geotechnical conditions have been performed for the proposed project. The bridges contain excavated cut slopes in steep terrain, with limited surface alluvial and colluvial soil cover. Potential hazardous slope instability conditions may be present in the lands surrounding the bridges. Based on subsurface exploration, the conditions vary at the bridges. Various stratigraphic units encountered in geotechnical borings included fill materials, volcanic ash, recent alluvium, residual soil, saprolite, basalt formation, and clinker material. Dense basalt formation was encountered at relatively shallow depths at the Kahului-side abutments of Bridge #2—Kailua Stream Bridge and Bridge #5—Makanali Stream Bridge. At the other locations, basalt formation was either not encountered or encountered at deeper depths (over 8.5 feet below ground surface) (Geolabs, Inc. 2020).

Natural and geologic hazard risks in the vicinity of the project area include earthquakes/seismic hazards, tsunamis, tropical cyclones, landslides, floods, and wildfires. Natural hazards are discussed in Section 3.4 of this EA.

3.1.2 Potential Impacts and Mitigation Measures

No Build Alternative

Under the No Build Alternative, site conditions would not change. There would be no effects on the topography, soils, and geologic processes in the project area.

Build Alternative

The Build Alternative involves long-term improvements focused on the six bridge locations and immediate roadway approaches. No major horizontal or vertical alignment changes to the roadway are associated with the project; therefore, there would be no major topographic changes or alteration or removal of unique geologic formations. At Bridge #19—Kopiliula Stream Bridge, a new bridge would be constructed makai of the existing bridge, thereby avoiding cuts to steep mauka slopes. Each bridge foundation will be appropriately designed to address the site-specific geologic and soil conditions encountered during geotechnical investigations. Deep foundation systems consisting of micropiles may be used at most locations. Where basalt formations were encountered at relatively shallow depths, shallow foundation systems such as spread footings may be considered. Geotechnical investigations will continue as project design progresses to ensure the same or improved factor of safety.

Although portions of the project would occur in lands classified as "Other Important Agricultural Land," these lands are not in active agricultural use and would only be temporarily impacted by the project. No permanent ROW or land conversions would be required in any lands classified as prime, unique, or other important agricultural lands.

Construction activities, such as grading, clearing and grubbing, and equipment/materials staging, would involve minor land disturbances that could result in soil erosion. None of the soils in the project areas are known to present a high erosion hazard potential. To minimize the potential for construction-related erosion and sedimentation impacts, BMPs would be developed and implemented per Chapter 20.08 of the Maui County Code. See Section 3.2 and Section 3.3 for a list of applicable BMPs.

3.2 Climate and Air Quality

3.2.1 Existing Conditions

The island of Maui has an incredibly diverse climate and rainfall patterns influenced by the mountainous terrain, prevailing trade winds from the northeast, the regular presence of a stable atmospheric layer, and marine effects. Dramatic differences in mean rainfall can exist over short distances (Giambelluca et al. 2013). The six bridges this project addresses have mean annual rainfall amounts ranging from approximately 132 to 225 inches per year (Table 3-1). Rainfall is typically highest in March and lowest in June. The mean annual air temperature is approximately 70 degrees Fahrenheit (°F) at five of the six bridges and slightly cooler at Bridge #19—Kopiliula Stream Bridge, with a mean annual temperature of approximately 67°F.

Table 3-1. Mean Annual Rainfall and Temperature at the Six Project Bridges

Bridge Name	Mean Annual Rainfall (inches)	Mean Annual Temperature (°F)
Bridge #2—Kailua Stream Bridge	132.2	70.6
Bridge #5—Makanali Stream Bridge	137.7	70.6
Bridge #8—Puohokamoa Stream Bridge	148.0	70.7
Bridge #19—Kopiliula Stream Bridge	225.2	67.2
Bridge #39—Ulaino Stream Bridge	161.9	70.9
Bridge #40—Mokulehua Stream Bridge	165.2	70.9

Source: Rainfall Atlas of Hawaii (Giambelluca et al. 2013) and Climate of Hawaii (Giambelluca et al. 2014)

According to the United Nations' Intergovernmental Panel on Climate Change, there is scientific consensus that the earth is warming due to manufactured increases in greenhouse gases in the atmosphere. Global mean air temperatures are projected to increase by at least 2.7°F by the end of the century, and the strongest ocean warming is projected in tropical and Northern Hemisphere subtropical regions. Increases up to 3.6°F in the upper ocean above 650 feet are projected. The contrast between wet and dry regions and seasons will likely become more extreme, with increased and more frequent and extreme precipitation. Ocean acidity is also projected to increase, and rates of global sea-level rise are likely to accelerate beyond those already experienced (UH Manoa Sea Grant College Program 2014). A sea level rise viewer from the Pacific Islands Ocean Observing System provides a graphical representation of potential future exposure areas from multiple coastal hazards due to sea level rise. This information is presented in Section 3.4 of this EA.

Under the Clean Air Act, the U.S. Environmental Protection Agency has established national ambient air quality standards for seven major air pollutants to protect public health. These include carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter smaller than 10 microns, particulate matter smaller than 2.5 microns ($PM_{2.5}$), and sulfur dioxide. The State of Hawaii has also established standards for these pollutants and hydrogen sulfide. Maui, as well as the entire state of Hawaii, is currently designated in attainment for all national ambient air quality standards. The HDOH Clean Air Branch has two air monitoring stations on Maui, one in Kihei and one in Kahului. The pollutant monitored at both locations is $PM_{2.5}$. As reported in the State of Hawaii Annual Summary 2021 Air Quality Data, no exceedances of $PM_{2.5}$ have been recorded in 2021 (HDOH 2022).

HDOH also regulates fugitive dust through HAR 11-60.1-33. The regulation states that "no person shall cause or permit visible fugitive dust to become airborne without taking reasonable precautions," and "no person shall cause or permit the discharge of visible fugitive dust beyond the property lot line on which the fugitive dust originates" unless it can be demonstrated that the best practical operation or treatment is being implemented.

3.2.2 Potential Impacts and Mitigation Measures

No Build Alternative

The No Build Alternative would not contribute to climatic or air quality changes.

Build Alternative

Construction activities are a source of dust and exhaust emissions that can impact local air quality. Construction for the entirety of the proposed project is expected to last no more than three years, with each bridge taking less than that. Short-term impacts on air quality may result from the following pollutants: (1) fugitive dust from vehicular movement and soil disturbance and (2) exhaust emissions from onsite construction equipment. Overall air quality impacts are expected to be insignificant because of the relatively small disturbance areas at each bridge site, short construction duration, and implementation of BMPs for dust control and exhaust emissions. Construction activities would incorporate control measures in compliance with provisions of HAR Chapter 11-60.1, "Air Pollution Control," Section 11-60.1-33 on Fugitive Dust and Maui County Code Chapter 20.08. Measures that are expected to be used to control airborne emissions include the following:

- Use water, disturbance area limitations, and re-vegetation to minimize dust emissions.
- Stabilize all disturbed areas with erosion control measures.
- Cover open-bodied trucks and trailers whenever hauling material that can be blown away.

- Revegetate disturbed areas as soon as practical after construction.
- Stabilize construction entrances to avoid offsite tracking of sediment.

Over the long term, this project would not result in any changes in traffic volumes, vehicle mix, location of the existing facility, or any other factor that can cause an increase in emissions. As such, this project would generate no changes in air quality impacts for the regulated criteria pollutants and would not be linked with any special mobile source air toxics concerns.

3.3 Water Resources

A water quality assessment and delineation of waters of the U.S. was performed for the project. A summary of the reported conditions from the report titled *Jurisdictional Waters Delineation and Water Quality Assessment of Hana Highway Bridges Repair Project,* dated May 2021, is provided below (AECOS 2021).

3.3.1 Existing Conditions

Surface Water

The project encompasses six bridges crossing six surface waters along the Hana Belt Road. The surface streams crossed are as follows:

- Kailua Stream (Bridge #2—Kailua Stream Bridge)
- Makanali Stream (Bridge #5—Makanali Stream Bridge)
- Puohokamoa Stream (Bridge #8—Puohokamoa Stream Bridge)
- Kopiliula Stream (Bridge #19—Kopiliula Stream Bridge)
- Heleleikeoha Stream (Bridge #39—Ulaino Stream Bridge)
- Kawakoe Stream (Bridge #40—Mokulehua Stream Bridge)

Kailua Stream: Kailua Stream (State ID No. 6-3-14) is listed as a perennial stream in the Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit 1990) and the Atlas of Hawaiian Watersheds (Parham et al. 2008). The stream is also classified as perennial by the Maui Island Water Use and Development Plan and listed as having six known stream diversions (County of Maui 2017). The stream is one of many streams flowing from the Koolau Forest Reserve.

The project is in the Kailua Watershed, a steep and narrow drainage basin along the Hana Highway. The watershed extends from approximately 6,550 feet AMSL on the northern flank of East Maui Mountain to the Pacific Ocean shore. The total area of the watershed is estimated at 4.9 square miles (Parham et al. 2008). Kailua Stream is the only named stream in the watershed. The Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit 1990) states that 20 percent of the Kailua Stream is in native forest. The stream achieves a “moderate” ranking for aquatic resources, while cultural and recreational resources are listed as “substantial.” However, the only recreational resource listed for Kailua Stream is swimming.

The elevation at Bridge #2—Kailua Stream Bridge is approximately 680 feet AMSL. Kailua Stream is contained within a steep-sided gulch near the bridge, where the stream flows as a straight run (Photo 3-1). At approximately 120 feet downstream of the bridge, Kailua Stream descends over a ledge into a plunge pool. The stream reaches the Pacific Ocean roughly 1 mile further downstream. Lowrie Ditch crosses Kailua Stream approximately 420 feet downstream of the bridge.

The U.S. Department of Agriculture, NRCS web soil survey maps the soil type along Kailua Stream at Bridge #2—Kailua Stream Bridge as entirely rRT; KBID bound the gulch (USDA-NRCS 2020). Neither of these soil types is included in the Hydric Soils List (USDA-NRCS, nd.) for the County of Maui.

Photo 3-1. Bridge #2—Kailua Stream Bridge crossing the Kailua Stream (looking upstream from the makai side of the bridge)

Makanali Stream: Makanali Stream is listed as a tributary of the perennial Oopuola Stream (State ID No. 6-4-01) in the Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit 1990). Oopuola Stream system has fifteen stream diversions (County of Maui 2017), with at least two diversions on Makanali Stream: Center Ditch and Spreckels Ditch.

The project is located in the Oopuola Watershed (DLNR-DAR code 64017), which arises at approximately 2050 feet AMSL on the northeast flank of East Maui Mountain, well below the summit. The total area of the watershed is estimated at one square mile (Parham et al. 2008), a relatively small size compared to other watersheds along the Hana Highway. According to the Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit 1990), recreational resources of Oopuola Stream (including Makanali Stream) are “substantial” and include hiking, hunting, and scenic views.

The elevation at Bridge #5—Makanali Stream Bridge is approximately 690 feet AMSL. Makanali Stream descends from a narrow, forested gulch at the project site and intersects Center Ditch approximately 80 feet upstream of the bridge (Photo 3-2). At the time of the water quality survey, nearly all of the surface water in Makanali Stream was directed into Center Ditch. However, despite the weir being closed, a hole in the weir gate of Center Ditch allowed some streamflow to spill into Makanali Stream. From the

intersection with Center Ditch, Makanali Stream flows beneath Bridge #5—Makanali Stream Bridge, over a bedrock ledge and down a steep rock face as a waterfall. Approximately 0.25 miles downstream of the bridge, Makanali Stream reaches a confluence with Oopuola Stream and reaches the Pacific Ocean approximately 0.6 miles downstream at Oopuola Point.

Center Ditch runs 2.2 miles from Kolea Reservoir to Huelo and Nailiilihaele Stream and connects the Manuel-Louise Ditch to Lowrie Ditch (USGS 2012; Wilcox 1996). These three ditches form the Lowrie Ditch System, which concluded construction in September 1900 (Wilcox 1996). Lowrie Ditch System generally runs parallel with Hana Highway. East Maui Irrigation Co. and Mahi Pono LLC currently manage this system.

The NRCS web soil survey maps the soil type along Kopiliula Stream at Bridge #5—Makanali Stream Bridge as rRT, with Honomanu silty clay, 5 to 25 percent slopes (rHOD) above the left bank, and KBID above the right bank (USDA-NRCS 2020). None of these soil types is included in the Hydric Soils List (USDA-NRCS nd.) for the County of Maui.

Photo 3-2. Bridge #5—Makanali Stream Bridge crossing the Makanali Stream (looking downstream from the mauka side of the bridge)

Puohokamoa Stream: Puohokamoa Stream (State ID No. 6-4-06) is listed as a perennial stream in the Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit 1990) and the Atlas of Hawaiian Watersheds (Parham et al. 2008). The stream is described as having eight known stream diversions

(County of Maui 2017) and is one of several streams flowing out of the Hanawi Natural Area Reserve and Waikamoi Preserve, managed by The Nature Conservancy of Hawaii.

The project is located in the Puohokamoa Watershed (DAR code 64006), a steep, narrow drainage typical of watersheds along the Hana Highway. The watershed extends from about 5600 feet AMSL on the north flank of East Maui Mountain to the Pacific Ocean, with an area estimated at 3.2 square miles (Parham et al. 2008). Puohokamoa Stream is the only named stream in the watershed. The Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit 1990) states that 40 percent of Puohokamoa Stream flows through native forest, with one named waterfall (Puohokamoa), and ranks aquatic resources as “limited,” whereas riparian resources are listed as “substantial.” Recreational resources listed include swimming, hunting, and scenic views.

The elevation at Bridge #8—Puohokamoa Stream Bridge is approximately 570 feet AMSL. Puohokamoa waterfall empties into a pool upstream of the bridge and flows through a bend in the gulch near the bridge (Photo 3-3). No stream diversions are present within the project vicinity. From the bridge, Puohokamoa Stream flows for approximately 0.5 miles before reaching the Pacific Ocean near Keopuka Rock, a small rocky islet.

The USDA-NRCS web soil survey maps the soil type along Puohokamoa Stream at Bridge #8—Puohokamoa Stream Bridge as rRT; KBID occurs beyond the gulch (USDA-NRCS 2020). Neither of these soil types is included in the Hydric Soils List (USDA-NRCS nd.) for the County of Maui.

Photo 3-3. Bridge #8—Puohokamoa Stream Bridge crossing the Puohokamoa Stream (looking upstream from the makai side of the bridge)

Kopiliula Stream: Kopiliula Stream (State ID No. 6-4-17) is listed as a perennial stream in the Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit 1990) and the Atlas of Hawaiian Watersheds (Parham et al. 2008). The stream is described as having two known stream diversions (County of Maui 2017) and is one of several streams flowing out of the Hanawi Natural Area Reserve and Waikamoi Preserve, managed by The Nature Conservancy of Hawaii.

The project is located in the Kopiliula watershed (DAR code 64017), a steep and narrow drainage basin typical of watersheds along the Hana Highway. The watershed extends from approximately 4800 feet AMSL on the Kaluaawa summit at the northeast end of Haleakala. The total area of the watershed is estimated at 4.8 square miles (Parham et al. 2008). Kopiliula Stream is the only named stream in the watershed. The Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit 1990) states that 80 percent of Kopiliula Stream flows through native forest and has at least one named waterfall, Kopiliula Falls. The Hawaii Stream Assessment ranks the aquatic resources as “moderate,” while riparian resources are listed as “outstanding.” Recreational resources listed include fishing, swimming, hunting, and scenic views.

The elevation at Bridge #19—Kopiliula Stream Bridge is approximately 1260 feet AMSL. At the project site, Kopiliula Stream passes through a narrow gulch, approximately 200 feet across at the downstream end of the survey area (Photo 3-4). Koolau Ditch runs parallel to Hana Highway and intersects Kopiliula Stream immediately upstream of the bridge. A low-head dam with a weir is constructed in the Kopiliula Stream channel beneath the bridge, where the structure controls the volume of stream water diverted into Koolau Ditch. At the time of the survey, the weir was propped open by a log, so most of the flow was directed down Kopiliula Stream. Some flow was directed to the Koolau Ditch system through an intake gate on the left bank of Kopiliula Stream. Koolau Ditch was originally constructed in 1905 and later connected with Wailoa Ditch in 1923 to convey water to central Maui for cane irrigation (Wilcox 1996). East Maui Irrigation Co. and Mahi Pono LLC currently manage this ditch system.

Photo 3-4. Bridge #19—Kopiliula Stream Bridge crossing the Kopiliula Stream (looking downstream from the mauka side of the bridge—Note East Maui Irrigation Co. sluice gate and weir)

The USDA-NRCS web soil survey maps the soil type along Kopiliula Stream at Bridge #19—Kopiliula Stream Bridge as rRT, with rHOD on the left bank and KBID on the right bank (USDA-NRCS 2020). None of these soil types are included in the Soil Data Access Hydric Soils List (USDA-NRCS nd.) for the County of Maui.

Heleleikeoha Stream: Heleleikeoha Stream (State ID No. 6-4-31) is listed as a perennial stream in the Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit 1990) and the Atlas of Hawaiian Watersheds (Parham et al. 2008). The stream is described as having at least fourteen known stream diversions (County of Maui 2017) and is one of several streams flowing out of the Hanawi Natural Area Reserve.

The project is in the Heleleikeoha Watershed, a large and steep drainage basin extending from approximately 6,890 feet AMSL on the Kaluaawa summit at the northeast end of Haleakala Crater. The total area of the watershed is estimated at 7.2 square miles (Parham et al. 2008). The watershed contains

one named stream, Heleleikeoha Stream. The stream system is fairly complex in the upper watershed, where the stream bifurcates and reconnects at several points. The Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit 1990) states that 40 percent of Heleleikeoha Stream is in native forest and ranks the riparian and recreational resources at the stream as "substantial." Recreational uses listed include hiking, swimming, hunting, and scenic views.

The elevation at Bridge #39—Ulaino Stream Bridge is approximately 635 feet AMSL. Heleleikeoha Stream descends a broad slope near the bridge, flowing from pool to pool in a streambed of basalt bedrock incised into the surrounding landscape (Photo 3-5). The stream reaches the Pacific Ocean shore approximately 0.7 miles downstream from the bridge.

Photo 3-5. Bridge #39—Ulaino Stream Bridge crossing the Heleleikeoha Stream (looking along the mauka side of the bridge)

The USDA-NRCS web soil survey maps the soil type along Heleleikeoha Stream at Bridge #39—Ulaino Stream Bridge as entirely HKLD. HKLD soil is not included in the Hydric Soils List (USDA-NRCS nd.) for the County of Maui.

Kawakoe Stream: Kawakoe Stream (State ID No. 6-4-32) is listed as an intermittent stream in the Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit 1990), with Mokulehua Stream listed as a tributary stream. However, Kawakoe and Mokulehua streams are listed as perennial in the Atlas of Hawaiian Watersheds (Parham et al. 2008). At least fifteen known stream diversions occur along the stream (County of Maui 2017).

The project is located in the Kawakoe Gulch watershed (DAR code 64032), which arises at approximately 1,654 feet AMSL on the Kalapawili Ridge of East Maui Mountain. The total area of the watershed is estimated at 4.0 square miles (Parham et al. 2008; Hawaii State GIS, 2017). The Hawaii Stream Assessment (Hawaii Cooperative Park Service Unit 1990) states that 30 percent of the course of Kawakoe Stream is in native forest, and native hala (*Pandanus tectorus*) forest is notable along the

Mokulehua Stream tributary. Kawakoe Stream achieves a rank of "outstanding" for both aquatic and recreational resources. Recreational uses listed include hiking, fishing, swimming, and scenic views.

The elevation at Bridge #40—Mokulehua Stream Bridge is approximately 525 feet AMSL. The confluence of Mokulehua and Kawakoe streams is approximately 615 feet upstream of the bridge, and the stream continues as Kawakoe Stream through the project area (Photo 3-6). Kawakoe Stream descends over a series of waterfalls from the project area before reaching the Pacific Ocean, approximately 0.8 miles downstream of the bridge.

Photo 3-6. Bridge #40—Mokulehua Stream Bridge crossing the Kawakoe Stream (looking upstream from the makai side of the bridge)

USDA-NRCS web soil survey maps the soil type along Kawakoe Stream at Bridge #40—Mokulehua Stream Bridge as entirely HKLD. HKLD soil is not included in the Hydric Soils List (USDA-NRCS nd.) for the County of Maui.

Jurisdictional Waters Delineation

A delineation of waters of the U.S., including wetlands, was performed within the survey area for each bridge site. Delineation results are documented in a project technical report titled *Jurisdictional Waters Delineation and Water Quality Assessment of Hana Highway Bridges Repair Project* (AECOS 2021). The OHWM for each stream was delineated, marked, and surveyed during the field delineations. Additionally, upland wetland areas beyond the limits of the OHWM were also delineated, marked, and surveyed.

Upland wetlands were observed at the following locations only:

- Bridge #8—Puohokamoa Stream Bridge: Upland Wetland area near the Hana side approach to the bridge on the mauka side of the approach roadway

- Bridge #19—Kopiliula Stream Bridge: Upland Wetland area near the Haiku side approach to the bridge on the mauka side of the approach roadway

Clean Water Act, Section 303(d)

The Federal CWA requires states to collect and review surface water quality data and related information and to prepare and submit to the Environmental Protection Agency biennial lists of impaired waterbodies (i.e., not meeting state water quality standards). The 2020 State of Hawaii Water Quality Monitoring and Assessment Report (HDOH 2020) includes the current list. According to the report, none of the inland streams covered in this report are listed as impaired waterways.

3.3.2 Potential Impacts and Mitigation Measures

No Build Alternative

Under the No Build Alternative, there would be no ground-disturbing activities or changes to the existing environment. Bridge improvements designed to better withstand scour and offer greater stability during flooding events would not be provided; therefore, susceptibility issues would persist.

Build Alternative

Short-term Construction Impacts

At each of the bridges, the proposed project would involve excavation, grading, and construction near the streams on the streambanks. Except for Bridge #19—Kopiliula Stream Bridge, physical temporary construction work (i.e., temporary structural supports, temporary retaining walls) in the areas of the streams would be primarily limited to areas outside of the OHWM to limit physical effects on the stream. Temporary grading or use of bank stabilization measures during construction for contractor access (i.e., gabion stabilization or similar) may be needed and may be located within the OWHM area. Impacts would be minimized to the extent practicable, and stream flow would be maintained at all times within the natural stream channel. At each of the 6 bridges, temporary construction impacts below the OWHM are anticipated to be limited to 0.05 acres or less at each site. Erosion and sediment delivery potential would be reduced by implementing BMPs during construction.

If water is present, portions of the bridge construction area containing water would be dewatered before in-stream work using a dewatering structure (such as a coffer dam or stream diversion), as appropriate for the location. The dewatering structure would be constructed where needed below the OHWM and sized as needed to dewater the bridge construction area. The dewatering structure would be removed immediately after it is no longer needed. Dewatering operations would be conducted in accordance with applicable permit requirements. The area below OHWM that would be temporarily disturbed by dewatering activities would be determined prior to applying for the CWA Section 404 and other required permits.

Section 404 of the CWA regulates the discharge of dredged or fill materials into the waters of the U.S. When work requires a Section 404 permit, a Section 401 water quality certification is also required. These permits and a state stream channel alteration permit are anticipated and will be obtained for the project. BMPs that have been either preapproved or coordinated with regulatory agencies, such as those included in FHWA-CFLHD and HDOT's *An Integrated Storm Water Management Approach and a Summary of Clear Water Diversion and Isolation Best Management Practices for Use in the State of Hawaii*, will be used to minimize the potential for water quality effects on the streams.

Because land disturbances would exceed 1 acre, coverage for the project will be obtained under a National Pollutant Discharge Elimination System General Permit for Storm Water Associated with Construction Activity (HAR 11-55, Appendix C). A project-specific Storm Water Pollution Prevention Plan with an approved erosion and sediment control plan will be developed and implemented. The plan will incorporate BMPs consistent with HDOT's *Construction Best Management Practices Field Manual*. Generally accepted BMPs such as the following will be used:

- Minimize sedimentation via onsite drainage or other pollution discharge to streams through BMPs or erosion control devices.
- Stabilize all disturbed areas with erosion control measures.
- Revegetate disturbed areas, including streambanks, as soon as practicable after construction.
- Stabilize construction entrances to avoid offsite tracking of sediment.
- Ensure all project-related materials and equipment placed in the water are pollutant-free.
- Fuel land-based vehicles and equipment at least 50 feet from the water, preferably over an impervious surface.

Accidental spills or releases of hazardous materials during construction could degrade the quality of stormwater runoff and reach the streams. Temporary stormwater control measures would be implemented to protect water quality in the streams. The potential for accidental spills or releases is low; if they did occur, they would be attended to and cleaned up immediately.

Overall, implementing BMPs would reduce the potential for sediment or pollutants to reach downstream waters. Small sediment plumes could occur, primarily due to the construction or removal of the dewatering/isolation structures; however, any turbidity released because of construction activities would be minimal and expected to dissipate quickly.

Long-term Impacts on Waters of the U.S. and Water Quality

The project has been designed to avoid and minimize effects on waters of the U.S. to the greatest extent practicable, and efforts will continue through the final design. The project will also evaluate and incorporate applicable post-construction BMPs in accordance with the standards and criteria of HDOT's Post-Construction Stormwater Management Program. Permanent, unavoidable impacts are anticipated for the construction of a new bridge adjacent to Bridge #19—Kopiliula Stream Bridge. A two-span bridge is necessary due to the stream crossing size and girder length limitations. While the new bridge abutments and wingwalls would be positioned above the OHWM, a center pier would be required in the stream. To minimize impacts, the newly constructed pier would be positioned near a natural rock outcropping; the design is still in the preliminary stages therefore, impacts are approximated. Approximately 0.04 acres of permanent effects on the stream are anticipated. These impacts would be included as part of the permitting request for the project, as discussed above.

At the remaining five bridges, there would be no permanent impacts on waters of the U.S. from the Build Alternative. The new bridges would fully span the streams with new supports built behind the existing bridge supports. This would result in no anticipated permanent impacts below the OHWM for the following five streams (bridges):

- Kailua Stream (Bridge #2—Kailua Stream Bridge)
- Makanali Stream (Bridge #5—Makanali Stream Bridge)

- Puohokamoa Stream (Bridge #8—Puohokamoa Stream Bridge)
- Heleleikeoha Stream (Bridge #39—Ulaino Stream Bridge)
- Kawakoe Stream (Bridge #40—Mokulehua Stream Bridge)

The bridges noted above would not change the general drainage pattern of stormwater flows. At these five bridges, impervious surface increase would be negligible, with less than 0.01 acres of impervious surface increase expected at each site, primarily due to increased area for a slightly wider bridge deck and connections to the highway. Because the project area is surrounded by undeveloped land, the slight increase in impervious surface area would not have an adverse effect on stormwater runoff entering the streams.

At Bridge #19—Kopiliula Stream Bridge, there would be a minor increase in the impervious surface of approximately 0.07 acres to accommodate the new structure and roadway approaches. Because the project area is surrounded by undeveloped land, the slight increase in impervious surface area would not significantly affect stormwater runoff entering the streams.

3.4 Natural Hazards

3.4.1 Existing Conditions

The island of Maui is susceptible to potential natural hazards, including flooding, earthquakes, tsunamis, hurricanes, tropical storms, landslides, and wildfires. These dangers pose a threat to life and property. Since 1955, there have been more than 30 major disaster declarations in Hawaii due to tropical cyclones, earthquakes, landslides, lava flows, and tsunamis (Maui Emergency Management Agency 2020). The County of Maui has an overarching goal to be resilient to disasters and recognizes in its Countywide Policy Plan that while "natural hazards are outside of human control, their impacts may be planned for and minimized" (County of Maui 2010). As part of this ongoing effort, the county has developed a Multi-Hazard Mitigation Plan to identify the hazards and risks posed by natural disasters and identify hazard mitigation actions to reduce losses from disasters. This plan identified the Hana community planning area as notably vulnerable to flooding from heavy rainfall events on windward mountain slopes, hurricanes and tropical storms, and damaging winds. Hana Highway is especially vulnerable to landslides and rockfalls from heavy rain. Flooding also causes road closures (Maui Emergency Management Agency 2020).

Flooding

As part of the National Flood Insurance Program, the Federal Emergency Management Agency (FEMA) identifies and maps geographic areas according to varying levels of flood risk and depicts flood zones on a Flood Insurance Rate Map (FIRM). Development within a designated Special Flood Hazard Area, or an area identified as having special flood or flood-related erosion hazards, is regulated and subject to review by the local floodplain administrator (County of Maui). FHWA-CFLHD and HDOT use design criteria and guidelines to evaluate existing and proposed bridge improvements as part of the design process. Existing condition information for each of the six bridges is provided below.

Bridge #2—Kailua Stream Bridge

Bridge #2—Kailua Stream Bridge is located within a Zone X floodplain (FIRM Panel 1500030445E, effective September 25, 2009). Zone X is defined as an area of minimal flood hazard and higher than the elevation of the 0.2-percent annual chance floodplain (500-year floodplain). Existing conditions analysis revealed that the existing hydraulic opening of this single-span bridge is currently undersized, and the bridge is overtopped by approximately a 10-year storm event. It conveys approximately two-thirds of a 50-year design storm event.

Bridge #5—Makanali Stream Bridge

Bridge #5—Makanali Stream Bridge is mapped in a Zone X floodplain, defined as an area of minimal flood hazard (FIRM Panel 1500030465E, effective September 25, 2009). Existing conditions analysis revealed that the existing hydraulic opening of this single-span bridge is currently adequate to pass a 50-year design storm event.

Bridge #8—Puohokamoa Stream Bridge

Bridge #8—Puohokamoa Stream Bridge is mapped in a Zone X floodplain, defined as an area of minimal flood hazard (FIRM Panel 1500030465E, effective September 25, 2009). Existing conditions analysis revealed that the existing hydraulic opening of this two-span bridge is currently adequate to pass a 50-year design storm event.

Bridge #19—Kopiliula Stream Bridge

Bridge #19—Kopiliula Stream Bridge is mapped in a Zone X floodplain, defined as an area of minimal flood hazard (FIRM Panel 1500030465E, effective September 25, 2009). Existing conditions analysis revealed that the existing hydraulic opening of this two-span bridge is currently undersized, and the bridge is overtopped by a 50-year storm event with water spilling around the perched bridge.

Bridge #39—Ulaino Stream Bridge

Bridge #39—Ulaino Stream Bridge is within a FEMA Zone A Special Flood Hazard Area (FIRM Panel 1500030655E, effective September 25, 2009). Zone A floodplains are areas with a one-percent annual chance of flooding and are determined using approximate methods with no base flood elevation or flood depths defined. Modeling was developed for existing and proposed conditions to understand the project's impacts on the base flood elevations. The existing conditions analysis revealed that the hydraulic opening of this two-span structure is currently undersized, and a 100-year storm overtops the bridge.

Bridge #40—Mokulehua Stream Bridge

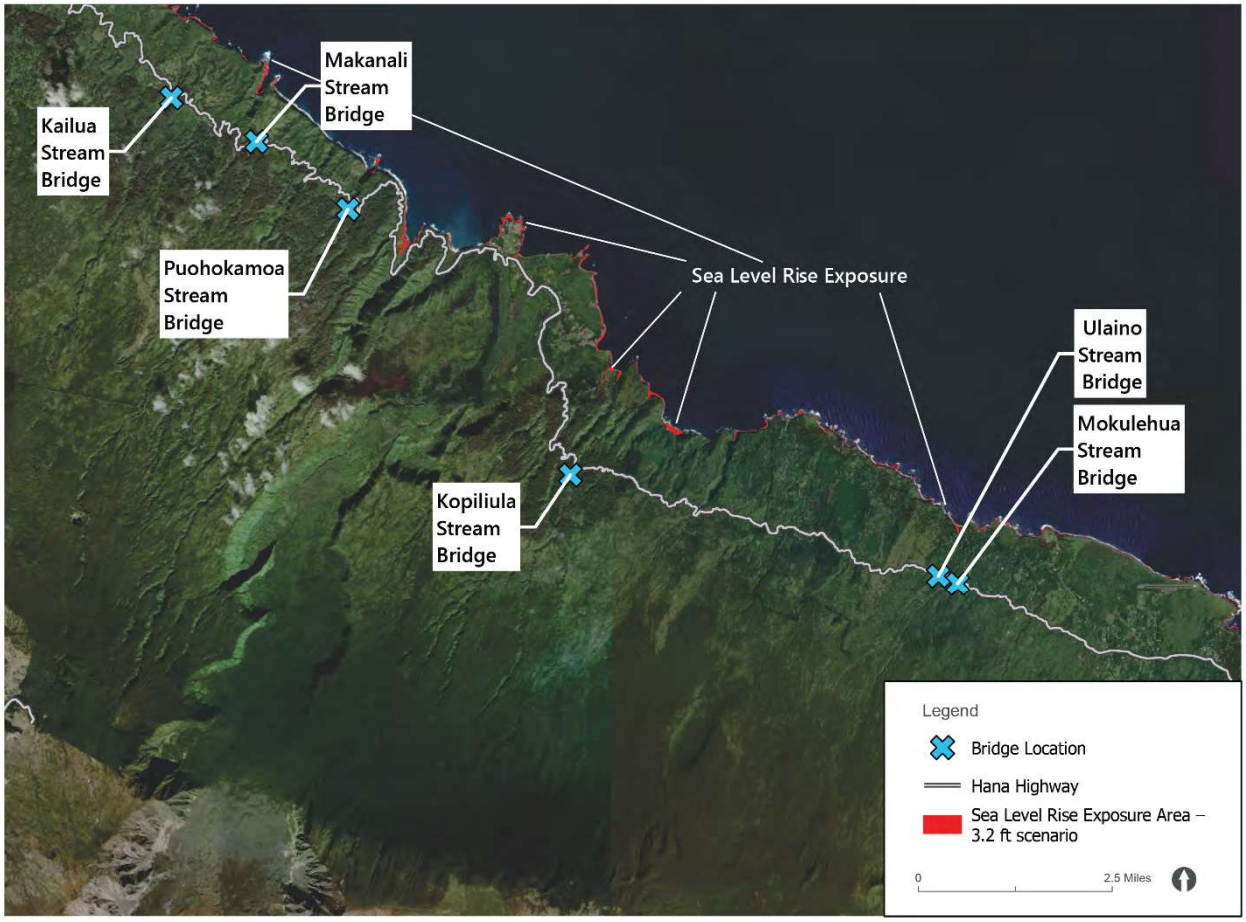
Bridge #40—Mokulehua Stream Bridge is within a FEMA Zone A Special Flood Hazard Area (FIRM Panel 1500030655E, effective September 25, 2009). Modeling was developed for existing and proposed conditions to understand the project's impacts on the base flood elevations. The existing conditions analysis revealed that the existing hydraulic opening of this three-span structure passes the 100-year storm event.

Sea Level Rise

The Hawaii Sea Level Rise Vulnerability and Adaptation Report, developed in 2017 and updated in 2022, addresses the threat posed by climate change to public health, natural resources, economic well-being, and the environment of Hawaii. Rising sea levels correspond to rising vulnerabilities (Hawaii State Climate Commission 2022). The report presents a Sea Level Rise Exposure Area viewer that depicts areas around the state projected to be exposed to chronic flooding hazards due to sea level rise. Three chronic flooding hazards were modeled: (1) passive flooding, (2) annual high wave flooding, and (3) coastal erosion. A map of the 3.2-foot exposure area in relation to the project area is depicted in Figure 3-3. Sea Level Rise Exposure Area Map

The project is inland from the coast at elevations ranging from 551 to 1,275 feet AMSL and is not located in areas identified as being exposed to sea level rise.

Figure 3-3. Sea Level Rise Exposure Area Map



Seismic Activity

Hawaii experiences thousands of earthquakes annually, primarily caused by eruptive processes within active volcanoes. Shaking from earthquakes from volcanic activity is typically too small to cause damage. These small earthquakes are located around the Haleakala volcano in the County of Maui, although a major earthquake could impact the entire county (Maui Emergency Management Agency 2020). Notable faults within the County of Maui include the West Maui Fault, East Molokai Fault, and an extensive fault system on Lanai. Earthquakes occurring on other Hawaiian Islands, such as the island of Hawaii or in the Pacific Ocean, can also impact Maui as it did in 2006. The Kiholo Bay and Mahukona earthquakes of 2006, centered in the Pacific Ocean west of the island of Hawaii, induced several landslides and rockfalls along the Piilani Highway and resulted in estimated damages of over $28 million. The probability assigned to the county for a significant earthquake event is “possible,” representing a 1 to 10 percent annual probability. Buildings and infrastructure not built to appropriate building codes are at a higher risk for damage from seismic events, especially certain types such as those constructed of unreinforced masonry and concrete (Maui Emergency Management Agency 2020).

The AASHTO LRFD Bridge Design Specifications provide minimum design criteria to address potential damage from seismic disturbances. The AASHTO LRFD Bridge Design Specification scale is from Seismic Zone 1 through 4, where 1 is the lowest level for potential seismic-induced ground movement. The island of Maui is designated Seismic Zone 2, representing an elevated seismic risk. The existing

substructures lack the ability to resist earthquake forces and motions as they were not designed for seismic loading.

Tsunamis

Tsunamis are a series of giant waves created by disturbances such as earthquakes, landslides, volcanic eruptions, or meteorites. Low-lying coastal areas are at the highest risk of tsunamis (Maui Emergency Management Agency 2020). The County of Maui and the National Oceanic and Atmospheric Administration have produced maps showing evacuation zones for areas at risk from tsunamis and extreme tsunamis. The proposed project area is not located within a tsunami evacuation zone. Hana Highway may serve the traffic of those leaving coastal areas of tsunami evacuation zones.

3.4.2 Potential Impacts and Mitigation

No Build Alternative

Under the No Build Alternative, there would be no changes to vulnerability to natural hazards in the project area. The existing structures were not designed for seismic loading and would not undergo any improvements to address this issue. There would also be no change in flood risk in the project area.

Build Alternative

The Build Alternative would provide for more resilient infrastructure and would not increase the project area's vulnerability to natural hazards. All the project bridges are being designed to the appropriate seismic response parameters and would be more resistant to damage from potential seismic events.

Hana Highway is in an area prone to landslides that can damage the roadway and necessitate road closures. Improving the reliability of six of the lowest load-rated bridges enhances HDOT's ability to access and repair potential future roadway damage from landslides.

All the project bridges are being designed to meet or exceed existing hydraulic conditions, and future condition modeling revealed that no adverse effects would result from implementing the Build Alternative. The bridges are also being designed to be reinforced for flood events to improve resiliency and durability. Minor drainage improvements at roadway approaches would be incorporated into the project as practicable to improve existing site conditions. Hydraulic analyses modeled for the proposed bridge improvements have indicated no rise in the base flood elevation from existing conditions for Bridge #39—Ulaino Stream Bridge and Bridge #40—Mokulehua Stream Bridge, the two bridges located within a regulatory floodplain. Therefore, there would be no adverse effects on flooding potential from the implementation of the Build Alternative.

3.5 Noise

3.5.1 Existing Conditions

Noise is defined in the HDOH Community Noise Control regulation (HAR 11-46-2) as any sound that may produce adverse physiological or psychological effects or interfere with individual or group activities, including but not limited to communication, work, rest, recreation, or sleep. For highway transportation projects with FHWA involvement, federal regulations govern the analysis and abatement of traffic noise impacts for certain project types that involve long-term changes to the noise environment. This bridge improvement project is not a type that has the potential to affect long-term changes due to the lack of significant physical changes to the horizontal or vertical alignment of the highway (i.e., not a Type I

project). There are no existing or permitted sensitive noise receptors at Bridge #19—Kopiliula Stream Bridge, where there is only a minor shift in the bridge location.

The project is in a rural area with scattered residences. The noise environment is predominantly influenced by automobile traffic noise on Hana Highway. The area's steep topography and dense vegetation help attenuate noise originating from the highway. No sensitive noise receptors are near Bridge #5—Makanali Stream Bridge, Bridge #8—Puohokamoa Stream Bridge, and Bridge #19—Kopiliula Stream Bridge. At the remaining bridges, nearby residences are approximately 100 feet from Bridge #2—Kailua Stream Bridge, approximately 45 feet from Bridge #39—Ulaino Stream Bridge, and approximately 80 feet from Bridge #40—Mokulehua Stream Bridge.

3.5.2 Potential Impacts and Mitigation Measures

No Build Alternative

Under the No Build Alternative, no permanent improvements to the bridges or roadway would occur, and current maintenance activities would continue. There would be no noise impacts associated with this alternative.

Build Alternative

The Build Alternative would not change highway capacity or operational conditions compared to current conditions. There would be no long-term impacts on noise from implementing the Build Alternative.

Construction activities associated with the Build Alternative would temporarily elevate noise levels in the project area. Noise resulting from construction activities would depend on the different types of equipment used, the distance between construction noise sources and sensitive noise receptors, and the timing and duration of noise-generating activities. Types of construction equipment that may be used include but are not limited to drill rigs, cranes, excavators, backhoes, front-end loaders, graders, dump trucks, concrete trucks, compactors, paving equipment, and compressors. FHWA's Roadway Construction Noise Handbook (FHWA 2006) indicates that the loudest equipment generally emits noise in the range of 80 to 90 A-weighted decibels (dBA) at a distance of 50 feet, which exceeds the maximum permissible sound levels specified in the HDOH Community Noise Control regulations. Table 3-2 summarizes noise levels produced by construction equipment commonly used on roadway construction projects. The noise produced by construction equipment would be reduced over distance at a rate of about 6 dBA per doubling of distance. Figure 3-4 depicts the noise levels of common activities to enable readers to compare the levels discussed in this section with common activities.

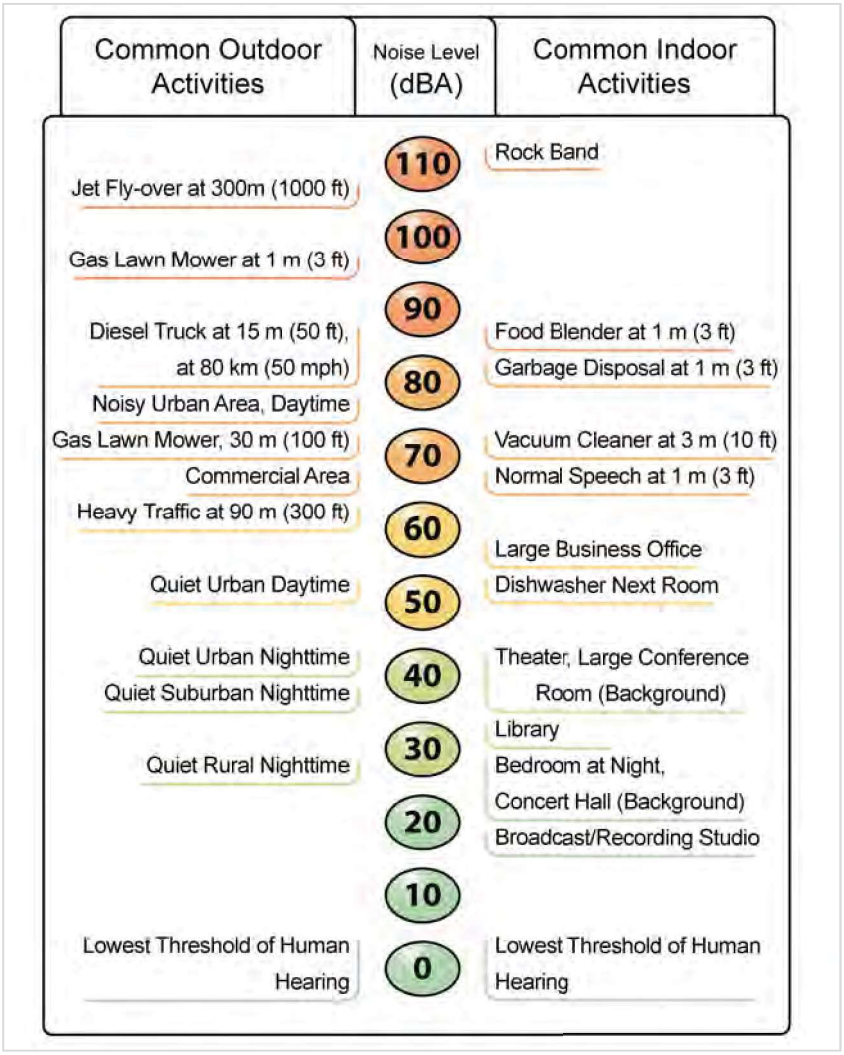
Table 3-2. Construction Equipment Noise Levels

Equipment	Actual Measured Average Lmax (dBA) at 50 feet
Backhoe	78
Chainsaw	84
Compactor (ground)	83
Compressor (air)	78
Concrete Mixer Truck	79
Concrete Pump Truck	81

Equipment	Actual Measured Average Lmax (dBA) at 50 feet
Concrete Saw	90
Crane	81
Drill Rig Truck	79
Excavator	81
Front End Loader	79
Grader	85
Mounted Impact Hammer (hoe ram)	90
Pickup Truck	75
Rock Drill	81
Scraper	84

Source: FHWA Roadway Construction Noise Handbook (2006)

Figure 3-4. Noise Levels of Common Activities



Per HAR 11-46-3, the project areas are within Class A Zoning Districts (conservation) and Class C Zoning Districts (agriculture). Under the Class A Zoning District, the maximum permissible sound levels are 55 dBA during the daytime (7 a.m. to 10 p.m.) and 45 dBA during the nighttime (10 p.m. to 7 a.m.). Under the Class C Zoning District, the maximum permissible sound levels are 70 dBA during the daytime and 70 dBA during the nighttime. A Community Noise Permit would be required and obtained because construction noise is expected to exceed the maximum permissible sound levels.

For HDOH to issue a noise permit, the application would describe construction activities for the project. Specific permit restrictions required for construction projects include the following:

- No permit shall allow construction activities that exceed the maximum permissible sound levels before 7 a.m. and after 6 p.m. of the same day, Monday through Friday.
- No permit shall allow construction activities in excess of the maximum permissible sound levels for hours before 9 a.m. and after 6:00 p.m. on Saturdays.

- No permit shall allow construction activities that emit noise in excess of the maximum permissible levels on Sundays and on holidays.

The HDOH noise permit generally does not limit the noise level generated at the construction site but rather the times when high-volume construction can occur. However, before issuing the permit, HDOH may require noise mitigations to be incorporated into construction plans, for example, maintenance and proper muffling of construction equipment and onsite vehicles that exhaust gas or air. HDOH may also require the contractor to conduct noise monitoring. Nighttime construction and potential weekend work are anticipated for this project to minimize impacts on the traveling public. Therefore, in addition to the noise permit, a Community Noise Variance would be requested from HDOH for specific occasions when work hours need to be extended into the evenings or on weekends to implement the overall construction schedule.

3.6 Hazardous Materials

3.6.1 Affected Environment

Six regulatory database reports were obtained from Environmental Data Resources Inc. (EDR), dated October 31, 2019. The EDR report included a review of the available historic information on the project site. The EDR report identifies regulated facilities with aboveground storage tanks, underground storage tanks, landfill sites, hazardous waste generation or treatment, storage, and disposal facilities, leaking underground storage tank sites, and other sites associated with recognized environmental conditions (REC) in the search area, up to one mile from the project area. A REC is defined as "the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property." These reports were reviewed for evidence of activities that would suggest the potential presence of hazardous substances at the project site and to evaluate the potential for the project site construction to be impacted by contamination. Two of the six bridges had regulated facilities with the specified search radius; each site was researched and dismissed from additional analysis based on the review of findings. None of the six bridges had RECs.

Bridge #2—Kailua Stream Bridge

According to the EDR report, three regulated facilities were noted within the search radius for the bridge, including the Kailua Radar Station, Maui Pesticide Haiku Road Site, and Pesticide Storage Site Removal. These orphan sites could not be mapped due to poor or inadequate information.

The Kailua Radar Station is approximately 0.36 miles northeast and down-gradient to cross-gradient. It is listed on the formerly used defense site database with the status of "Properties without Projects." This facility does not pose an environmental threat to the site.

The Maui Pesticide Haiku Road Site is listed in the superfund archive database (1996), is not on the National Priorities List, and was a removal-only site. No site assessment work was needed.

The Pesticide Storage Site Removal is listed in the state hazardous waste site database as a pesticide cleanup site with no further action status in 1988.

Each regulated facility was researched and determined not to pose a threat.

Bridge #5—Makanali Stream Bridge

No regulated facilities were noted within the search radius of the database report for the bridge.

Bridge #8—Puohokamoa Stream Bridge
No regulated facilities were noted within the search radius of the database report for the bridge.

Bridge #19—Kopiliula Stream Bridge
No regulated facilities were noted within the search radius of the database report for the bridge.

Bridge #39—Ulaino Stream Bridge
No regulated facilities were noted within the search radius of the database report for the bridge.

Bridge #40—Mokulehua Stream Bridge
According to the EDR report, one regulated facility was noted within the search radius for the bridge. This regulated facility is listed for a leaking underground storage tank, underground storage tank, and financial assurance database. Site cleanup was completed, and no further action was granted in October 2001. This site was dismissed as a result.

3.6.2 Potential Impacts and Mitigation Measures

Based on the results of the EDR, no known hazardous waste sites are located at any of the bridges.

Project construction would require the removal of the existing superstructures for five bridges. Surveys of structures were performed to determine whether asbestos-containing material or lead-based paint (LBP) is currently present.

Asbestos was not detected in the 90 samples collected.

The limited paint survey was conducted on sixteen (16) paint intact chip samples. Samples were collected from various painted components that may be disturbed during the project. Except for three non-detect results, all other paint samples contain detectable concentrations of lead.

Since LBP was identified, BMPs would be implemented before LBP removal to contain debris, control airborne dust, and properly dispose of materials with LBP.

Construction-related activities would also involve the use of hazardous materials. Hazardous materials spill prevention measures would be applied in areas of refueling and at storage facilities and when handling hazardous materials . Development and execution of the plan would reduce potential effects to a minimal level. The contents and requirements of the hazardous materials spill plan include the following:

- The project manager and heavy equipment operators would perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations would be postponed or halted should a leak be detected, and they would not proceed until the leak is repaired and the equipment is cleaned.
- Absorbent material manufactured for containment and cleanup of small hazardous materials spills would be kept at the project site.
- In the event of a large hazardous materials spill or if unanticipated hazardous materials are encountered within the project site, the HDOH Hazard Evaluation and Emergency Response Office and the HDOT Hazard Evaluation and Environmental Response Office will be contacted immediately.
- Hazardous waste generated as a result of removal, demolition, and rehabilitation activities would be managed to the highest and best end use and in a manner to ensure the protection of human health

(workers, visitors to the site, and the general public) and the environment in accordance with applicable laws, rules, and regulations.

- A hazardous waste determination for all anticipated waste would be prepared to determine whether the waste is classified as hazardous waste, universal waste, excluded waste, wastewater, or solid waste. Before removal, demolition, and rehabilitation activities related to ACM or LBP commence, all applicable permits will be obtained from, and notifications be provided to, the federal, state, and local permitting and regulatory agencies with jurisdiction over this work.

3.7 Flora and Fauna

Biological resources include native or naturalized plants and animals and the habitats (e.g., grasslands, forests, wetlands) in which they exist. Protected and sensitive biological resources include Endangered Species Act (ESA) listed species (federally threatened, endangered, or candidate species) and those proposed for ESA-listing as designated by the U.S. Fish and Wildlife Service (USFWS) (terrestrial and freshwater organisms) and migratory birds. Migratory birds are protected species under the Migratory Bird Treaty Act. Sensitive habitats include those areas designated or proposed by USFWS as critical habitat protected by the ESA and as sensitive ecological areas designated by the state or other federal rulings. Sensitive habitats also include wetlands, plant communities that are unusual or limited in distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, crucial summer and winter habitats).

The ESA (16 USC § 1531 et seq.) establishes a federal program to protect and recover imperiled species and the ecosystems they depend on. The ESA requires federal agencies, in consultation with USFWS, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. Under the ESA, “jeopardy” occurs when an action is reasonably expected, directly or indirectly, to diminish a species' numbers, reproduction, or distribution so that the likelihood of survival and recovery in the wild is appreciably reduced. The ESA defines an “endangered species” as any species in danger of extinction throughout all or a significant portion of its range. The ESA defines a “threatened species” as any species likely to become endangered in the foreseeable future. The ESA also prohibits any action that causes a “take” of any listed animal. “Take” is defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct.” Listed plants are not protected from a take, although collecting or maliciously harming them on federal land is illegal.

The Magnuson-Stevens Fisheries Conservation Management Act requires identifying and conserving essential fish habitat (EFH). The EFH provisions of the act require heightened consideration of habitat for commercial fish species in resource management decisions. EFH is defined as “those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity” (16 U.S.C. 1802(10)). Federal and state agencies, National Marine Fisheries Service (NMFS), and regional Fishery Management Councils work together to identify EFH for each federally managed fish species and develop conservation measures to protect and enhance these habitats.

Critical habitat is designated if the USFWS determines that the habitat is essential to the conservation of a threatened or endangered species. Federal agencies must ensure that activities do not adversely modify designated critical habitat to the point that they will no longer aid in the species’ recovery.

Under the State of Hawaii endangered species law, codified in Chapter 195D, HRS, it is unlawful for any person to “take” an endangered or threatened species of aquatic life, wildlife, or land plant. “Take” means

to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect endangered or threatened species of aquatic life or wildlife or to cut, collect, uproot, destroy, injure, or possess endangered or threatened species of aquatic life or land plants, or to attempt to engage in any such conduct (Section 195D-2 HRS).

3.7.1 Existing Conditions

Biological surveys in support of the proposed project were conducted in December 2018 (Hobdy 2018). A walk-through botanical and wildlife survey method covered the project area for each of the six bridge locations. This included inspection of bridge footprints, staging areas, stream waters, stream beds, and adjacent banks and gulches to distances of 100 feet upstream and 300 feet downstream. Biologists documented flora and fauna species, distribution and abundance, terrain, and substrate. The descriptions of flora and fauna for each bridge below are cited from Hobdy's (2018) *Biological Survey and Assessment for the Hana Highway Bridge Rehabilitation Project*. In addition to the 2018 biological surveys, an aquatic resources habitat characterization was conducted by a USFWS biologist in April 2022 to document existing fish and wildlife resources at the proposed bridge sites in the project area (Polhemus 2022). **The** 2022 survey information has been added to Appendix F**.** The results and findings from these surveys are summarized below.

USFWS and Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) and Division of Aquatic Resources (DAR) were consulted in 2019 to obtain information on potential species or habitats that may occur within the project area and recommended avoidance and minimization measures. Information shared by the agencies is incorporated into the analysis, where applicable. A summary of regulatory consultation and coordination activities to date is provided in Chapter 7.

Flora

Bridge #2—Kailua Stream Bridge: Non-native species dominate the vegetation near the bridge. A total of 47 plant species were recorded during the 2018 survey, and of these, 44 were non-native species of trees, shrubs, grasses, and ferns. One tree species dominated the project area, hau (*Hibiscus tiliaceus*), which formed a dense tangle of growth. Also common was shoe button ardisia or inkberry (*Ardisia elliptica*). Three native fern species were documented: the endemic lepelepe a moa (*Selaginella arbuscula*), the indigenous uluhe (*Dicranopteris linearis*), and the moa (*Psilotum nudum*). All three of these ferns are widespread throughout Hawaii.

Bridge #5—Makanali Stream Bridge: Non-native species dominate the vegetation in the project area surrounding the bridge. A total of 44 plant species were recorded during the survey, and of these, 41 were non-native trees, shrubs, vines, grasses, and ferns. Two non-native trees are considered common or dominant, the African tulip tree (*Spathodea campanulata*) and Henon bamboo (*Phyllostachys nigra*). Three indigenous native species were found, the uluhe fern, 'ie'ie (*Freycinetia arborea*), and the hala tree (*Pandanus tectorius*). All three of these species are widespread and common throughout Hawaii.

Bridge #8—Puohokamoa Stream Bridge: Non-native species dominate the vegetation in the project area surrounding the bridge. A total of 51 plant species were recorded during the 2018 survey, and of these, 49 were non-native trees, shrubs, vines, grasses, and ferns. Seven non-native species were found to be common: Formosa koa (*Acacia confusa*), African tulip tree, inkberry, pothos (*Epipremnum pinnatum*), yellow ginger (*Hedychium flavescens*), platanillo (*Heliconia collinsiana*) and crepe ginger (*Cheilocostus speciosus*). Two indigenous native species were found, the hala tree and the uluhe fern. Both of these are widespread and common throughout Hawaii.

Bridge #19—Kopiliula Stream Bridge: The bridge is at the highest elevation on the Hana Highway at 1,260 feet. Within the project area, the vegetation includes more middle-elevation species, and native species become more common. A total of 60 plant species were recorded during the 2018 survey, and of these, 52 were non-native trees, shrubs, vines, grasses, and ferns. One native fern and six other non-native species were found to be common: uluhe fern, Job's tears (*Coix lacryma-jobi*), yellow ginger, African tulip tree, moonflower (*Ipomoea alba*), strawberry guava (*Psidium cattleianum*), and California grass (*Urochloa mutica*)

Eight native plant species were found in the project area, including four endemic species, ʻamaʻu fern (*Sadleria cyatheoides*), hāpuʻu pulu tree fern (*Cibotium glaucum*), koa (*Acacia koa*), ʻōhiʻa (*Metrosideros polymorpha*), and four indigenous species, uluhe fern, no common name (NCN) (*Cyperus polystachyos)*, ahaniu (*Machaerina mariscosdes*), and kamole (*Persicaria glabra*). All of these native species are common throughout Hawaii.

Bridge #39—Ulaino Stream Bridge: Non-native species dominate the project area vegetation surrounding the bridge. A total of 55 plant species were recorded during the 2018 survey, and of these, 52 were non-native trees, shrubs, grasses, and ferns. Six non-native species were found to be common. These included California grass, yellow ginger, lobster claw (*Heliconia bihai*), ki (*Cordyline fruticosa*), parasitic maiden fern (*Cyclosorus parasiticus*), and crepe ginger. Three indigenous native plant species were found in the project area, including the uluhe fern, *Cyperus polystachyos,* and the hala tree. All of these native species are common throughout Hawaii.

Bridge #40—Mokulehua Stream Bridge: Non-native species dominate the project area vegetation surrounding the bridge. A total of 44 plant species were recorded during the survey, and of these, 43 were non-native trees, shrubs, vines, grasses, and ferns. Three non-native species were common: the parasitic maiden fern, the yellow ginger, and the African tulip tree. One indigenous native fern was found in the project area, the ʻēkaha or bird's nest fern (*Asplenium nidus*). This large fern is common in lowland wet forest throughout Hawaii.

Fauna

Bridge #2—Kailua Stream Bridge: One non-native bird, the red-billed leiothrix (*Leiothrix lutea*), and two non-native insects, the southern house mosquito (*Culex quinquefasciatus*) and the long-tailed blue butterfly (*Lampides boeticus*), were recorded within the project area. Although not seen, some other non-native mammals such as rats (*Rattus* sp.), mice (*Mus* sp.), mongoose (*Herpestes auropunctatus*), and wild pigs (*Sus scrofa*) undoubtedly occasionally occur in this habitat, and several non-native birds as well. No mollusks or fish were seen in or around the stream.

Bridge #5—Makanali Stream Bridge: Animal species were poorly represented in this area of the project. Two mammals were recorded here, the non-native mongoose and the endemic and federally endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*). More information regarding the bat in the project area is provided in the Threatened and Endangered Species Section below. Two non-native insects were recorded, the southern house mosquito and the banana leaf roller butterfly (*Erionota thrax*). No birds were seen or heard. No mollusks or fish were seen in or around the stream.

Bridge #8—Puohokamoa Stream Bridge: The presence of rats, mice, mongoose, and wild pigs are expected in this habitat. One non-native bird, the red-billed leiothrix, was identified by its call. No other birds were seen or heard, but a few non-native birds could occur within the project area. The federally endangered Hawaiian hoary bat was also detected at this bridge during surveys. More information is provided below in the Threatened and Endangered Species Section below. Four non-native insects were

recorded here. These included the Asian spiny-backed spider (*Gasteracantha mammosa*), the common garden spider (*Argiope appensa*), the black earwig (*Chelisoches morio*), and the southern house mosquito. No mollusks or fish were seen in or around the stream.

Bridge #19—Kopiliula Stream Bridge: The survey found no mammals, although rats, mice, mongoose, and wild pigs are expected in this habitat. No bird species were heard or seen during the survey. Four species of insects were recorded in the project area, including one endemic damselfly, the pīnao'ula (*Megalagrion calliphya*), one indigenous dragonfly, pīnao or globe skimmer (*Pantala flavescens*), and two non-native species, the blowfly (*Rhinia testacea*) and the small rice grasshopper (*Oxya japonica*). No mollusks or fish were seen in or around the stream.

Bridge #39—Ulaino Stream Bridge: No mammals were found during the survey, although non-native rats, mice, mongoose, and wild pigs are expected in this habitat. Three species of non-native birds were recorded during the survey: the zebra dove (*Geopelia striata*), spotted dove (*Streptopelia chinensis*), and hwamei (*Leucodioptron canorum*). The survey recorded three species of non-native insects: the Asian spiny-backed spider, the southern house mosquito, and the honeybee (*Apis mellifera*). No mollusks or fish were seen in or around the stream. The April 2022 surveys conducted in the project area did record a Pacific Hawaiian damselfly (*Megalagrion pacificum*) approximately 150 feet upstream of Bridge #39—Ulaino Stream Bridge. This species is discussed in detail in the Threatened and Endangered Species Section.

Bridge #40—Mokulehua Stream Bridge: Two domestic mammal species were seen, the cat (*Felis catus*) and the dog (*Canis familiaris*), associated with nearby homes. Also expected in this habitat are non-native rats, mice, mongoose, and wild pigs. No bird species were seen or heard in the project area. Two non-native insect species were found in this project area: the southern house mosquito and the Asian swallowtail butterfly (*Papilio xutha*). No mollusks or fish were seen in or around the stream.

Threatened and Endangered Species

Consistent with ESA Section 7 implementing regulations (50 Code of Federal Regulations [CFR] 402.12[b][2]), a list of 32 endangered, threatened, and proposed species that could occur within or near the project area was generated from the USFWS Information for Planning and Consultation (IPaC) system, the 2019 official species list request for this proposed action (01EPIF00-2019-SL-0262), and communications with USFWS biologist during a July 11, 2023 teleconference, as summarized in Table 3-3 (USFWS 2023a, USFWS 2019). Scientific literature, field 2018 and 2022 survey results (Hobdy 2018, Polhemus 2022), Division of Forestry and Wildlife (DOFAW 2023) information and other available and relevant data were used to evaluate whether the proposed project could affect the 32 federally listed species.

Based on the 2018 and 2022 field survey results, species' current known distribution, and habitat requirements, seven species and critical habitat for five plant species were identified as having the potential to be affected by the proposed project. The full detailed analysis of the 32 federally listed species is provided in the Biological Assessment developed for this project (HDR 2023).

The species that have the potential to be affected by the proposed action include:

- Flying earwig Hawaiian damselfly (*Megalagrion nesiotes*)
- Pacific Hawaiian damselfly
- Hawaiian stilt (*Himantopus mexicanus knudseni*)

- Seabirds (band-rumped storm-petrel [*Oceanodroma castro*], Hawaiian petrel [*Pterodroma sandwichensis*], and Newell's shearwater [*Puffinus auricularis newelli*])
- Hawaiian hoary bat

There is no final or designated critical habitat within the project area. Although there is no critical habitat in the project area, there is designated critical habitat for five plant species downstream of Bridge #8—Puohokamoa Stream Bridge and Bridge #19—Kopiliula Stream Bridge (USFWS 2019):

- Pua ʻala (*Brighamia rockii*)
- NCN (*Cyperus pennatiformis*)
- Hilo ischaemum (*Ischaemum byrone*)
- Makou (*Peucedanum sandwicense*)
- NCN (*Vigna o-wahuensis*)

Table 3-3. Federally Listed Species with the Potential to be Affected by the Proposed Project

Species	ESA-Listing Status [1]	Habitat Description and Range[2]	Potential for Occurrence
Invertebrates			
Flying earwig Hawaiian damselfly (*Megalagrion nesiotes*)	E	Inhabits wet forest understory and does not frequent the project area. The only confirmed adult population in the last 15 years has occurred in east Maui. Adults were observed along a steep, riparian rock slope densely covered with uluhe (*Dicranopteris linearis*) and the adjacent stream on windward Haleakalā. Terrestrial or semi-terrestrial larvae may occur in damp leaf litter, moist leaf axils of plants up to several feet above ground, or within moist soil or seeps between boulders in suitable habitat.	May occur
Pacific Hawaiian damselfly (*Megalagrion pacificum*)	E	Habitat requirements consist of lentic habitats that may include marshes, seepage-fed pools, large ponds, and quiet pools in gulches, usually in areas with dense surrounding vegetation below 2,000 feet on all Hawaiian Islands except Kaho'olawe and Ni'ihau. These lentic habitats need to be free of non-native fish that prey on the larva.	Known to occur
Birds			
Band-rumped storm petrel (*Oceanodroma castro*)	E	This species' current known breeding range in the Hawaiian Islands includes the islands of Hawaii, Lanai, Kauai, and Lehua. Based on ground-calling observations, breeding is also suspected on Maui, but no known colonies exist. BRSPs use dry cliff (dry grasslands and shrublands), wet cliff (wet forest), coastal cliff, and barren lava field habitat types when breeding. They are known to nest in remote cliff locations on Kauai and Lehua Islands, steep open vegetated cliffs, and little vegetated, high-elevation lava fields on Hawaii Island.	May occur
Hawaiian petrel (*Pterodroma sandwichensis*)	E	Remote or high-elevation areas on Hawaii, Maui, Molokai, Lanai, and Kauai islands. They nest in burrows, primarily in remote montane locations, along large rock outcrops, under cinder cones or old lichen-covered lava, or in the soil beneath dense vegetation.	May occur
Hawaiian stilt (*Himantopus mexicanus knudseni*)	E	Hawaiian stilts use a variety of aquatic habitats, primarily at lower elevations, but are limited by water depth and vegetation cover. Hawaiian stilts require early successional marshlands with a water depth of less than 9 inches and utilize areas of sparse, low-growing perennial vegetation or exposed tidal flats. Hawaiian stilts are currently found on all the main Hawaiian Islands except Kahoolawe.	May occur

Species	ESA-Listing Status [1]	Habitat Description and Range[2]	Potential for Occurrence
Newell's shearwater (*Puffinus auricularis newelli*)	T	This species nests on the slopes and cliffs of Kauai. Small colonies also exist on Molokai, Maui, and the Hawaii Islands. This species nests in burrows beneath ferns and tree roots in dense forests, steep slopes, and cliffs.	May occur
Mammals			
Hawaiian hoary bat (*Lasiurus cinereus semotus*)	E	The Hawaiian hoary bat roosts alone or with dependent young in native and non-native trees, typically more than 15 feet tall. On Maui, bat activities were detected across the island during all months of the year, with monthly detection highest from July to November and greater detections occurring in the remnant forests than in the shrubland for most months.	Known to occur
Plants			
Pua 'ala (*Brighamia rockii*)[3]	E	Pua 'ala occurs in rock crevices on steep basalt sea cliffs, often within the spray zone, in coastal dry or mesic forest, kawelu *(Eragrostis variabilis*) mixed coastal cliff communities or shrubland, or loulu (*Pritchardia* sp.) coastal mesic forest from sea level to 2,201 feet. It occurs on steep, inaccessible sea cliffs along East Molokai's northern coastline.	Unlikely to occur
NCN (*Cyperus pennatiformis*)[3]	E	On Maui, Cyperus pennatiformis occurs on cliffs with brown soil and talus within reach of ocean spray in Hala coastal wet forests at elevations between sea level and 615 feet and containing one or more of the following associated native plant species: makaloa (*Cyperus laevigatus*), kawelu (*Eragrostis* spp.), morning glory (*Ipomoea* spp.), *Lysimachia mauritiana*, and amau ii (*Sadleria pallida*).	Unlikely to occur
Hilo ischaemum (*Ischaemum byrone*)[3]	E	On Maui, at moku Huki, Nahiku, Kaohuhua Gulch, and from Hana to Waianapanapa the associated native species include *Achyranthes splendens*, aeae (*Bacopa monnieri*), kookoolau (*Bidens hillebrandiana*), *Carex wahuensis*, pohuehue (*Cocculus orbiculatus*), *Cyperus* spp., aalii (*Dodonaea viscosa*), kumuniu (*Doryopteris decipiens*), wiliwili (*Erythrina sandwicensis*), akoko (*Euphorbia degeneri*), mauu akiaki (*Fimbristylis cymosa*), mao hau hele (*Hibiscus brackenridgei*), *Kadua littoralis*, nehe (*Lipochaeta lobata*), noni kauhiwi (*Morinda trimera*), ulei (*Osteomelis anthyllidifolia*), hala, kakonakona (*Panicum torridum*), lauae (*Phymatosorus grossus*), amau ii, naupaka (*Scaevola taccada*), royal schiedea (*Schiedea salicaria*), ilima (*Sida fallax*), and palaa (*Sphenomeris chinensis*).	Unlikely to occur

Species	ESA-Listing Status [1]	Habitat Description and Range[2]	Potential for Occurrence
Makou (*Peucedanum sandwicense*)[3]	T	On Maui, makou occurs on sparsely vegetated steep to vertical cliffs with little soil in mesic or coastal communities at sea level to 3,714 feet with the associated native species Carex wahuensis, *Cyperus phleoides*, ulei (*Osteomeles anthyllidifolia*), naupaka, and akulikuli (*Sesuvium portulacastrum*).	Unlikely to occur
No common name (*Vigna o-wahuensis*)[3]	E	*Vigna o-wahuensis* occurs in dry to mesic grassland and shrubland from 30 to 4,500 feet in elevation. Associated native plant species include ilima, aheahea (*Chenopodium* spp.), kupaoa (*Dubautia menziesii*), and ulei.	Unlikely to occur

Notes:
[1] E = Endangered, T = Threatened
Species list generated from the site-specific USFWS IPaC web-based system report (Project Code: 2023-0109994). USFWS 2023a, USFWS 2019.
[2] Habitat Description and Range data from the USFWS Species Profile (USFWS 2023b).
[3] Only critical habitat for this species will be considered in the analysis (USFWS 2019).

Federally listed species were not documented at five of the eight bridges during the December 2018 biological surveys (Hobdy 2018) and April 2022 Aquatic Resource Habitat Characterizations (Polhemus 2022). One federally listed insect, the Pacific Hawaiian damselfly, was recorded upstream of Bridge #39—Ulaino Stream Bridge during the 2022 aquatic resource characterizations and the Hawaiian hoary bat was detected at Bridge #5—Makanali Stream Bridge and Bridge #8—Puohokamoa Stream Bridge during the 2018 biological surveys. More information regarding federally listed species presence/absence is provided in the discussion below.

Two federally listed species in Table 3-3 have been documented in the project area, including the Pacific Hawaiian damselfly and Hawaiian hoary bat. The remaining five species were not observed during the 2018 or 2022 surveys, but since suitable habitat is present, they have the potential to occur. The five species with potential habitat include the flying earwig Hawaiian damselfly Hawaiian stilt, band-rumped storm petrel, Hawaiian petrel, and Newell's shearwater. There is no proposed or final critical habitat near the project area. However, there is critical habitat for five species downstream of Bridge #8—Puohokamoa Stream Bridge and Bridge #19—Kopiliula Stream Bridge along the coast (USFWS 2019). The critical habitat is for the following plant species: Pua ʻala, *Cyperus pennatiformis*, Hilo ischaemum, Makou, and NCN (*Vigna o-wahuensis*).

The flying earwig Hawaiian damselfly species inhabits wet forest understory and does not frequent the project area. The only confirmed adult population in the last 15 years occurs in east Maui. Adults were observed along a steep, riparian rock slope densely covered with the native fern, uluhe, and the adjacent stream on windward Haleakala. Terrestrial or semi-terrestrial larvae may occur in damp leaf litter, moist leaf axils of plants up to several feet above ground, or within moist soil or seeps between boulders in suitable habitat. This species was not observed during the 2022 aquatic resource habitat characterization (Polhemus 2022) within the project area, but suitable habitat is present.

The Pacific Hawaiian damselfly requires lentic habitats, including marshes, seepage-fed pools, large ponds, and quiet pools in gulches, usually in dense surrounding vegetation below 2,000 feet. Surveys conducted in April 2022 for this project observed a damselfly population in a set of seepage-fed side pools in bedrock approximately 150 feet upstream of Bridge #39—Ulaino Stream Bridge. The population appeared relatively small, with three individuals observed here and at several other pools further upstream. The stream along this reach consisted of scattered pools in Hana basalts, fed by low volume, laminar flows or perhaps by seepage through the porous lavas, and was devoid of introduced fishes, the presence of which is negatively correlated with the persistence of *Megalagrion* populations (Polhemus 2022).

Hawaiian stilts have not been observed in the project area but have the potential to occur wherever ephemeral or persistent standing water may occur (USFWS 2019). Suitable habitat for the Hawaiian stilt includes a water depth of less than 9 inches. The preferred foraging habitats are early successional marshlands with shallow water and perennial low-growing vegetation or exposed tidal flats; other wetland habitats with similar characteristics also are used. This includes freshwater habitats (ephemeral lakes, reservoirs, settling basins, natural or manmade ponds, and sugar settling basins), brackish water habitats (coastal ponds, silted fishponds, and estuaries), and saltwater habitats (inshore reefs, silted beach areas, and tidal flats) (DOFAW 2015a). This species may occur as a transient individual moving between wetland habitats on Maui. Suitable foraging habitat is present at all bridges in the proposed project. No Hawaiian stilt nesting habitat is present within the project area.

The Hawaiian hoary bat roosts in native and non-native vegetation from 3 to 29 feet above ground; the species, on rare occasion, has been observed using lava tubes, cracks in rocks, or human-made structures for roosting. While roosting during the day, this species is solitary, although mothers and pups

roost together. They forage on a variety of native and non-native night-flying insects, including moths, beetles, crickets, mosquitoes, and termites (DOFAW 2015). On Maui, bat presence is detected across the island and during all months of the year, with monthly detection highest from July to November and greater detections occurring in the remnant forests than in the shrubland for most months. During biological surveys conducted in December 2018 to support this project (Hobdy 2018), evening surveys were conducted with bat detectors at all six bridges in the project area. The Hawaiian hoary bat was recorded at Bridge #5—Makanali Stream Bridge and Bridge #8—Puohokamoa Stream Bridge. Suitable habitat (remnant forests with trees taller than 15 feet) is present in the vicinity of all bridges in the project area.

Although unlikely, the band-rumped storm petrel (*Oceanodroma castro*), Hawaiian petrel (*Pterodroma sandwichensis*), and Newell's shearwater (*Puffinus auricularis newelli*), collectively referred to as Hawaiian seabirds, may traverse the project area at night during the breeding, nesting, and fledging seasons (March 1 to December 15). These seabirds nest in a variety of remote habitats including high-elevation inland areas, steep, densely vegetated mountains, and xeric habitats with very sparse vegetation (DOFAW 2023). They are required to traverse inland areas to return to the sea. Therefore, impacts should be considered even though suitable habitat does not occur in the project area. For the remaining federally listed species, the project area lacks suitable habitat, or the distribution and range exclude these bridge areas.

Based on the 2018 and 2022 biological survey results (Hobdy 2018, Polhemus 2022), no threatened or endangered plant species were observed in the project area.

Critical habitat for Pua ʻala, *Cyperus pennatiformis*, Hilo ischaemum, Makou, and *Vigna o-wahuensis* has been designated along the eastern coast of Maui from Honomanu Bay east to Kapalua Gulch. This critical habitat unit is downstream of Bridge #8—Puohokamoa Stream Bridge and Bridge #19—Kopiliula Stream Bridge. The Maui-Coastal-Unit 5 is 27 acres (USFWS 2012). Bridge #19—Kopiliula Stream Bridge is 1.33 miles mauka of the critical habitat area, and Bridge #8—Puohokamoa Stream Bridge is 0.5 miles mauka of the critical habitat. The proposed project would not affect or modify this critical habitat. With implementation of construction BMPs for compliance with regulatory requirements and considering a temporary zone of mixing, the maximum extent of temporary water quality impacts would not exceed 300 feet downstream of construction activities. Because the boundary of Maui-Coastal-Unit 5 is more than 300 feet downstream from the project area and the associated no-effect determination, critical habitat is not analyzed further in this EA.

EFH and NMFS-listed species occur downstream of all six bridges outside of the project area. In Hawaii, the Western Pacific Fishery Management Council defines EFH, which is then implemented by the National Oceanic and Atmospheric Administration (NOAA) Fisheries, Pacific Islands Regional Office. The proposed activities would not affect any EFH or NMFS-listed species due to implementing BMPs to eliminate sediment flowing downstream from the project area. Because of these BMPs and associated no-effect determination, EFH and NMFS-listed species will not be discussed further in this EA.

3.7.2 Potential Impacts and Mitigation Measures

No Build Alternative

Under the No Build Alternative, no permanent improvements to the bridges or roadway would occur, and current maintenance activities would continue. This alternative would not impact biological resources, including flora, fauna, or threatened and endangered species.

Build Alternative

Under the Build Alternative, the proposed activities at each bridge would involve excavation, grading, and construction near the streams on the streambanks within 100 feet of each bridge. Physical temporary construction materials (i.e., temporary structural supports and temporary retaining walls) would be present in the areas of the streams.

Flora: Minor impacts on vegetation would occur during construction activities. Impacts on vegetation would occur as temporary disturbances from using heavy equipment during the bridge construction and sliding in place. This would include vegetation removal, trampling, and soil compaction. No threatened or endangered plant species were identified in the project area; therefore, none would be affected by the proposed project.

The construction of the new bridge makai of the existing Bridge #19—Kopiliula Stream Bridge is expected to impact vegetation. Permanent removal of vegetation and trees would result in a reduction in vegetation cover. The bridge is located at the highest elevation of the six bridges, and the vegetation includes more middle elevation and native species than the other five bridges. Although there are native species present, non-native flora still constitutes most of the cover.

Construction footprints should be constrained to a minimal area to minimize impacts on vegetation for activities to be completed safely. Once construction is complete, disturbed areas will be revegetated with non-invasive plant species appropriate for the project area.

Fauna: Minor impacts on common wildlife would occur because of the proposed construction activities. Fauna diversity in the project area is very low, with most species observed in 2018 being non-native. Although some fauna may use the project area for shelter, nesting, or foraging, the abundance of wildlife in these areas is low because of the lack of flora diversity and adjacent human use. Short-term impacts on wildlife would occur from noise associated with heavy equipment use and increased human presence during construction. Any increase in the frequency or intensity of noise from construction would likely lead to wildlife temporarily avoiding the construction areas. The proposed construction activities would require heavy equipment that would generate short-term increases in noise near the bridge sites. Individual pieces of heavy equipment typically generate noise levels of 80 to 90 dBA at 50 feet (see Section 3.5). With multiple items of equipment operating concurrently, noise levels can be high within several hundred feet of active bridge sites. Wildlife species would be expected to utilize suitable habitat outside the project area during construction and return once the noise has ceased. Furthermore, wildlife currently inhabiting the areas of the proposed action would be accustomed to noise disturbances because of the existing roadway noise. There could be a small increase in the frequency of startle responses or other behavioral modifications caused by the project improvements.

Minor impacts on wildlife would occur from the permanent loss of potential habitat for wildlife associated with Bridge #19—Kopiliula Stream Bridge. As mentioned above, fauna species diversity is low and consists mostly of non-native species; therefore, impacts are expected to be minor. Once construction is complete, temporarily disturbed areas will be revegetated with non-invasive plant species appropriate for the project area.

Threatened and Endangered Species: The proposed project *may affect, but is not likely to adversely affect,* the Pacific Hawaiian damselfly and flying earwig Hawaiian damselfly. The Pacific Hawaiian damselfly was observed upstream of Bridge #39—Ulaino Stream Bridge. The flying earwig Hawaiian damselfly has not been observed in the project area, but suitable habitat is present. Construction at the bridge has the potential to reduce habitat quality for both species temporarily or could result in injury or mortality of damselfly individuals. No permanent stream impacts are anticipated at this bridge location as

the new superstructures would fully span the existing abutments. Temporary grading or use of bank stabilization measures during construction for contractor access (i.e., gabion stabilization or similar) may be needed on the adjacent streambanks; it could occur slightly below the OWHM, primarily due to the placement of BMPs to protect water quality. Stream flow and aquatic passage would be maintained at all times within the natural stream channel. The potential for sediment delivery and reduced habitat quality from construction land disturbances will be reduced through installing and managing BMPs throughout construction. To avoid and minimize potential impacts on the Pacific Hawaiian damselfly and the flying earwig Hawaiian damselfly, the following USFWS recommended measures will be incorporated into the project:

- Turbidity and siltation from project-related work will be minimized and contained within the project area by silt containment devices and curtailing work during flooding or adverse tidal and weather conditions. BMPs will be maintained throughout the construction period until turbidity and siltation within the project area are stabilized. All project construction-related debris and sediment containment devices will be removed and disposed of at an approved site.

- All project construction-related materials and equipment (i.e., dredges, vessels, backhoes, and silt curtains) to be placed in an aquatic environment will be inspected for pollutants including, but not limited to, marine fouling organisms, grease, and oil, and cleaned to remove pollutants before use. Project-related activities will not result in debris disposal, non-native species introductions, or attraction of non-native pests to the affected or adjacent aquatic or terrestrial habitats. Implementing both a litter-control plan and a Hazard Analysis and Critical Control Point plan (USFWS 1990) can help to prevent the attraction and introduction of non-native species.

- FHWA-CFLHD review and approval of the contractors' bridge removal plan in accordance with FP-14 203.04 which includes a plan to keep debris out of the stream and streambed.

- Project construction-related materials (i.e., fill, revetment rock, or pipe) will not be stockpiled in or near aquatic habitats and will be protected from erosion (e.g., with filter fabric) to prevent materials from being carried into waters by wind, rain, or high surf.

- Fueling of project-related vehicles and equipment will take place away from the aquatic environment, and a contingency plan to control petroleum products accidentally spilled during the project will be developed. The plan will be retained on-site with the person responsible for compliance with the plan. Absorbent pads and containment booms will be stored on-site to facilitate the clean-up of accidental petroleum releases.

- All deliberately exposed soil or under-lava materials used in the project near water will be protected from erosion and stabilized as soon as possible with geotextile, filter fabric, native or non-invasive vegetation matting, or hydro-seeding.

The proposed project *may affect, but is not likely to adversely affect,* the Hawaiian hoary bat. Mitigation measures would be implemented to minimize any potential impacts due to the proposed action. The Hawaiian hoary bat was detected at Bridge #5—Makanali Stream Bridge and Bridge #8—Puohokamoa Stream Bridge. Impacts on this species could occur from removing trees surrounding the bridges and avoiding the area during construction activities. To minimize impacts on the Hawaiian hoary bat, the following USFWS recommended BMPs (USFWS 2023c) will be implemented during project construction:

- Do not disturb, remove, or trim woody plants greater than 15 feet tall during the bat birthing and pup rearing season (June 1 through September 15).

- Do not use barbed wire for fencing.

The proposed project *may affect, but is not likely to adversely affect,* the Hawaiian stilt. Mitigation measures would be implemented to minimize any potential impacts due to the proposed action. The Hawaiian stilt has not been observed in the project area but has the potential to occur within the stream channels as a transient individual utilizing the areas for foraging. Temporary impacts include stilts temporarily avoiding the area during construction due to increased noise and human presence and temporary sedimentation of stream habitat. Since this species would only occur during brief periods, they would likely avoid the project area during construction activities and select a higher-quality habitat nearby. To avoid and minimize potential project impacts on Hawaiian stilts, the following applicable BMPs will be implemented during construction activities:

- In areas where waterbirds are known to be present, post and implement reduced speed limits and inform project personnel and contractors about the presence of endangered species on-site.

- Where water resources are located within or adjacent to the project area, incorporate applicable BMPs regarding work in aquatic environments into the construction design (Section 6.1.1).

In summary, because impacts on the Hawaiian stilt would be negligible due to the lack of presence and BMPs that will be utilized, the proposed action *may affect, but is not likely to adversely affect*, individuals or populations of these species.

Hawaiian seabirds (band-rumped storm petrel [*Oceanodroma castro*], Hawaiian petrel [*Pterodroma sandwichensis*], and Newell's shearwater [*Puffinus auricularis newelli*]) may traverse the project area at night during the breeding, nesting, and fledging seasons (March 1 to December 15). Although these seabirds have not been observed within the project area and there is no suitable nesting or foraging habitat, these species could occur as flyovers between the ocean and nesting grounds. Construction lighting could result in seabird disorientation, fallout, and injury or mortality. Seabirds are attracted to lights, and after circling the lights, they may become exhausted and collide with nearby wires, buildings, or other structures, or they may land on the ground. Downed seabirds are subject to increased mortality due to collision with automobiles, starvation, and predation by dogs, cats, and other predators. Young birds (fledglings) traversing the project area between September 15 and December 15, in their first flights from mountain nests to the sea, are particularly vulnerable to light attraction.

The following BMPs (USFWS 2023c) will be implemented during construction activities to avoid potential impacts on Hawaiian seabirds:

- Fully shield all outdoor lights so the bulb can only be seen from below.

- Install automatic motion sensor switches and controls on all outdoor lights or turn off lights when human activity is not occurring in the lighted area.

- Avoid nighttime construction during the seabird fledging period, September 15 through December 15.

With the implementation of the above BMPs, all adverse impacts would be considered negligible; therefore, the project *may affect, but not likely to adversely affect,* individuals or populations of Hawaiian petrel, band-rumped storm petrel, or Newell’s shearwater.

ESA Section 7 consultation is ongoing with the USFWS. Recommended avoidance and minimization measures provided by the USFWS have been incorporated into the proposed project, as described

above. As part of the Section 7 consultation process, FHWA-CFLHD will obtain USFWS concurrence with the effect findings described in this EA prior to project approval.

3.8 Consultation with DAR and DOFAW will also continue through project development. Historic and Archaeological Resources

Section 106 of the NHPA requires actions that are federally funded, authorized, or implemented to consider the effect of such actions on any district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP. Such resources are considered "significant" historic properties. The Section 106 process involves coordination and consultation with the State Historic Preservation Officer (SHPO) and other agencies and organizations that have an interest in or are mandated to protect historic properties. In addition, the Advisory Council on Historic Preservation has the opportunity to comment on actions that may potentially affect these historic properties. At the Hawaii state level, Chapter 6E-8 of the HRS places similar responsibilities on Hawaii state agencies to evaluate its projects.

Hawaii state statutes define "historic property" as any building, structure, object, district, area, or site, including heiau and underwater sites, that is over 50 years old. Although the state law has a broader definition of what is considered a historic property, similar to Section 106, only those resources that meet the definition of "significant," as defined by Chapter 13-275-6(b) of the HAR, are protected by HRS 6E-8. This document will refer to those properties that are considered eligible for the NRHP or meet the "significant criteria" (protected under Section 106 and HRS 6E-8) as "significant historic properties" to distinguish them from those that are considered historic because they are over 50 years old.

For a district, site, building, structure, or object to be considered a significant historic property, it must possess integrity of location, design, setting, materials, workmanship, feeling, and association and must meet one of the following criteria:

A. Associated with events that have made a significant contribution to the broad patterns of our history

B. Associated with the lives of persons significant in our past

C. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. Have yielded or may be likely to yield information important in prehistory or history.

The Hawaii Register of Historic Places provides an additional criterion:

E. Has an important value to the native Hawaiian people or to another ethnic group.

In accordance with regulations provided in Title 36, Part 800 of the CFR, the federal sponsoring or regulating agency has the responsibility of conducting a good faith effort to identify whether there are any significant historic properties in the project's area of potential effects (APE) after initiating the Section 106 process. If any significant historic property(ies) are identified within the APE, the federal agency would then assess whether it would be adversely affected by the proposed project.

Under Section 106 of the NHPA, the federal agency—in this case, FHWA-CFLHD—is responsible for assessing the project's effects on all significant historic properties within the APE. Under the Hawaii state rules, the proposing agency, HDOT, carries the same burden to identify historic properties within the

project area (HAR 13-275-5), assess the significance of each identified historic property (HAR 13-275-6), and evaluate the proposed project's impacts (HAR 13-275-7).

Pursuant to Section 106, FHWA-CFLHD can render one of the following three possible findings for SHPD review and concurrence:

- No historic properties affected,
- No adverse effect, or
- Adverse effect.

"No historic properties affected" means that either there are no significant historic properties present or there are historic properties present, but the undertaking would have no effect upon them.

"No adverse effect" means that there could be an effect, but the effect would not be harmful to those characteristics that qualify the property for inclusion in the NRHP "in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association" (36 CFR 800.5(a)(1)). A "no adverse effect" finding may also apply "…when the undertaking's effects do not meet the criteria of paragraph (a)(1) of [36 CFR 800.5] or the undertaking is modified, or conditions are imposed, such as the subsequent review of plans for rehabilitation by the SHPO/THPO to ensure consistency with the Secretary's standards for the treatment of historic properties (36 CFR part 68) and applicable guidelines, to avoid adverse effects" (36 CFR 800.5(b).

An "adverse effect" means an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property.

Pursuant to HRS 6E-8, HDOT can render one of the following two possible findings for SHPD review and concurrence:

- No historic properties affected, or
- Effect, with proposed mitigation commitments.

"No historic properties affected" means that either there are no significant historic properties present or there are significant historic properties present, but the undertaking would have no effect upon them of any kind (HAR 13-275-7).

"Effect, with proposed mitigation commitments," means that the project will affect one or more significant historic properties, and the effects will be potentially harmful. However, the agency has proposed mitigation commitments involving one or more forms of mitigation to reasonably and acceptably mitigate the harmful effects (HAR 13-275-7).

3.8.1 Existing Conditions

For this project, HDOT and FHWA-CFLHD were aided in historic property identification and effect evaluation efforts by consultant historic architects, architectural historians, and archaeologists who meet the Secretary of the Interior's professional qualification standards for their respective disciplines. Historic properties within the APE were identified through past survey and documentation efforts for the 2015 Preservation Plan and a supplemental archaeological inventory survey (AIS) conducted for this project by the consultant team. A copy of the AIS is provided in Appendix B.

Hana Highway, referred in historic documents as Hana Belt Road (NRHP Reference # 01000615 / SIHP # 50-50-va-01638), is significant as nominated for the NRHP as a historic district under Criteria A and C for its state and local significance in the areas of engineering, social history, transportation, and commerce. The six bridges included in the project are located within the historic district and are contributing elements to the Hana Belt Road historic district. Information on the historic significance and integrity of the six bridges, such as the character-defining features documented for each bridge, was integral to the project development process. The 2015 Preservation Plan also categorized the bridges into groups based on the relative significance of the bridge within the larger context of the district. Seventeen bridges and one culvert are categorized as "exceptional" for having unique characteristics, features, high aesthetic value, high integrity, and/or remain in an intact condition. The remaining 26 bridges and 11 culverts are categorized as "contributing" bridges that retain the integrity of setting and collectively have significant but common character-defining features that do not rise to the uniqueness or significance of the bridge features in the "exceptional" category.

Table 3-4 presents the character-defining features of the six bridges included in this project.

Table 3-4. Historic Character-Defining Features of the Six Project Bridges

Bridge Name	Preservation Plan Category	Character-Defining Features
Bridge #2—Kailua Stream Bridge	Contributing	◆ Concrete tee beam structure ◆ CRM abutments ◆ CRM wingwalls ◆ Natural rock formations ◆ Unusual single-span length
Bridge #5—Makanali Stream Bridge	Contributing	◆ Concrete slab bridge ◆ CRM abutments ◆ CRM wingwalls ◆ Concrete open vertical railings
Bridge #8—Puohokamoa Stream Bridge	Exceptional	◆ Concrete tee beam bridge ◆ Concrete abutments with CRM base ◆ CRM wingwalls ◆ Concrete pier wall with CRM base ◆ Concrete solid parapets with cap and panel detail ◆ Inset inscription "A.D. 1912" on two panels, downstream parapet
Bridge #19—Kopiliula Stream Bridge	Exceptional	◆ Concrete girder and floor beam system ◆ Reinforced concrete pier columns ◆ CRM wingwalls ◆ Concrete solid parapets with EMI gears attached ◆ EMI irrigation system, dam, and sluice gate below
Bridge #39—Ulaino Stream Bridge	Contributing	◆ Concrete tee beam bridge ◆ CRM abutments ◆ CRM wingwalls ◆ Reinforced concrete pier cap and columns on a concrete pier wall ◆ Concrete open vertical railings

Bridge Name	Preservation Plan Category	Character-Defining Features
Bridge #40—Mokulehua Stream Bridge	Exceptional	◆ Concrete slab bridge ◆ CRM abutments ◆ CRM wingwalls ◆ Concrete pier walls with rounded cutwater profile ◆ Concrete solid parapets

Source: 2015 Hana Highway, Route 360 Bridge Preservation Plan

The consultant team also conducted an AIS for the project APE that covered an area of 8.8 acres, including areas around the six bridges and one discontiguous potential staging area. Two previously identified and evaluated historic properties were in the APE—the Hana Belt Road is listed in the NRHP (NRHP No. 01000615/SIHP No. 50-50-va-01638) and the EMI System (SIHP No. 50-50-07-01508). The AIS identified nine features; all but one are associated with either the Hana Belt Road or the EMI System. The identified features associated with the Hana Belt Road and related bridges are significant under Criteria A and C, the same significance criteria under which the Hana Belt Road historic district is listed in the NRHP. The EMI System was previously evaluated in 1992 as significant under Criterion D, and no change to that was recommended. The last identified feature, feature TS-1, is a former house foundation evaluated as significant under Criterion D and is therefore considered a history property. No archaeological signatures for pre-contact or early historic-era features were identified in the APE.

3.8.2 Potential Impacts and Mitigation Measures

No Build Alternative

Under the No Build Alternative, no historic properties would be affected.

Build Alternative

The Section 106 process is currently in the consultation process, and SHPD is expected to conduct its HRS 6E-8 review responsibilities in conjunction with its Section 106 responsibilities. FHWA-CFLHD and HDOT have assessed the effects, and the potential impacts and proposed mitigation are disclosed below, consistent with HRS Chapter 343. Consultation regarding the effects and proposed mitigation will continue with SHPD and consulting parties.

Through a robust alternative evaluation process, no alternative could be identified that would completely avoid potential adverse effects on six historic bridges and adequately address the structural degradation and deficiencies of the project bridges. Therefore, the Build Alternative, as proposed, has incorporated special treatments to be compatible and consistent with the character of the Hana Belt Road historic district. A similar approach has been developed at five of the six bridge locations (Bridge #2—Kailua Stream Bridge, Bridge #5—Makanali Stream Bridge, Bridge #8—Puohokamoa Stream Bridge, Bridge #39—Ulaino Stream Bridge, and Bridge #40—Mokulehua Stream Bridge) and includes the following elements/steps:

- New micropile bridge foundations would be drilled and constructed behind the existing bridge abutments.
- New bridge abutments would then be constructed on the new foundation.

- The existing superstructure and railing would be removed. The removal of the approach CRM barriers and approach walls will be limited to the upper several feet to approximately 1 to 2 feet below the proposed roadway grade, with the majority of the existing CRM approach walls to be preserved. The stones from the removed portions of CRM approach walls would be salvaged for re-use.
- Concurrently, a new superstructure and railing would be constructed on a platform adjacent to the bridge. This structure would be slid into place on the new bridge abutments.
- MASH 2016 compliant CRM approach barriers would be constructed over the CRM approach wall preserved and faced with the stone salvaged from the existing CRM approach walls to closely match.

This approach generally results in superstructure elements being replaced in a context-sensitive manner and substructure elements being preserved, as described below:

- **Bridge Deck:** the existing bridge deck will be replaced with a concrete deck of similar geometry as the existing bridge deck. The design team started with the same structural shape as the existing deck and modified the geometry minimally, if at all, for several structures and only as necessary to satisfy design criteria requirements for load capacity and safety.
- **Railing:** the existing railing will be replaced with a "close match" crash-tested rail with modifications as permitted by the State Bridge Engineer to more closely match the existing railings while satisfying modern crash safety requirements.
- **CRM Approach Barriers:** The CRM approach barriers will be replaced with a MASH 2016 TL-2 compliant approach barrier, specifically analyzed for context-sensitive design and use along the Hana Highway to match the existing CRM barriers within the District. These barriers will be faced with stone salvaged from the original CRM approach walls to the extent practical.
- **CRM Abutments:** CRM abutments will be preserved in place, with the new bridge deck being located on foundations built behind the existing abutments.
- **CRM Wingwalls:** not all bridges have CRM wingwalls, but in instances where wingwalls are present, they will be preserved in place.
- **Piers:** not all bridges have existing piers, but in instances where piers are present, they will be preserved in place.

As a representative example, Figures 3-5 and 3-6 present an overview of the effects and rendering of the Build Alternative for Bridge #2—Kailua Stream Bridge. Section 3.11 presents visual renderings for all the project bridges. Because the approach is very similar for five of the six bridges, a description of the effects is summarized in this EA. Correspondence from FHWA-CFLHD to the SHPD, dated September 6, 2023, has a detailed breakdown of effects for each bridge and is included in Appendix F.

Figure 3-5. Bridge #2—Kailua Stream Bridge, Overview of Effects

The bridge superstructure and railing would be replaced. The existing abutments and wingwalls would be preserved in place.

Figure 3-6. Bridge #2—Kailua Stream Bridge, Rendering of the Proposed Action

The proposed improvements to the bridges include installing load-bearing piles behind the character-defining abutments and piers where they are present and replacing the concrete deck of the superstructure. The existing abutments are retained, and the new piles would not be visible. The new concrete deck would match the existing material, texture, and other visual qualities but would be new construction.

Replacement of the superstructures would impact the bridges' historic integrity of materials and workmanship and, to a lesser extent, design. Although the new superstructures would closely resemble or even match the current superstructures in material, texture, and aesthetic, the historic fabric would be replaced. Given the visual similarity, the superstructure replacements would have a minimal impact on the bridges' integrity of feeling and no impact on setting, association, or location. Retention of the abutments and wingwalls or piers, where present, with the introduction of a substructure hidden behind these historic features, would minimally impact the design and association and have no impact on the bridges' integrity of feeling, setting, or location. Overall, to a casual observer, the bridges would look very similar to the current historical condition but also be identifiable as replacement bridges supported on historic substructure. The substructures would appear unchanged, and the superstructures would appear very similar to the existing superstructures. The bridges' historic integrity of feeling, setting, association, and location would all remain high as related to the bridges' significance under Criterion A. However, replacing the superstructure substantially impacts the bridges' historic integrity of materials and workmanship that relates to its significance under Criterion C. Additionally, the superstructure replacement would moderately impact the integrity of the design. The new design would be similar to and complementary to the historic design but not replicated. Therefore, the proposed undertaking would constitute an "adverse effect" on the five bridges under Section 106 of the NHPA and an "effect, with proposed mitigation commitments" under HAR 13-275-7.

At Bridge #19—Kopiliula Stream Bridge, the entirety of the bridge would be preserved in place with a new bridge constructed makai of the historic bridge. Preserving the existing bridge would retain all the character-defining features identified in the 2015 Preservation Plan. Construction of a new bridge adjacent to the existing bridge would not affect Bridge #19—Kopiliula Stream Bridge's significance under Criterion C and have no impact on its historic integrity of location, design, workmanship, or materials. The new bridge would introduce a new visual element to the bridge's historic setting and would, therefore, impact the bridge's historic integrity of setting and feeling. However, this impact would not directly alter any of the features that make the bridge eligible for listing in the NRHP and, therefore, does not meet the Criteria of Adverse Effect (36 CFR 800.5). The bridge's integrity of association would be negligibly impacted by no longer being an in-use bridge. However, it would still be recognizable as a historic bridge and a part of the history of the Hana Highway and an integrated design with the East Maui Irrigation equipment that reflects that unique association. Therefore, the project would not adversely affect Bridge #19—Kopiliula Stream Bridge or the EMI System features embedded with the bridge features or in the immediate vicinity. Effects for this bridge would, therefore, be "no adverse effect" under Section 106 of the NHPA and "no historic properties affected" under HAR 13-275-7.

While five of the six bridges would be individually adversely affected, the proposed action would be complementary and compatible with the character of the Hana Belt Road historic district. The proposed improvements at five bridges include designs responsive to the setting and topography and do not affect scenic vistas or significantly alter the natural topography of East Maui. The retention of key significant features of each bridge and the use of a complementary new design that respects and relates to the historic fabric maintain the consistent stylistic design within the district.

The one remaining historic property recorded in the AIS, a former house foundation eligible under Criterion D for information potential, was inside the APE established for purposes of the survey. However, the project design has been refined, and this site would be fully avoided.

The proposed project is not expected to affect archaeological resources, as none were identified in the project area.

A summary of individual historic properties, significance criterion, and project effects under both Section 106 of the NHPA and HAR 13-275-7 is provided in Table 3-5.

Table 3-5. Historic Properties and Potential Effects

Historic Property	Significance Criteria (NRHP and HAR)	NHPA Section 106 (36 CFR 800.5)	HAR 13-275-7
Bridge #2—Kailua Stream Bridge, SIHP 50-50-06-01638	A and C	Adverse effect	Effect, with proposed mitigation commitments
Bridge #5—Makanali Stream Bridge, SIHP 50-50-07-01638	A and C	Adverse effect	Effect, with proposed mitigation commitments
Bridge #8—Puohokamoa Stream Bridge, SIHP 50-50-07-01509	A and C	Adverse effect	Effect, with proposed mitigation commitments
Bridge #19—Kopiliula Stream Bridge, SIHP 50-50-12-01638	A and C	No adverse effect	Effect, with proposed mitigation commitments
Bridge #39—Ulaino Stream Bridge, SIHP 50-50-13-01638	A and C	Adverse effect	Effect, with proposed mitigation commitments
Bridge #40—Mokulehua Stream Bridge, SIHP 50-50-13-01638	A and C	Adverse effect	Effect, with proposed mitigation commitments
East Maui Irrigation Network SIHP 50-50-12-01508	D	No historic properties affected	No historic properties affected
Former Residence Foundation SIHP TS-1	D	No historic properties affected	No historic properties affected
Hana Belt Road Historic District SIHP 50-50-VA-01638	A and C	No adverse effect	Effect, with proposed mitigation commitments

While effects are presented above for individual resources, the Section 106 process results in an overall Finding of Effect for an undertaking (i.e., a federally funded or federally approved project). Based on previous and current documentation, the proposed project is anticipated to have an "adverse effect" under 36 CFR 800.5 and "effect, with proposed mitigation commitments" under HAR 13-275-7.

Proposed Mitigation

Under HAR 13-275-8, if a project will have an effect on significant historic properties, then a mitigation commitment proposing the form of mitigation to be undertaken for each significant historic property shall be submitted by the agency to SHPD for review and approval. The proposed mitigation measure options below should be considered preliminary until SHPD provides concurrence with an HRS 6E-8 review. Completion of project design, consultation, and concurrence by the SHPD will confirm appropriate mitigation commitments. HDOT and FHWA-CFLHD will continue to resolve the adverse effect pursuant to

36 CFR 800.6 and HAR 13-275-8. Possible mitigation measures for the bridges include one or more of the following:

- Provide design plans for SHPD review and approval of project design treatments for the bridges,
- Preservation of physical character-defining features,
- Recordation through LiDAR to produce precisely measured models of bridges prior to alteration,
- Development of supplement design decision process documentation and/or update of foundational planning documents for the historic district, and/or
- Interpretation of bridges or overall district via physical printed or digital media.

No further archaeological fieldwork is proposed for this project. However, if cultural resources or human remains are inadvertently discovered during construction, all work would immediately cease, and all laws and administrative rules would be followed.

3.9 Cultural Resources

3.9.1 Existing Conditions

Consistent with the requirements of HRS Chapter 343, a cultural impact assessment (CIA) was prepared by a consultant to evaluate the potential effect of the proposed project on cultural beliefs, practices, and resources. The assessment included archival and documentary research and communication with organizations and individuals with knowledge of the project area, its cultural resources, and its practices and beliefs. Archival research focused on a historical documentary study involving both published and unpublished sources, including legendary accounts of native and early foreign writers, early historical journals and narratives, historic maps, land records such as Land Commission Awards, Royal Patent Grants, and Boundary Commission records, historic accounts, and previous archaeological reports. The CIA is provided in Appendix C.

The project is at six separate bridges, with the distance between the furthest bridges being 22.4 miles (Bridge #2—Kailua Stream Bridge to Bridge #40—Mokulehua Stream Bridge). It encompasses the distinct ahupuaa of Puuomaile and Papaaea in the traditional District of Hamakualoa, now Makawao District; East Makaiwa, Kolea, Loiloa, Kaliae, Kekuapawela, Ulaino, located in the traditional District of Koolau (now Hana District), and Makapuu located in the traditional and modern District of Hana. Thus, for purposes of the CIA, bridge locations were discussed by the traditional district and the ahupuaa within each district.

Traditional Moku of Hamakualoa (Modern District of Makawao)

The traditional district of Hamakualoa has been described as a coastal region "….where gently sloping kula [plains or open land] lands intersected by small gulches come down to the sea along the northern coastline of East Maui." The number of named narrow ahupuaa in this region suggests a sizable population living there, although the area did not receive large amounts of rainfall. The CIA summarized that the inhabitants of this area likely subsisted on the taro cultivated in loi watered by Kailua Stream and fished in the small bays along the coast for fishing, which were possibly accessed by the Alaloa (long road) that extended around the Island of Maui (SCS 2021). The slopes between gulches were planted with breadfruit, banana, sugar cane, arrowroot, and yams, while the interior forests would have been planted with awa (CSH 2015). Bridge #2—Kailua Stream Bridge is located in the traditional moku of Hamakualoa (now Makawao District) and is situated 0.9 miles from the coast and 727 feet AMSL.

Kailua Stream forms the boundary between Puuomaile and Papaaea ahupuaa. Puuomaile, literally translated, means "hill of Maile (a kupua [demigod] goddess)." The makai side of Puuomaile was a battle scene where, in 1790, Kamehameha I invaded Maui, defeated Kalanikupule, and conquered the island. Papaaea means turtle-shell piece and refers to a long paved road that began at Papaaea and was built by Kiha-a-piiliani (SCS 2021). According to literature, a tradition of the Papaaea-Keanae region was that this area was home to the Hawaiian god of thunder, Kanehekili. Worship to Kanehekili by special kahuna who could claim that they were descendants of this god was encouraged (CSH 2021).

In the historic period, descriptions of the north coast of Maui were first recorded in November of 1778 as the Resolution and the Discovery sailed down a portion of Hamakualoa. SCS cited Beaglehole 1967, Part I, Vol.III:1151 that recorded:

> Kahekili was "a middle aged man ... rather of a mean appearance..." and the land was "...mountainous, the sides of the hills are covered with trees… large open plains on which stand their houses & where they have their plantations of sweet potatoes, taro & c. ..."
>
> In 1828, a party of missionaries traveled around the island. In Hamakualoa, they came across a roadway paved with stone and built in the 16th century that "…extends more than 30 miles, and is a work of considerable magnitude. This pavement afforded us no inconsiderable assistance in traveling as we ascended and descended a great number of steep and difficult paries (palis)" [SCS cited Kuykendahll 1931).

The CIA notes no awarded Land Commission Awards or Land Grants on the parcels associated with Bridge #2—Kailua Stream Bridge.

Traditional Moku of Koolau

The traditional district of Koolau, now part of the modern Hana District, was comprised of a series of ahupuaa located along the north-facing section of East Maui. Bridge #5—Makanali Stream Bridge, Bridge #8—Puohokamoa Stream Bridge, Bridge #19—Kopiliula Stream Bridge, and Bridge #39—Ulaino Stream Bridge are located in this area within the ahupuaa of East Makaiwa, Kolea, Loiloa, Kaliae, Kekuapawela, and Ulaino. More specifically, the four bridges in this district are at the following locations:

- Bridge #5—Makanali Stream Bridge is located in East Makaiwa Ahupuaa, approximately 0.13 miles from the coast at 386 feet AMSL
- Bridge #8—Puohokamoa Stream Bridge is located in Kolea and Loiloa Ahupuaa, approximately 0.52 miles from the coast at 507 feet AMSL
- Bridge #19—Kopiliula Stream Bridge is located in Kaliae and Kekuapawela Ahupuaa, approximately 1.41 miles from the coast at 1,286 feet AMSL
- Bridge #39—Ulaino Stream Bridge is located in Ulaino Ahupuaa, approximately 0.65 miles from the coast at 357 feet AMSL

Oopuola Gulch forms the boundary between the traditional districts of Hamakua and Koolau. "Koolau" literally translates to "windward" (SCS 2021 cited Pukui et al. 1974:117). The CIA report cited Handy and Handy (1792:498) describing the region as having:

> "…precipitous slopes eroded by the waves which the tradewinds sweep against its cliffs, islets, and inlets. Here the flank of Haleakala is steep, and as the trade winds blowup across their

> forested slopes they are cooled and release their moisture, making this the wettest coastal region in all of the islands."

Handy and Handy (1972:501) further state:

> "Throughout the Koʻolau, the wild taro growing along the streams and in the pockets high on the canyon walls of the gulches bespeaks former planting of stream taro along the watercourses, on the sides of the gulches, and in the forests above. The same is true of the wild taros seen here and there in the present forest above the road and in the protected spots on what was formerly low forest land, now used as pasture."

The literature has limited information pertaining directly to East Makaiwa, Kolea, Loiloa, Kaliae, Kekuapawela, and Ulaino ahupuaa. Literature suggests the pre-contact ahupuaa settlement in Keanae be considered the example for general land use patterns on the windward region of East Maui. The Keanae ahupuaa settlement pattern is supported by the many documented heiau, house lots, agricultural architecture and soils, and archival/historic references. It can then be inferred that the traditional ceremonial activities, permanent and temporary habitation loci, and marine exploitation were common throughout this region, with agricultural activities undertaken on the upland plateau lands and within the valleys where permanent streams allowed for extensive loi construction.

"Makaiwa" literally translates to "mother-of-pearl-eyes (an image)" (SCS 2021 cited Pukui et al. 1974:140). The legend of Eleio is associated with East Makaiwa Ahupuaa. It is said that Eleio was "the caretaker [kahu] of Kakaalaneo, an Alii of Maui, and it is thought that Kakaalaneo was the fifth generation of Maui chiefs…Eleio was a fast runner, and because of Eleio's speed, Kakaalaneo chose Eleio to fulfill his needs in very far places" (SCS 2021 cited Pualewa 1863).

Fishing legends are also associated with the ahupuaa within the project area corridor in Koolau Moku. Moku Manu recounts a story of Aiai, a renowned fisherman and the son of Kuula, the Hawaiian god of the fisherman (SCS 2021 cited Pukui and Elbert 1986:187):

> "Aiai…taught his art of fishing in all its forms and when he was satisfied the people were proficient, he prepared to visit other places to teach his art. But before leaving Hana, ʻAiʻai told the friend he had appointed as head fisherman of Hana to go and kill the big heʻe kupua (supernatural octopus) in the deep sea right off of Wailuanui, Koʻolau (west of Waiohue); and his friend consented.
>
> When the canoes were prepared and drawn to the beach and the people were ready to go, ʻAiʻai gave his friend the hokeo (gourd for fishing gear) in which the leho (cowry shell lure for catching octopus) his father had given him was kept. This shell is called Lehoʻula ("Red cowry"), and Lehoʻula in Hana was named after it.
>
> The people went in the canoes till they reached the pali near Kopiliula, where they rested. ʻAiʻai was not with them, but supervised their work from the pali of Puhiai. While resting, they prepared the leho for lowering, and when it was ready, ʻAiʻai's friend called on Kuʻula and Hina for the assistance of their mana kupua. Then he removed the covering of the gourd and took out the leho, which had rich beautiful colors like the rainbow; he attached it to a line and lowered it into the sea, where it sent out rays of fiery light."

The story continues that the heʻe was so attracted by the radiance that it came out of its hole and:

> "Ai'ai's friend, at the proper moment, shoved a stone he had brought into the head of the he'e; and the weight of the stone drew the he'e down to the bottom of the sea and kept it there; being powerless to remove the stone, the he'e died. The men seized and cut off one of the arms; it was so big it loaded down all the canoes and they returned to Hana with just that one arm. The rest of the he'e turned to stone and is pointed out today just outside of Wailuanui, where a stone formation resembles the body of a he'e with one arm missing."

Historic period accounts suggest that occupation of the area continued into the twentieth century, but the lifestyle had changed, and people were moving on. Cited observations were that "[i]n 1954 there were about 10 houses still occupied in Lower Nahiku, and a small school in use….[a]pparently ranching was the only activity; we saw no taro or sweet potato patches, but there were some banana. A number of houses were falling into decay; others had more recently vacated" (SCS 2021 cited Handy and Handy 1972:502).

SCS identified source material that indicates Bridge #5—Makanali Stream Bridge is located within Land Grant 1396. There appears to be conflicting information on whether Land Grant 1396, comprised of 391.63 acres, was awarded to Luka and 10 others in 1854. Bridge #8—Puohokamoa Stream Bridge is located within Land Grant 2916, comprised of an undisclosed number of acres, awarded to Kekuahane et al. in 1863. No Land Commission Awards or Land Grants appear to have been awarded near Bridge #19—Kopiliula Stream Bridge. A portion of the Bridge #39—Ulaino Stream Bridge project area may fall within a portion of Land Grant 8518-B:2, awarded to James Young Kanehoa in 1855 (SCS 2021).

Traditional District of Hana (Modern District of Hana)

Bridge #40—Mokulehua Stream Bridge is in Ulaino and Makapuu Ahupuaa, in the traditional and modern district of Hana. The bridge is approximately 0.75 miles from the coast at 840 feet AMSL. During the pre-contact period, the traditional district of Hana was considered valuable for its strategic location and the productivity of its land and the sea. As described by SCS, "[t]he fish ponds in ʻAleamai, Haneoʻo, and Hāmoa were not only able to support residing aliʻi and their entourage, but the natural fishing grounds and well-watered soils caused prosperity for its thriving community. Hāna [the district] was a fertile land 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...." (SCS 2021). Kamehameha's favorite wife, Kaahumanu, was born in Hana at a place called Ponaha-ke-one (SCS 2021 cited Pukui et al. 1974:40).

"Makapuu" literally translates to "hill beginning or bulging eye" and refers to "the name of an image said to have been in a cave known as Ke-ana-o -ke-akua-pōloli" (SCS 2021 cited Pukui et al. 1974:40).

Hana's political importance was noted in legendary and historical accounts and the religious temples consecrated by paramount chiefs. SCS (2021) notes:

> "Topographic and constructed features, such as Puʻu Kaʻiwi O Pele, Puʻu Kaʻuiki and Kekoʻona Fishpond in Wananalua reflect its connection with the gods, as does its choice as a residence for many of Maui's aliʻi (chief) such as Kaluanuiahua, Kamalalawalu, Lonikamakahiki, Piʻilani, Kāhapiʻilani, Kahekili, Kalaniōpʻu, Keʻeaumoku, and Kamehameha, to name a few (in Beckwith 1970:19–22, 379). Myths and legends reaffirm Hāna's sacredness. Many stories, including those concerning Kōʻula, the fish god; Pele, the fire goddess; the origin of Kauʻiki Hill; the fishing grounds of Kapukaulua; and the formation Alau Island, suggests Hāna had always been a place of favor (Sterling 1998:118–155)."

The historic period saw the appearance of sugar cultivation and ranching. SCS described that archival research indicates the settlement pattern in the Hana District was one of dispersed households living and farming within a relatively narrow coastal zone (0-600 feet AMSL), and valuable land was absorbed into an established sugar plantation as the importance of commercial sugar increased. Settlement then became concentrated around the mill and port of Hana (SCS 2021). Following the introduction of livestock to the Hawaiian Islands, when Captain Vancouver transported cattle and sheep aboard the Discovery to gift to Kamehameha I, cattle influenced traditional life on Maui. SCS (2021) cited the following account:

> They had recently brought to this island, one of the bulls the Captain Vancouver landed at Owhyee (Hawaii). He had made very great destruction amongst their sugar cane and gardens, breaking them and their cane patches and tearing them to pieces with his horns and tearing them with his feet. He would run after and frighten the natives and appeared to have the disposition to do all the mischief he could, so much so that he was an unwelcome guest among them.

No Land Commission Awards appear to be near Bridge #40—Mokulehua Stream Bridge, but the bridge does appear to be located within Land Grant 1830. Under Land Grant 1830, a portion of the 61.5 acres award was granted to Opuni and Pali in 1855. No information was available for Land Grant 4770 near Bridge #40—Mokulehua Stream Bridge (CSH 2021 cited Office of Hawaiian Affairs Kipuka Database 2021).

Consultation Results

Information pertaining to cultural resources and traditional cultural practices conducted within the project area or the ahupuaa of the six bridges was sought from 58 individuals and organizations. Sixteen written responses were received by the consultant, and one oral interview was performed. No specific concerns about potential impacts on cultural resources or traditional cultural practices were expressed. One responder emphasized the cultural sensitivity of the area and the importance of community consultation.

Information shared through the CIA process reaffirmed the cultural significance of the Hana District as a wahi pana (legendary place) with shared examples of a few major areas of cultural significance: “Hāna was the home of Kuʻula, the Hawaiian god of fishing; Haneoʻo Fishpond, although not near any of the bridges associated with the current project, is associated with the moʻo goddess Kihawahine; and Puʻu o Pele, high up on Haleakalā, is where the volcano goddess Pele made her home for a time” (SCS 2021). Historical and cultural information was also shared regarding the construction of the Hana Highway bridges, which coincided with a big influx in sugar production, which played a big part in life in Hana, cattle ranching, and rubber production, which was not as successful, as well as the significance of the Hana district during World War II. It was noted that “[W]ithin a little over 100 years, these bridges have overseen five major economic trends (i.e., the brief period of rubber production, sugar cane production, cattle ranching, military, and tourism) in Hāna, which exemplify the story of Hawaii” (SCS 2021).

Consultation input also reaffirmed traditional reliance on resources in valley bottoms along the coast, such as “…ocean resources, some kalo lo’i in the larger valley bottoms, stream resources such as ʻoʻopu, hihiwai and ʻopae kalaʻole and forest resources such as Mai’a, awa, ulu,ʻohe ʻohia ʻai and various wood, stone and medicinal plants” (SCS 2021 cited Hobdy email dated August 21, 2020) with some descendants still carrying on some of their practices. A responder noted that the project bridges have steep gradients and numerous waterfalls, and “most of the stream life does not get up to the elevations of the bridges (with the exception of the ʻopae kalaʻole and the oʻopu hiʻu kole)” and had knowledge of “…current gathering of the ʻopae kalaʻole only from the streams above Puaʻakaʻa State Park but not from

any of the streams at the named bridges. The ʻoʻopu hiʻu kole is not considered to be one of the edible ʻoʻopu and is not gathered" (SCS 2021 cited Hobdy's email dated August 21, 2020).

3.9.2 Potential Impacts and Mitigation Measures

No Build Alternative

There would be no effects on cultural resources or traditional cultural practices under the No Build Alternative.

Build Alternative

Based on the preliminary results of the CIA, no traditional cultural practices are currently known to be conducted within the project area. Therefore, no direct effects on Hawaiian rights related to gathering, access, or other customary activities are anticipated. Cultural and historical background and information gathered during interviews suggest that foraging, traditional, and generational gathering of freshwater and marine species, as well as plants adjacent to tributaries, may occur further makai where resources may be more abundant. At five of the six bridge locations, new bridge elements would fully span the existing abutments, and existing piers where they do exist would remain. At Bridge #19—Kopiliula Stream Bridge, a new pier would be required in the stream, but it has been designed to be located near a natural rock outcropping to minimize in-stream impacts. The project has been designed to minimize in-water work such that stream flows and aquatic passages would be maintained throughout construction. Water quality protection measures would also be developed and installed during construction, as described in Section 3.3, to maintain water quality in accordance with state standards. Implementation of these measures to protect the stream environment and associated resources would avoid potential effects on cultural resources and practices further makai from the project area, should they occur. Should cultural resources or human remains be inadvertently discovered during construction, all work would immediately cease, the appropriate agencies (including the Office of Hawaiian Affairs) would be contacted, and the contractor would comply with applicable state law and administrative rules for handling them.

3.10 Social and Economic Conditions

3.10.1 Existing Conditions

Hana Highway is the primary connection for the East Maui communities, such as Hana, Wailua, Nahiku, and Keanae, to local and regional services, activity centers, employment centers, and emergency services. The roadway is also a destination in and of itself, drawing visitors to experience the drive and its scenic vistas and experiences, communities, and local vendors along the corridor.

The economy of the Island of Maui has transformed over time from a plantation economy to a modern economy with a mix of tourism, diversified agriculture, construction, retail, and professional businesses. The largest industries in the County of Maui are construction and tourism, with the largest employers being the State of Hawaii, the County of Maui, the Maui Memorial Medical Center, and several resorts. The County of Maui's economy is expected to continue positive growth based on the national and global economies, the strong performance of the local tourism and real estate industries, labor market conditions, and the growth of personal income and tax revenues. Hana's primary industry is tourism, as the major employers are the Hana Maui Hotel and the Waianapanapa State Park.

Hana is located at the eastern end of the island of Maui and is one of the most isolated communities in the state, with a population of 1,526. A majority of the population of Hana is biracial, at 38 percent of the population, and the next largest demographic is native Hawaiian/Pacific Islanders, at 35 percent; the

remaining population is a combination of White and Hispanic. Many Hana residents travel to surrounding towns for work and depend on the Hana Belt Road for travel. Thirty percent of the population of Hana is considered to be low-income compared to the State of Hawaii.

3.10.2 Potential Impacts and Mitigation Measures

No Build Alternative

Under the No Build Alternative, site conditions would not change. The bridges would continue to be deficient and may require frequent maintenance, requiring ongoing long-term public expenditures. Recurring maintenance operations may also impact local travelers from reaching critical destinations on time.

Build Alternative

Many Hana residents travel to the surrounding cities for work, and closed bridges would impact their daily commute. Since tourism is one of the major industries in Hana, closed bridges and detours could impact the local resorts, which employ many locals. Hana Belt Road is also a critical transportation facility for police, fire, and emergency medical services.

Five of the six structures would employ construction techniques to minimize closure impacts on the traveling public due to the critical operation of the Hana Belt Road. Construction of the substructure elements are anticipated to be performed utilizing overnight closures of the Hana Highway. During the daytime, the work areas could be plated over to allow traffic to operate normally. The construction can occur on the remaining structure, Bridge #19—Kopiliula Stream Bridge, while the existing bridge remains in service with minimal impacts on the traveling public.

The contractor would make provisions for emergency access, and emergency service providers, including police, fire, and ambulance services, would be notified before closures with information on detours provided.

The project also has the potential to positively impact the local economy by bringing in business to local construction companies that could be used to rehabilitate and reconstruct the bridges. Because the project includes funds that are coming from both state and federal sources, wages paid to workers on this project (direct income), payments to suppliers (indirect income), and their subsequent expenditures (induced income) would have a positive cumulative impact as revenue circulates through the local economy.

3.11 Visual and Aesthetic Resources

3.11.1 Existing Conditions

Maui is famous for its scenic beauty. The scenic resources of the island are noted in the Maui Island Plan (County of Maui 2012) as being closely tied to residents' quality of life and the island's sense of place as many views and landscapes are closed tied to Hawaiian culture, folklore, and history. The spectacular scenery also contributes to the island's thriving tourism industry. The Maui Island Plan notes, "[T]he East Maui portion of the Hana Highway is famous for its legendary cliff, ocean, rainforest, waterfall, and valley views." A drive on the "Road to Hana" is a visitor attraction in and of itself, drawing visitors to experience the drive along the historically significant route with its multiple one-lane bridges and scenic vistas. Scenic resource preservation has been identified as an important goal in protecting the health of Maui's economy.

The County of Maui has mapped the island's scenic resource corridors and rated roadway corridors as exceptional, high, medium, or low based on its overall resource values. Roadway corridors with exceptional or high scenic resource values typically contain dramatic and diverse resource values throughout the corridor and are typically in a natural condition and remain undeveloped. Hana Highway is identified as a scenic corridor, with portions rated as either "high" or "exceptional." Portions of the highway closest to Kahului, where Bridge #2—Kailua Stream Bridge, Bridge #5—Makanali Stream Bridge, and Bridge #8—Puohokamoa Stream Bridge are located, are rated as "high." Just past Bridge #8—Puohokamoa Stream Bridge traveling towards Hana, the roadway is rated as "exceptional" and remains so for the entirety of the route. Therefore, Bridge #19—Kopiliula Stream Bridge, Bridge #39—Ulaino Stream Bridge, and Bridge #40—Mokulehua Stream Bridge are in a portion of Hana Highway rated as "excellent" (County of Maui 2012).

The project bridges are situated in rural, heavily vegetated settings with steep surrounding topography. The primary views are of the narrow, two-lane asphalt roadway and the one-lane bridges themselves, the surrounding lush vegetation that is both mauka and makai of the bridges, and the streams below the bridges. Roadway striping, signage, and reflective delineator posts are also present and visible at the bridge approaches, and overhead utility lines and poles are visible at Bridge #39—Ulaino Stream Bridge. In addition to vegetation views, glimpses of ocean views are provided in the background to travelers driving Hana Highway at Bridge #5—Makanali Stream Bridge and, to a lesser degree, at Bridge #19—Kopiliula Stream Bridge. At Bridge #19—Kopiliula Stream Bridge, adjacent East Maui Irrigation canal features are also in the viewshed.

Private residences near Bridge #39—Ulaino Stream Bridge and Bridge #5—Makanali Stream Bridge are visible from the roadway at these bridges. Conversely, the project areas and bridges are visible from these developed, private parcels. The private residence nearest Bridge #40—Mokulehua Stream Bridge is on the makai side at a lower elevation and has some vegetative screening. At Bridge #39—Ulaino Stream Bridge, the private residence is mauka of the bridge on the Hana side and has a direct view of the project area.

3.11.2 Potential Impacts and Mitigation Measures

No Build Alternative

Under the No Build Alternative, there would be no impact on visual and aesthetic resources.

Build Alternative

Under the Build Alternative, modern bridge elements would be introduced to the visual setting that would be of a similar size and scale to those that presently exist. The project would not result in a substantial change to the existing landscape or viewshed. At five of the six bridges, new visible superstructures would closely resemble the current superstructures in material, texture, and visual appearance, though the materials would be new and not an exact replication. The massing and spatial relationship of the bridges within the landscape would be preserved, maintaining harmony with the surrounding landscape. Open picket-style concrete rails and solid concrete rails that are visually similar to the existing rails but also meet crashworthiness standards would be installed. When first constructed, the visible concrete will have a more modern, clean appearance than the existing structures, but this will lessen after several months of exposure to the elements. The project would also apply CRM approach barriers and transition barrier systems specially designed and analyzed for application along the Hana Highway. This offers the ability to provide barriers that comply with the safety requirements faced with stone salvaged from existing approach walls requiring replacement, thereby minimizing the visual changes. Visible substructural

elements determined to be character-defining would be preserved, and new buried supports would not be visible. Visual simulations showing the proposed bridge designs compared to existing conditions for five of the six bridges are depicted in Figures 3-7 through 3-11.

Figure 3-7. Existing Bridge #2—Kailua Stream Bridge

Figure 3-8. Proposed Design of Bridge #2—Kailua Stream Bridge

Figure 3-9. Existing Bridge #5—Makanali Stream Bridge

Figure 3-10. Proposed Design of Bridge #5—Makanali Stream Bridge

Figure 3-11. Existing Bridge #8—Puohokamoa Stream Bridge

Figure 3-12. Proposed Design of Bridge #8—Puohokamoa Stream Bridge

Figure 3-13. Existing Bridge #39—Ulaino Stream Bridge

Figure 3-14. Proposed Design of Bridge #39—Ulaino Stream Bridge

Figure 3-15. Existing Bridge #40—Mokulehua Stream Bridge

Figure 3-16. Proposed Design of Bridge #40—Mokulehua Stream Bridge

At the sixth bridge, Bridge #19—Kopiliula Stream Bridge, the entire bridge would be preserved in place, and a new bridge constructed makai of the existing bridge. A new bridge adjacent to the existing would introduce a new visual element to the setting at this location. The massing and scale of the new bridge would be compatible with the existing bridge and muted in design such that it does not compete with the preserved historic bridge. The views of Bridge #19—Kopiliula Stream Bridge set against the mauka landscape would not be affected. The makai side of the existing bridge would be somewhat obscured while approaching the bridge, which is similar to current conditions due to roadside vegetation. A minor amount of permanent vegetation removal at the location of the new bridge would be required, primarily affecting grasses and shrubs, and would not noticeably alter the landscape. Figure 3-18 shows a simulation of the proposed bridge design.

Figure 3-17. Existing Bridge #19—Kopiliula Stream Bridge

Figure 3-18. Proposed Design of Bridge #19—Kopiliula Stream Bridge

The project would result in temporary, adverse visual impacts during the construction period, from the presence of construction equipment and personnel, increased temporary traffic control signage, and minor vegetation removal to accommodate a work zone. These temporary impacts during the construction period would be minimal, and no specific mitigation is required. All construction equipment would be removed upon project completion, and temporarily disturbed areas would be revegetated with non-invasive plant species appropriate for the project area.

3.12 Roads and Traffic

3.12.1 Existing Conditions

The Hana Highway is the main transportation corridor from the central valley of Maui to Hana and points south of Hana. While the road is colloquially referred to as the Hana Highway for this entire route, the Hana Highway falls within three different ownership jurisdictions. The subject bridges addressed in this document are located on the portion of the Hana Highway owned by HDOT and designated "State Route 360." The state-owned portion of the road is generally between Haiku and Hana. South of Hana, the jurisdiction of the Hana Highway changes to the County of Maui, with another change in jurisdiction for the portion of the road that falls within the boundaries of Haleakala National Park, which the National Park Service administers. South of the Haleakala National Park boundary, the Hana Highway becomes the Piilani Highway to complete the belt road around the eastern half of Maui. The HDOT-owned portion of the Hana Highway on the northern side of east Maui is the primary route for commuter, tourism, and commercial traffic with effectively no viable detour, as the southern portion of the belt road is extremely narrow in spots and not suitable for increased traffic volume.

There is limited traffic data for the Hana Highway, and it is estimated that the average AADT is approximately 2,000 vehicles per day. While this volume of vehicles is typically considered low for a standard state highway, the nature of the Hana Highway, with tight curves, one-lane bridges, and limited width, can often lead to significant congestion. The existing speed limit on the Hana Highway is generally 25 miles per hour (mph), with several areas where the speed limit drops to 15 mph at narrow roadway sections. The roadway is classified as a rural collector road and is situated on mountainous terrain.

3.12.2 Potential Impacts and Mitigation Measures

No Build Alternative

Under the No Build Alternative, there would be no impact on existing traffic.

Build Alternative

Development in the State Highway ROW

The project would affect approximately 500 to 1000 feet of state ROW at each of the bridges near the following mile markers along the Hana Highway:

- MP 5.9: Bridge #2—Kailua Stream Bridge
- MP 8.2: Bridge #5—Makanali Stream Bridge
- MP 11.0: Bridge #8—Puohokamoa Stream Bridge
- MP 21.7: Bridge # 19—Kopiliula Stream Bridge
- MP 27.9: Bridge #39—Ulaino Stream Bridge

- MP 28.3: Bridge #40—Mokulehua Stream Bridge

The ROW width along the Hana Highway is generally 40 feet (20 feet on each side of the roadway centerline). At all bridges except for Bridge #19—Kopiliula Stream Bridge, the replacement bridges would be within the ROW of the existing highway facility, and temporary construction easements would be required on adjacent ROW for bridge construction, staging, and access. The new bridges, except for Bridge #19—Kopiliula Stream Bridge, would be operated within the ROW of the existing highway facility.

Development outside of State Highway Right-of-Way

At Bridge #19—Kopiliula Stream Bridge, the new bridge could be installed on an alignment approximately 25 feet makai of the existing bridge alignment. To facilitate the new position of the bridge, HDOT will request a land transfer from the Hawaii DLNR to acquire approximately 0.2 acre from the DLNR to the makai side of the existing state highway ROW.

Traffic Impacts

Short-term Construction-related Impacts. Construction is expected to be completed within three years. At this time, it is unknown whether the bridges would be constructed simultaneously or separately. Phasing requirements will be determined prior to construction and will consider the ability to reduce the duration of construction, reduce impacts to roadway users, and the availability of materials and resources.

Most construction is anticipated to be adjacent to the existing roadway so that vehicles can continue to pass during construction. Work to construct the proposed foundations for the new bridges would occur in the roadway and would require short-duration closures for subgrade work in trenches within the existing roadway footprint. However, these closures are anticipated to occur overnight, with roadway plates installed during daytime hours to allow normal operation during daytime and peak travel periods.

A short-term, multi-day (up to approximately four days) closure would be required at each bridge to install the new bridge deck after it is built adjacent to the existing roadway. During this time, the existing bridge deck would be removed, and the pre-built new bridge deck would be lifted or slid into place. The bridge would be reopened to public traffic once the new structure is in place.

Long-term Traffic Impacts. The project would retain the existing traffic patterns. The new bridges would be single-lane, similar to the existing bridges, and the traffic volumes and vehicle usage are anticipated to be similar to the current road usage.

Traffic Control. The contractor would develop a traffic management plan before construction, which would be submitted to HDOT for review and approval. Components of the traffic plan may include public notices and electronic signboards to inform motorists about the work schedule and help with travel planning. In particular, multi-day closures require ample notice and extensive public outreach to inform affected users. In addition to the public and emergency service responders noted below, the multi-day closure coordination would include local services and school districts along the route. The construction contract requires the contractor to develop and communicate a plan for the closures well ahead of actual closure operations. These requirements would be coordinated with HDOT and be required in the construction contract. All temporary signs, signals, and pavement markings would conform to the FHWA Manual on Uniform Traffic Control Devices for Streets and Highways standards.

As each bridge is currently one-lane, vehicles have to yield at each end of the bridge and negotiate staggered passage over the bridges with on-coming traffic. Typically, this results in 5 to 8 vehicles crossing the bridge in one direction before the line of traffic yields and allows 5 to 8 vehicles to pass from the opposite direction. To facilitate similar movement through the bridges under construction, it is

anticipated that temporary traffic signals would be installed on each side of the bridges to control traffic flow. These signals can adjust timing as needed to allow flow efficiency during various parts of the day.

Emergency Services. The Hana Highway is a lifeline transportation facility for police, fire, and emergency medical services. The contractor would be required to make provisions for emergency access and would be required to maintain full access during non-working hours. Emergency services, including police, fire, and ambulance, would be notified before any required roadway closures or detours are implemented.

3.13 Parks and Recreation Facilities

3.13.1 Existing Conditions

No parks or recreational facilities are located within or immediately adjacent to the six bridge project areas. There are also no lands within the project area that have been acquired or developed with grants from the Land and Water Conservation Fund. However, Hana Highway provides access to several county- and state-maintained parks in East Maui and ultimately provides access from the island's east side to Haleakala National Park. The DLNR, Division of State Parks, manages the following parks accessed along Hana Highway (DLNR-DSP 2023):

- Kaumahina State Wayside, located near MP 12, approximately one mile past Bridge #8—Puohokamoa Stream Bridge when traveling towards Hana, is a forested rest stop that offers picnicking, trash receptacles, restrooms, and a scenic viewpoint of the northeast Maui coastline. Open daily during daylight hours.
- Wailua Valley State Wayside, located near MP 18.8 between Bridge #8—Puohokamoa Stream Bridge and Bridge #19—Kopiliula Stream Bridge, is a roadside park that offers a scenic viewpoint of Keanae Valley and Loolau Gap in Haleakala's rim and of Wailua Village with taro loi fields. Open daily from 7:00 a.m. to 7:45 p.m.
- Puaa Kaa State Wayside, located near MP 22.5 along Hana Highway, is approximately 0.8 miles past Bridge #19—Kopiliula Stream Bridge when traveling towards Hana. This rest area with small scenic waterfalls and pools provides a walking path, picnic table, trash receptacles, and restrooms. Open daily during daylight hours.
- Waianapanapa State Park is accessed off Waianapanapa Road, which intersects with Hana Highway near MP 31.8, about 3 miles southeast of Bridge #40—Mokulehua Stream Bridge. This incredibly popular state park offers beach access, swimming, fishing, camping, hiking, and sightseeing, with several maintained facilities to improve the visitor experience. Access to this park is by reservation only through the State Parks Reservation System. Entrance and parking fees vary by state residency status, transportation mode, and the size of the vehicle with commercial vehicles. Open daily from 7:00 a.m. to 6:00 p.m.; overnight camping by permit only.

The County of Maui Department of Parks and Recreation also operates and maintains public parks and recreational facilities accessible via Hana Highway. Two parks that are accessed by roads that intersect with Hana Highway at MPs located between Bridge #8—Puohokamoa Stream Bridge and Bridge #19—Kopiliula Stream Bridge are as follows:

- Honomanu Park, accessed by a gravel road located near MP 14, is approximately 9.6 acres of black pebble beach that offers offshore swimming

- Keanae Park, located on the Keanae Peninsula, is accessible by Keanae Road near MP 16. This approximately 4.1-acre park offers parking, restrooms, telephones, playing fields, and scenic views of picturesque, non-swimmable shoreline.

Additional county-maintained parks and a community center are also located in central Hana town, as well as further past Hana town near Kipahulu.

3.13.2 Potential Impacts and Mitigation Measures

No Build Alternative

Under the No Build Alternative, there would be no impact on parks and recreational facilities or changes to travelers' access to these resources.

Build Alternative

The Build Alternative would not cause any direct changes to parks or recreational facilities. Addressing the structural deficiencies of the six bridges through the implementation of the Build Alternative would indirectly benefit visitors to parks and recreational facilities over the long term due to more reliable access to these resources. No parks or recreational facilities are near the project sites and would therefore not be exposed to direct construction disturbances.

Construction-related traffic delays and roadway closures can potentially affect the traveling public, including those driving Hana Highway, to access the many recreational resources in East Maui. Construction is anticipated to occur adjacent to the existing bridges, allowing vehicles to continue to pass during the daytime. This is the predominant travel time for travelers accessing the area parks and recreational facilities. Work to construct the new, on-alignment proposed foundations would occur in the roadway and require short-duration closures. However, these closures are anticipated to take place during the overnight hours. During select construction milestones (i.e., slide-in of the new superstructures), multi-day, full road closures would be required at each bridge. Each closure could be up to approximately four days. A public outreach program would adequately relay all delays and closures to residents and the tourism industry. With the implementation of a traffic management plan, including extensive public outreach to provide advance notice of closures, travelers can plan to enjoy amenities outside of limited closure periods or plan additional travel time via Piilani Highway.

3.14 Public Services and Utilities

3.14.1 Existing Conditions

This section describes public services and utilities in and near the project area, including police, fire, medical services, education, utilities, and solid waste management.

Police, Fire, and Medical Services

Law enforcement and fire protection services are provided by the County of Maui Police Department and the Department of Fire and Public Safety, respectively. The nearest police stations to the project are in Hana and Wailuku, and the nearest fire stations are in Hana, Makawao, and Paia. Maui Memorial Medical Center, located in Wailuku and approximately 25 miles from Bridge #2—Kailua Stream Bridge, is the only major medical facility on the island. It is a full-service and acute medical care facility, licensed for 219 acute care beds, capable of receiving emergency air medical transports 24 hours a day. Emergency ambulance and air evacuation stations are located in Hana. Medical clinics and dental practices are located across the island, including in Hana.

Education

Hawaii Public Schools, Maui District operates the following schools in the area: Hana High & Elementary (grades K—12) in Hana, Haiku Elementary (K—5) in Haiku, Paia Elementary (K—5) in Paia, and Makawao Elementary (K—5) and Samuel E. Kalama Intermediate (6—8) in Makawao. There are also several private schools in Paia, Makawao, and Pukalani.

Utilities

No known utility facilities exist at Bridge #2—Kailua Stream Bridge, Bridge #5—Makanali Stream Bridge, and Bridge #8—Puohokamoa Stream Bridge. Features of the extensive EMI Aqueduct System, which collects surface stream waters and supplies them for agricultural and domestic water uses, are adjacent and integrated into the Bridge #19—Kopiliula Stream Bridge.

Bridge #39—Ulaino Stream Bridge has existing overhead utilities in the project area. While no utility poles are within the project limits, an electrical powerline, owned and maintained by Hawaiian Electric Company, and a Hawaiian Telcom telecommunications line cross over the existing bridge. In addition, a water line conduit extends from the stream and under the bridge (mauka to makai).

Bridge #40—Mokulehua Stream Bridge has a waterline near one of the existing bridge abutments.

Solid Waste and Disposal

Solid waste generated in the project area is typically transported to the Hana Landfill or the Central Maui Landfill in Puunene. Commercial construction and demolition waste is only accepted at the Central Maui Landfill.

3.14.2 Potential Impacts and Mitigation Measures

No Build Alternative

No changes to public services and utilities would occur under the No Build Alternative.

Build Alternative

The Build Alternative would not cause any changes to public service or utility requirements over the long term. Bridge #19—Kopiliula Stream Bridge would remain in place, and continued access for EMI maintenance would be provided. As described in Section 3.12, coordination with the local school district and emergency services providers would occur during the development of a traffic management plan so that potential roadway closures are scheduled at times where impacts are avoided or minimized to the extent practicable. Provisions to provide for emergency response during closures would also be provided.

Coordination with utility providers would continue through the project design process and construction. At this time, it is anticipated that the contractor would be capable of protecting overhead utility lines in place during construction. However, temporary and short-term power or telecommunication service interruptions could occur if potential conflicts arise. Existing water lines are also anticipated to be protected in place. BMPs would be implemented throughout construction for the protection of water quality.

The project would generate solid waste in the form of construction debris from removing the existing superstructures on five of the bridges. The contractor would be required to dispose of or recycle all materials at approved sites and with proper handling during transport. Project-related waste would be a small proportion of the island-wide total and is not expected to impact the county's solid waste facilities significantly.

3.15 Cumulative Impacts

Cumulative impacts are effects on the environment that result from the incremental impact of a project when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions over time.

The Build Alternative is a self-contained project that would primarily have localized, short-term impacts that would be minor with the implementation of avoidance and minimization measures. It does not involve expanding facilities that could contribute to increased access or development. Adverse effects would result from replacing deteriorated features that contribute to the significance of a historic district (Hana Belt Road historic district). However, these would be effectively mitigated by incorporating special design treatments so that improvements are consistent with the district's historic character. As agreed upon with SHPD and other consulting parties, additional mitigation would also be implemented, such as architectural recordation, interpretation, or development of design process documentation.

A review of The Environmental Notice publications for nearby Chapter 343, NEPA, and planning actions was conducted to aid the cumulative effects analysis for this EA. In addition, the County of Maui's Automated Planning and Permitting System was reviewed to identify other projects in the area, and HDOT directly coordinated with the County of Maui Department of Public Works to review present and reasonably foreseeable future projects. Other isolated HDOT and county bridge improvement projects along Hana Highway are anticipated; therefore, historic district effects are described separately, below. One county project to replace Kahawaiokapia Bridge has timing that may overlap with this project, but effects would be minor as the projects would be coordinated with consideration of construction access and reducing traffic impacts. No known major planned or ongoing land use development projects were identified that would interact with this project. Individual, localized improvement projects to renovate buildings in Hana town, Nahiku, and Paia were identified, but these would not interact with this project. Continued capture and conveyance of surface waters through the EMI aqueduct system in the project vicinity could occur as a result of the issuance of a 30-year water lease, which the Board of Land and Natural Resources is currently pursuing. The proposed project to improve six bridges would fully maintain stream flow, making no changes to aquatic passage conditions or water availability, and it would not contribute to the beneficial or adverse effects of the EMI system operation.

For this project, a focused analysis of cumulative effects on the Hana Belt Road historic district was conducted. HDOT maintains portions of the Hana Belt Road, while the County of Maui maintains the road past Hana town. A review of past, present, and reasonably foreseeable future projects for both agencies was undertaken to understand the collective impact of all projects on the historic district. No additional surrounding developments or actions by others were identified that are anticipated to measurably influence effects on the historic district.

Important to an understanding of cumulative effects was understanding the condition of the resource or, in the case of historic properties, its integrity. Resource integrity refers to the ability of a resource to convey its significance. There are seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association. Considering statements in the NRHP nomination, the key character-defining features of the overall district that display its areas of significance include:

- The alignment within East Maui's uniquely rugged topographical setting,
- Engineering design features responsive to setting and topography,
- Scenic vistas, and

- Consistent stylistic elements.

The Hana Belt Road retains its historic character and integrity in all seven aspects. In summary of the past alterations, the overall historic character of the Hana Belt Road remains intact and holds high integrity in all seven aspects, as noted in the 2001 NRHP nomination and documentation, studies, and plans written since. The predominant alterations in number have been related to improving safety with largely reversible additions, such as steel beam guardrails, basalt guard walls, road striping, reflector posts, and signage. While these elements have been introduced across the entire length of the district, the application is not part of a consistent plan. These safety changes have not altered the alignment, examples of unique engineering, scenic vistas, or any of the consistent stylistic elements.

Furthermore, these additions have not collectively diminished the district's historic integrity. In the twenty-first century, bridges have begun to be repaired, rehabilitated, or replaced depending on the bridge type, condition of structural elements, and extenuating circumstances. The county has replaced four bridges in the section it maintains between Hana and Kipahulu. All four were concrete-deck structures, two with solid parapets, one with open parapets, and one where the original parapet had been removed as part of a previous repair. Solid parapets are the predominant type between Hana and Kipahulu, while open parapets are more common between Huelo and Hana. Concrete deck structures are the most common bridge type. While replacing these four bridges represents a loss of characteristics of the overall historic district, multiple representative examples of concrete deck structures with open and solid parapets remain in great numbers throughout the district.

Potential actions in the foreseeable future include addressing three bridges in the county-maintained portion and two in the state-maintained portion with structural deficiencies that may warrant major rehabilitation or potential replacement. HDOT and the county are committed to applying similar context-sensitive design approaches that are consistent with the Hana Belt Road's historic character and would avoid intrusive or incompatible additions. The HRS 6E-8 process and, if federally funded, the Section 106 process would further ensure appropriate future treatments. Effects would, therefore, likely be similar to those described for this project in Section 3.8. Four additional bridges are candidates for rehabilitation to extend service life and would have minimal to no effects on the historic district.

As described in Section 3.8, while five of the six bridges under this project would be individually affected, the proposed action would be complementary and compatible with the character of the Hana Belt Road historic district. The proposed improvements at five bridges include designs responsive to the setting and topography and do not affect scenic vistas or significantly alter the natural topography of East Maui. The retention of key significant features of each bridge and the use of a complementary new design that respects and relates to the historic fabric maintains the consistent stylistic design within the district. At Bridge #19—Kopiliula Stream Bridge, the entirety of the bridge would be preserved in place with a new bridge constructed makai of the historic bridge. Preserving the unique, existing bridge would retain all the character-defining features identified in the 2015 Preservation Plan. Therefore, the integrity of the historic district would be maintained.

In summary, the Build Alternative would result in less than significant impacts in concert with other past, present, and reasonably foreseeable future projects. Retention of key significant features of each bridge and the use of a complementary new design that respects and relates to the historic fabric maintains the consistent stylistic design within the district. The proposed mitigation described in Section 3.8.2 would be implemented as agreed upon by SHPD.

CHAPTER 4 Consistency with Government Plans, Policies, and Controls

The plans and policies relating to the proposed project range from broad program guidance to land use controls governing the project site. Construction of the proposed improvements is consistent with the various plans, policies, and regulatory controls, as discussed herein.

4.1 State of Hawaii

4.1.1 Hawaii State Plan

The Hawaii State Plan (State Plan), HRS Chapter 226, is the umbrella document in the statewide planning system. It serves as a written guide for the long-range development of the state by describing a desired future for the residents of Hawaii and providing a set of goals, objectives, and policies intended to shape the general direction of public and private development.

The proposed project is consistent with the overall goals established in the State Plan, which are to achieve:

> *(1) A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawaii's present and future generations.*
>
> *(2) A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.*
>
> *(3) Physical, social, and economic well-being, for individuals and families in Hawaii, that nourishes a sense of community responsibility, of caring, and of participation in community life.*

Specific objectives and policies related to the state goals have been established for population, economy, physical environment, facility systems, and socio-cultural advancement. The proposed project supports and is consistent with the relevant State Plan objectives and policies in Table 4-1.

Table 4-1. State Plan Objectives and Policies

Objective	Compliance with Specific Objectives and Policies
Economy—in general	The project would be in compliance with this theme, particularly the following objectives and policies: ◆ (a)(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people, while at the same time stimulating the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited. As described in Chapter 3CHAPTER 3, the proposed project is anticipated to provide economic benefits by supporting a number of construction workers for the duration of the project.
Economy—federal expenditures	The project would be in compliance with this theme, particularly the following objectives and policies: ◆ (b)(3) Promote the development of federally supported activities in Hawaii that respect statewide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawaii's environment.

Objective	Compliance with Specific Objectives and Policies
	◆ (b)(6) Strengthen federal-state-county communication and coordination in all federal activities that affect Hawaii. The proposed project involves using federal funds as needed to improve the six Hana Highway bridges as part of HDOT's goal to continue to provide a safe and functional component of the regional transportation system for highway users. It is being implemented through a partnership between HDOT and FHWA-CFLHD.
Physical environment–land-based, shoreline, and marine resources	The project would be in compliance with this theme, particularly the following objectives and policies: ◆ (b)(3) Take into account the physical attributes of areas when planning and designing activities and facilities. ◆ (b)(6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii. The proposed project would provide bridges designed of similar size as the existing bridges and is not expected to have a significant adverse effect on important natural resources. Avoidance and minimization measures would be implemented to avoid any adverse effects on special-status species that could potentially occur in the project area.
Physical environment–scenic, natural beauty, and historic resources	The project would be in compliance with this theme, particularly the following objectives and policies: ◆ (a)(1) Promote the preservation and restoration of significant natural and historic resources. ◆ (a)(3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features. ◆ (a)(4) Protect those special areas, structures, and elements that are an integral and functional part of Hawaii's ethnic and cultural heritage. Although the proposed project would result in visual changes to the site as a result of replacing the original bridge elements and constructing a new bridge adjacent to Bridge #19—Kopiliula Stream Bridge, the visual changes are considered minimal and would not affect the quality of views. Similar and complementary design treatments would maintain the visual quality. The proposed project would not result in a substantial change to the existing landscape or viewshed. The Hana Belt Road is listed in the NRHP. Although the proposed project would adversely affect five of the six bridges, mitigation, as agreed upon with SHPD, would be implemented to minimize the potential impacts.
Physical environment–land, air, and water quality	The proposed project would be in compliance with this theme, particularly the following objectives and policies: ◆ (a)(1) Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources. ◆ (b)(3) Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters. ◆ (b)(5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters. The proposed project would provide for more resilient infrastructure. All the project bridges are being designed to the appropriate seismic response parameters and would be more resistant to damage from potential seismic events. The proposed project would result in short-term, construction-related impacts (noise, dust, and erosion), but implementation of BMPs would minimize the effects on the environment. BMPs will be implemented for the protection of water quality and specified through the permitting under Sections 401 and 402 of the CWA and through consultation under Section 7 of the ESA.

Objective	Compliance with Specific Objectives and Policies
Facility systems–in general	The proposed project would be in compliance with this theme, particularly the following objectives and policies: ◆ (a) Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives. ◆ (b)(1) Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans. HDOT's mission is to maximize available resources to provide a safe, efficient, accessible, and sustainable State Highway System that ensures the mobility of people and goods and supports economic vitality and livability. HDOT recognizes the need to provide for bridge improvements to provide for continued access.
Facility systems–transportation	The proposed project would be in compliance with this theme, particularly the following objectives and policies: ◆ (a)(1) An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods. ◆ (a)(2) A statewide transportation system that is consistent with and will accommodate planned growth objectives throughout the State. ◆ (b)(2) Coordinate state, county, federal, and private transportation activities and programs toward the achievement of statewide objectives. ◆ (b)(3) Encourage a reasonable distribution of financial responsibilities for transportation among participating governmental and private parties. ◆ (b)(6) Encourage transportation systems that serve to accommodate present and future development needs of communities. ◆ (b)(10) Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawaii's natural environment. The proposed project would improve the bridges with a context-sensitive design that considers the surrounding environment and communities they serve. The project is a partnership project between HDOT and FHWA-CFLHD to improve the bridges so they can continue to serve the communities well into the future.

4.1.2 State Functional Plans

The State Plan directs appropriate Hawaii State agencies to prepare functional plans for its respective program areas. Twelve State Functional Plans serve as the primary implementing vehicle for the State Plan's goals, objectives, and policies. The State Transportation Functional Plan identified the four most critical issues of transportation: congestion, economic development, funding, and education (HDOT 1991). Objectives, policies, and implementing actions were identified for each issue. The following objectives and policies apply to the project:

> *Objective I.A. Expansion of the transportation system.*
>
> *Policy I.A.1. Increase transportation capacity and modernize transportation infrastructure in accordance with existing master plans and laws requiring accessibility for people with disabilities.*

Improving the six high-priority bridges included in this project helps HDOT fulfill its mission to provide a safe, efficient, accessible, and sustainable transportation system for the public. The project would be

consistent with existing plans described throughout this chapter and designed to meet modern safety requirements.

4.1.3 Hawaii 2050 Sustainability Plan

The Hawaii 2050 Sustainability Plan, revised in June 2021, serves as a guide for the future long-range development of the state. The plan promotes the growth and diversification of the state's economy, the protection of the physical environment, the provision of public facilities, and the promotion of and assistance to socio-cultural advancement.

The project is consistent with Sustainable Development Goal 9, "Industry, Innovation, and Infrastructure," to "Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation" (Hawaii Office of Planning 2021). The plan's description for this goal recognized the aging and deterioration of Hawaii's bridges and the challenges of effectively maintaining and improving infrastructure. The proposed project would address deteriorated bridges with more resilient structures.

4.1.4 Federal-Aid Highways 2035 Transportation Plan

HDOT prepared the Statewide Federal-Aid Highways 2035 Transportation Plan to guide land transportation decisions throughout the state through 2035. It defines goals and needs to set the direction for transportation system improvements for which funding priorities can be developed. The proposed project is consistent with the following relevant goals (HDOT 2014a):

> *Goal 3.1. Manage transportation assets and optimize investments.*
>
> *Goal 3.2. Maintain safe, efficient, complete transportation system for the long term.*
>
> *Goal 8.1. Maintain a safe transportation system for all land transportation modes.*

The regional Federal-Aid Highways 2035 Transportation Plan for the District of Maui was developed concurrently with the statewide plan and serves as an interface between overarching state transportation issues and island-specific needs and funding priorities. Maintaining the region's infrastructure and assets through the system preservation program was identified as important because the road network is the lifeline of the islands. As described in the regional plan, "keeping roadways and bridges in optimal form is a key factor in helping the District of Maui build its economy and progress towards its transportation goals" (HDOT 2014b). This proposed project is, therefore, consistent with this regional and statewide priority.

4.1.5 State Land Use Law

The State Land Use Commission, pursuant to HRS Chapters 205 and 205A and HAR Chapters 15-15, is empowered to classify all lands in the state into one of four land use districts: Urban, Rural, Agricultural, and Conservation. The lands surrounding the project limits are classified in the Agricultural and Conservation District. The proposed improvements are allowable uses within these land use districts. No change in land use classification will be needed. A Conservation District Use Permit will be required. See Figures 4-1 and 4-2 for state land use districts.

Figure 4-1. State Land Use Districts – Kailua, Makanali, and Puohokamoa Stream Bridges

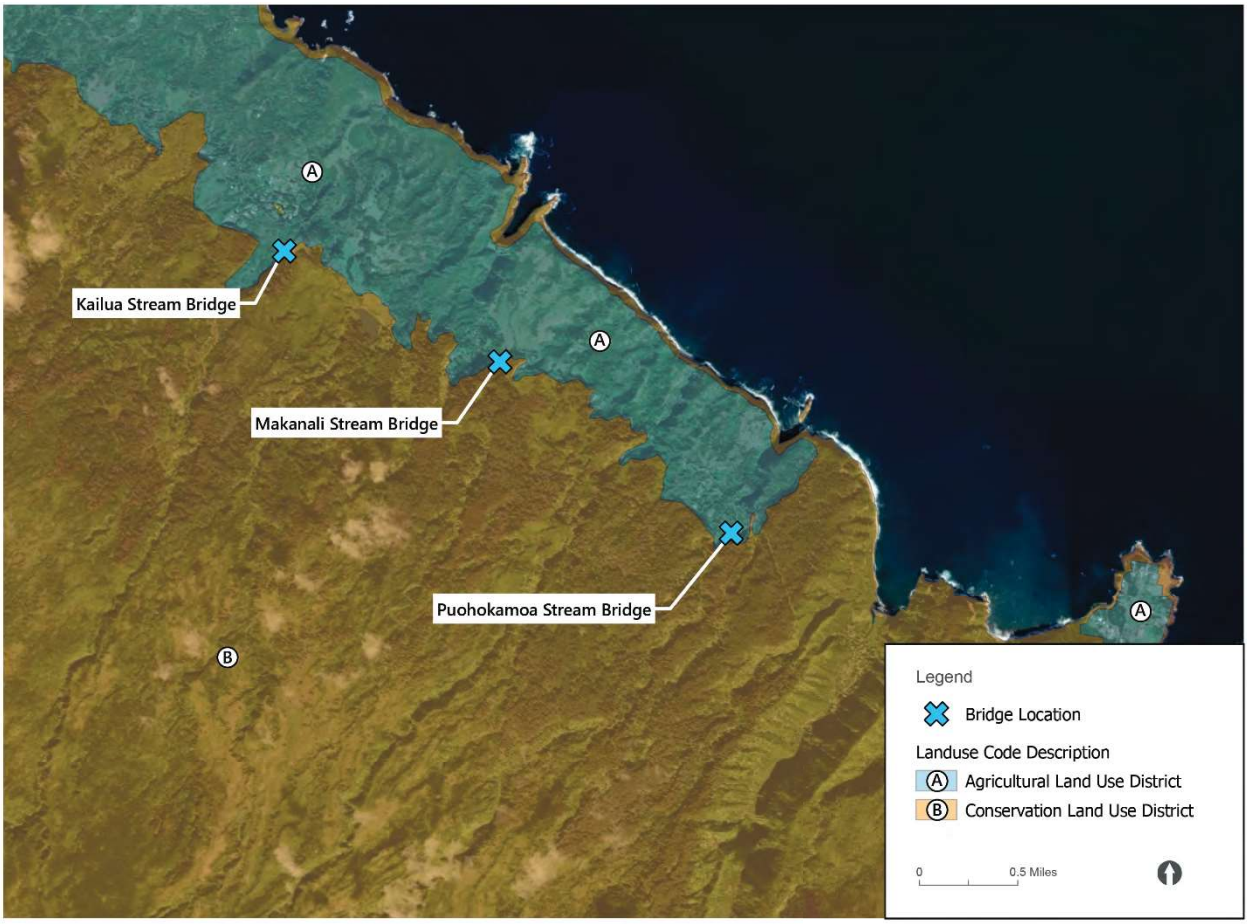
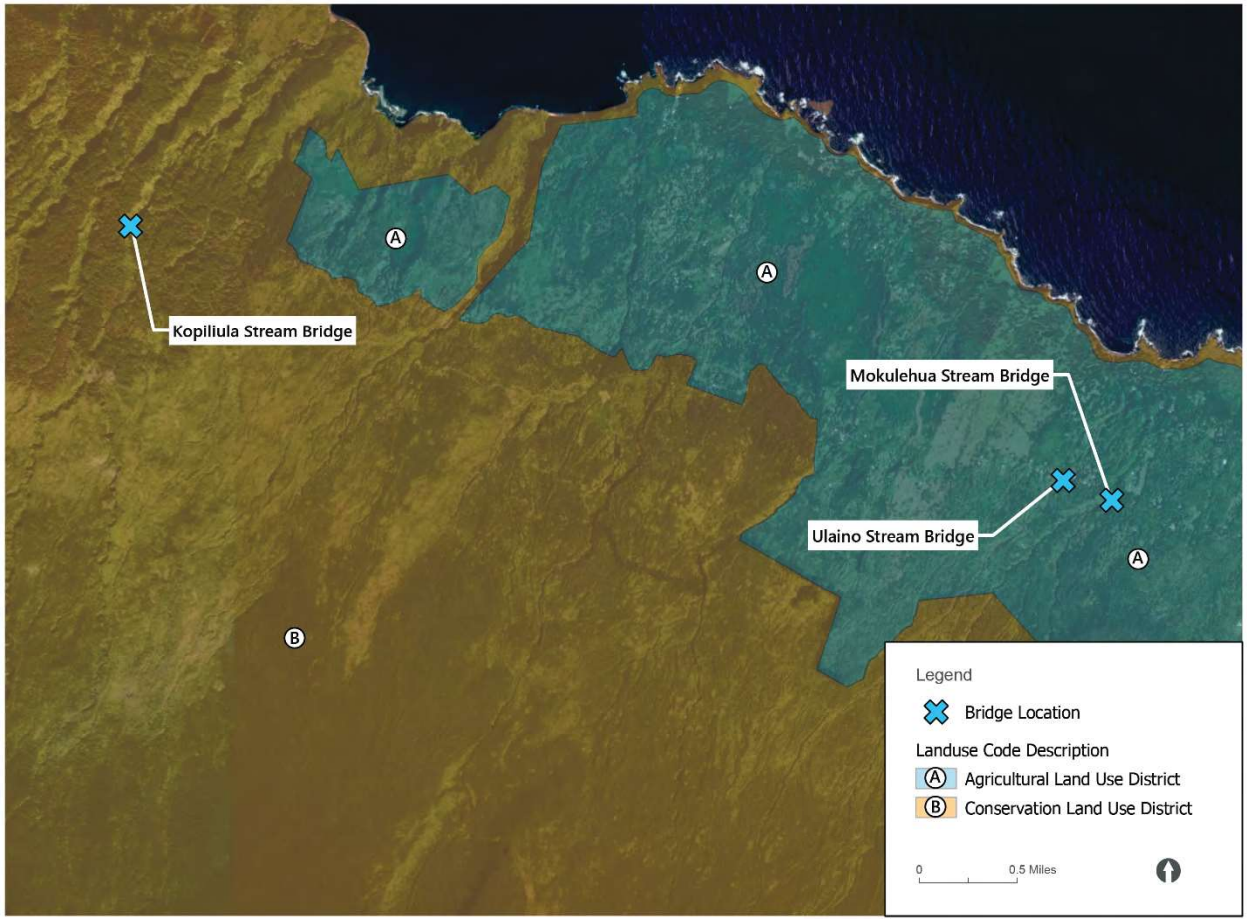


Figure 4-2. State Land Use Districts – Kopiliula, Ulaino, and Mokulehua Stream Bridges



4.1.6 Coastal Zone Management Program and Federal Consistency Determination

In 1977, Hawaii enacted HRS Chapter 205A, Hawaii Coastal Zone Management Program, to carry out the state's CZM policies and regulations under the Federal Coastal Zone Management Act. The CZM area encompasses the entire state, including all marine waters seaward, to the extent of the state's police power and management authority, including the 12-mile U.S. territorial sea and all archipelagic waters.

As a result, the project is within the CZM area and subject to consistency with the objectives and policies of the Hawaii CZM Program. The State Office of Planning reviews the CZM Federal Consistency Certification. The Hawaii CZM program focuses on ten policy objectives. Other key areas of the CZM program include a permit system to control development within an SMA managed by each county and the Office of Planning (see Section 4.2.3), a Shoreline Setback Area that serves as a buffer against coastal hazards and erosion and protects view-planes, and marine and coastal resources. Finally, a Federal Consistency provision requires that federal activities, permits, and financial assistance be consistent with the Hawaii CZM program. The project is consistent with the CZM program objectives (HRS 205A-2) described below.

1. ***Recreational Resources.*** *Provide coastal recreational opportunities accessible to the public.*

The project area does not contain any coastal recreational resources. Over the long term, improved reliability in access to coastal recreation areas via Hana Highway would be provided.

2. ***Historic Resources.*** *Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.*

Studies focusing on archaeology, historic architecture, and cultural perspectives were conducted for this project, and consultation under Section 106 of the NHPA and HRS, Chapter 6E, is ongoing. Implementation of the project would extend the functional lifespan and the historical use of the Hana Highway (historically referenced Hana Belt Road), a significant historic property listed in the NHRP. Although five of the six bridges under this project would be individually affected, the proposed action would be complementary and compatible with the character of the Hana Belt Road historic district. The proposed improvements at five bridges include designs responsive to the setting and topography and do not affect scenic vistas or significantly alter the natural topography of East Maui. The retention of key significant features of each bridge and the use of a complementary new design that respects and relates to the historic fabric maintains the consistent stylistic design within the district. At Bridge #19—Kopiliula Stream Bridge, the entirety of the bridge would be preserved in place with a new bridge constructed makai of the historic bridge. Preserving the unique, existing bridge would retain all the character-defining features of the bridge.

3. ***Scenic and Open Space Resources.*** *Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.*

The project is being designed to ensure visual compatibility with the surrounding environment. The bridge design elements, including the bridge railing, have been designed to be visually similar to those they would replace. The proposed project would not negatively impact coastal scenic resources, nor is it anticipated to obstruct views of the landscape or open space resources.

4. ***Coastal Ecosystems.*** *Protect valuable coastal ecosystems, including reefs, beaches, and coastal dunes, from disruption and minimize adverse impacts on all coastal ecosystems.*

Because of its inland location and the implementation of mitigation measures and BMPs during construction, the potential for sediment or pollutants to reach downstream waters would be reduced, and the project is not expected to affect coastal ecosystems.

5. ***Economic Uses****. Provide public or private facilities and improvements important to the State's economy in suitable locations.*

The proposed project would improve Hana Highway, an essential facility that contributes to the state's economy.

6. ***Coastal Hazards.*** *Reduce hazard to life and property from coastal hazards.*

The project is outside a sea level rise exposure area and tsunami evacuation zone. All the project bridges would meet or exceed existing hydraulic conditions and would be more resilient structures, contributing to the overall reliability of a critical transportation facility. Two of the six bridges are located within a FEMA-mapped Zone A floodplain. There would be no rise in the base flood elevation from existing conditions from implementing proposed bridge improvements at these locations.

7. ***Managing Development.*** *Improve the development review process, communication, and public participation in the management of coastal resources and hazards.*

Numerous permit approvals will be required to complete the proposed project, many of which contain a public participation component. HDOT and FHWA-CFLHD have ensured that the proposed action conforms with land use designations for the site and will consult with the Hawaii Office of Planning and Sustainable Development, the County of Maui Planning Department, and DLNR, Office of Conservation and Coastal Lands for all required reviews and approvals. Extensive public coordination on the project occurred prior to the development of the Draft EA, as discussed in Section 7.2. The EA and permitting processes would provide additional opportunities for the public to review and comment on the project.

8. ***Public Participation.*** *Stimulate public awareness, education, and participation in coastal management.*

See Objective #7. Managing Development discussion, above.

9. ***Beach and Coastal Dune Protection.*** *Protect beaches and coastal dunes for: (i) public use and recreation, (ii) the benefit of coastal ecosystems, and (iii) use as natural buffers against coastal hazards; and coordinate and fund beach management and protection.*

The project is located inland and would not affect beaches or coastal dunes.

10. ***Marine and Coastal Resources.*** *Promote the protection, use, and development of marine and coastal resources to assure their sustainability.*

The project would not affect marine or coastal resources, and BMPs would be implemented to prevent the degradation of the aquatic environment and the quality of the Hawaii state waters.

4.2 County of Maui

4.2.1 Maui County General Plan 2030

The Maui County General Plan (General Plan) is a long-term comprehensive blueprint for the county's physical, economic, and environmental development and cultural identity. The General Plan is a series of ordinances that provide direction for the county's future growth and policy creation. It includes the Countywide Policy Plan, which acts as an overarching values statement and is an umbrella policy document that provides direction for the Maui Island Plan and community plans. The Hana Community Plan covers the proposed project area. The Countywide Policy Plan, Maui Island Plan, and Hana Community Plan are each described below.

Countywide Policy Plan

The Countywide Policy Plan provides broad goals, objectives, policies, and implementing actions that portray the desired direction for the county’s future. It also provides the policy framework for developing the Maui Island Plan and nine community plans. The proposed project is consistent with and supports the relevant goals, objectives, and policies. Most relevant are the goals related to transportation. Also relevant to this project are those related to protecting the natural environment.

Table 4-2. Countywide Policy Plan Objectives and Policies

Theme	Compliance with Specific Objectives and Policies
Diversify Transportation Options	The project would be consistent with this theme's goal of the county having an efficient, economical, and environmentally sensitive means of moving people and goods, particularly with the following objectives and policies: ◆ 1(e). Ensure that roadway systems are safe, efficient, and maintained in good condition. ◆ 1(f). Preserve roadway corridors that have historic, scenic, or unique physical attributes that enhance the character and scenic resources of communities. ◆ 1(g). Design new roads and roadway improvements to retain and enhance the existing character and scenic resources of the communities through which they pass. As described in Chapter 3, the proposed project would provide for long-term functionality and use of the bridges, maintaining critical access for the traveling public. The project is also being designed to be compatible with the surrounding environment, preserving the scenic beauty and character of the historic roadway.
Protect the Natural Environment	The project would be consistent with this theme's goal to preserve, manage, and care for the county's natural environment and distinctive open space, particularly the following objectives and policies: ◆ 1. Improve the opportunity to experience the natural beauty and native biodiversity of the islands for present and future generations. ◆ 3(a). Preserve and protect natural resources with significant scenic, economic, cultural, environmental, or recreational value. ◆ 3(d). Improve efforts to mitigate and plan for the impact of natural disasters, human-influenced emergencies, and global warming. ◆ 4. Preserve and restore significant historic architecture, structures, cultural sites, cultural districts, and cultural landscapes. ◆ 4(b). Promote the rehabilitation and adaptive reuse of historic sites, buildings, and structures to perpetuate a traditional sense of place. ◆ 4(d). Protect and preserve lands that are culturally or historically significant. The proposed project provides for the long-term functionality of the six bridges on an important transportation corridor that allows travelers to access and experience the natural beauty of East Maui. The bridges would be designed to offer more resiliency, seismic resistance, and improved safety but would also be balanced with context-sensitive design elements to preserve character-defining features, provide best-match replacements for elements needing replacement, and maintain the character of the historic district.

Maui Island Plan

The Maui Island Plan provides policy direction for the use and development of land, extension, and improvement of transportation services and infrastructure, development of community facilities, expansion of the island's economic base, provision of housing, and protection of natural and cultural resources. It also establishes policies to manage change and to direct decisions about future land use and development, and it provides the foundation to set capital improvement priorities and other implementation tools. The Maui Island Plan's goals, objectives, policies, and actions are consistent with and implement the Countywide Policy Plan's goals, objectives, policies, and actions. The proposed project is also consistent with the Maui Island Plan goals, objectives, and policies relevant to this project, including the following:

6.4.2.d. Identify and improve hazardous and substandard sections of roadways, drainage infrastructure, and bridges, provided that the historical integrity of the roads and bridges are protected.

6.4.3.a. Ensure that the roadway and transit alignments respect the natural environment and scenic views.

3.1.2.c. Strengthen current development standards to minimize destruction of land and property.

3.1.2.d. Encourage the use of construction techniques that reduce the potential for damage from natural hazards.

2.5.1.e Protect scenic resources along Maui's scenic roadway corridors.

The proposed project would address substandard and deteriorated bridges with a context-sensitive design to respect the surrounding environment and maintain the beauty of the scenic roadway corridor. The bridges would meet current seismic and loading standards and rail crashworthiness.

The project is also consistent with relevant goals and objectives aimed at protecting natural resources. Avoidance and minimization measures are being incorporated into the project to protect sensitive flora and fauna and prevent the introduction of invasive species. The project is also being designed to minimize in-water work, and site-specific BMPs will be implemented during construction to protect water quality. Therefore, the project would also be consistent with the below-listed goals.

2.2 An intact, ecologically functional system of reef, shoreline, and nearshore waters that are protected in perpetuity.

2.3 Healthy watersheds, streams, and riparian environments.

2.4 Maui's natural areas and indigenous flora and fauna will be protected.

The Maui Island Plan also identified planned protected areas. These areas should be incorporated into appropriate community plan updates, capital improvement plans, and other similar plans. The Hana Belt Road is identified as a planned protected area.

Hana Community Plan

The Hana Community Plan was completed in 1994 and reflects the unique characteristics of the planning area. The proposed project is consistent with the relevant goals, objectives, and policies as it provides long-lasting, improved structures on a transportation facility that is essential for the residents of Hana and other communities and the region's economic well-being. The improvements are being designed to be in harmony with the surrounding environment and to protect the community's natural and cultural resources. While certain upgrades would be provided on the bridges to improve safety and longevity, other design exceptions would be applied to be in balance with the nature of the historic roadway. The project is consistent with the following:

Physical Infrastructure Goal

Timely and environmentally sensitive development and maintenance of infrastructure systems which protect and preserve the safety and health of the Hana region's residents and visitors, including the provision of domestic water, utility and waste disposal services, and effective

transportation systems which meet the needs of residents and visitors while protecting the region's rural character.

Objectives and Policies

3. Encourage a program of roadway safety improvements, including shoulder widening, pull-over spots and installation of new signage and guardrails that do not detract from the region's scenic and rural character.

4. Balance traffic flow and safety requirements with the preservation of the Hana region's historic bridges.

Urban Design Goal

Harmony between the natural and man-made environments through building, infrastructure and landscaping design which ensures that the natural beauty and character of the Hana region is preserved.

Objectives and Policies

2. Encourage roadway, drainage, landscaping and other public improvement standards which are in harmony with an informal rural or natural environment.

4. Preserve significant view corridors.

The proposed project would be consistent with other goals with relevancy to the project, including those related to the protection of the environment. The proposed project is being designed to avoid and minimize in-water work, and site-specific BMPs will be implemented to protect aquatic resources during construction. Additional measures, as described throughout Chapter 3, would also be implemented to avoid and minimize other potential short-term, construction-related impacts, such as noise and air emissions.

Environment Goal

Protection and management of Hana's land, water and ocean resources to ensure that future generations can enjoy the region's exceptional environmental qualities.

Objectives and Policies

1. Protect, preserve and increase the Hana region's natural marine, coastal and inland resources, encouraging comprehensive resource management programs.

4. Discourage water or land development and activities which threaten the biological diversity of the Hana region and degrade the existing quality of the region's (1) air and noise character, (2) marine, surface and ground water and (3) scenic resources and vistas.

7. Protect, restore and preserve native aquatic habitats and resources within and along all streams within the Hana District by (1) protecting existing instream flows and (2) regulating diversions of stream waters.

4.2.2 County of Maui Zoning

County zoning provides the most detailed regulations affecting land development before construction. The project bridges are in the Hana Highway ROW. The bridges and surrounding lands are in the following County of Maui zoning districts (see Figures 4-3 and Figure 4-4):

- Bridge #2—Kailua Stream Bridge: Agriculture and Interim
- Bridge #5—Makanali Stream Bridge: Agriculture and Interim
- Bridge #8—Puohokamoa Stream Bridge: Agriculture and Interim
- Bridge #19—Kopiliula Stream Bridge: Interim
- Bridge #39—Ulaino Stream Bridge: Agriculture
- Bridge #40—Mokulehua Stream Bridge: Agriculture

The proposed project appears consistent with the permitted uses of the applicable zoning districts, as described in Maui County Code Sections 19.30A.050 and 19.02A.030, and would not require any zoning change.

Figure 4-3. County of Maui Zoning Map – Kailua, Makanali, and Puohokamoa Stream Bridges

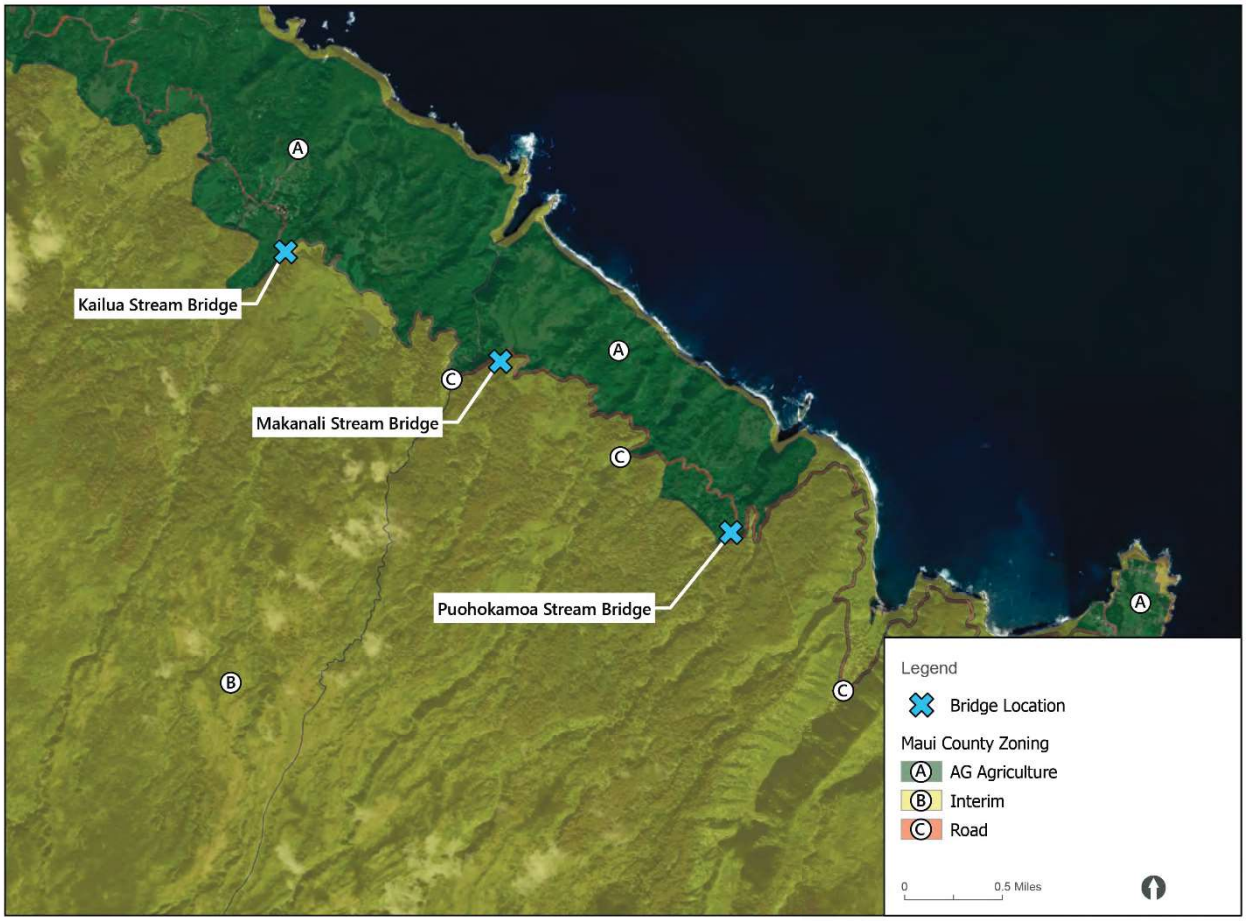
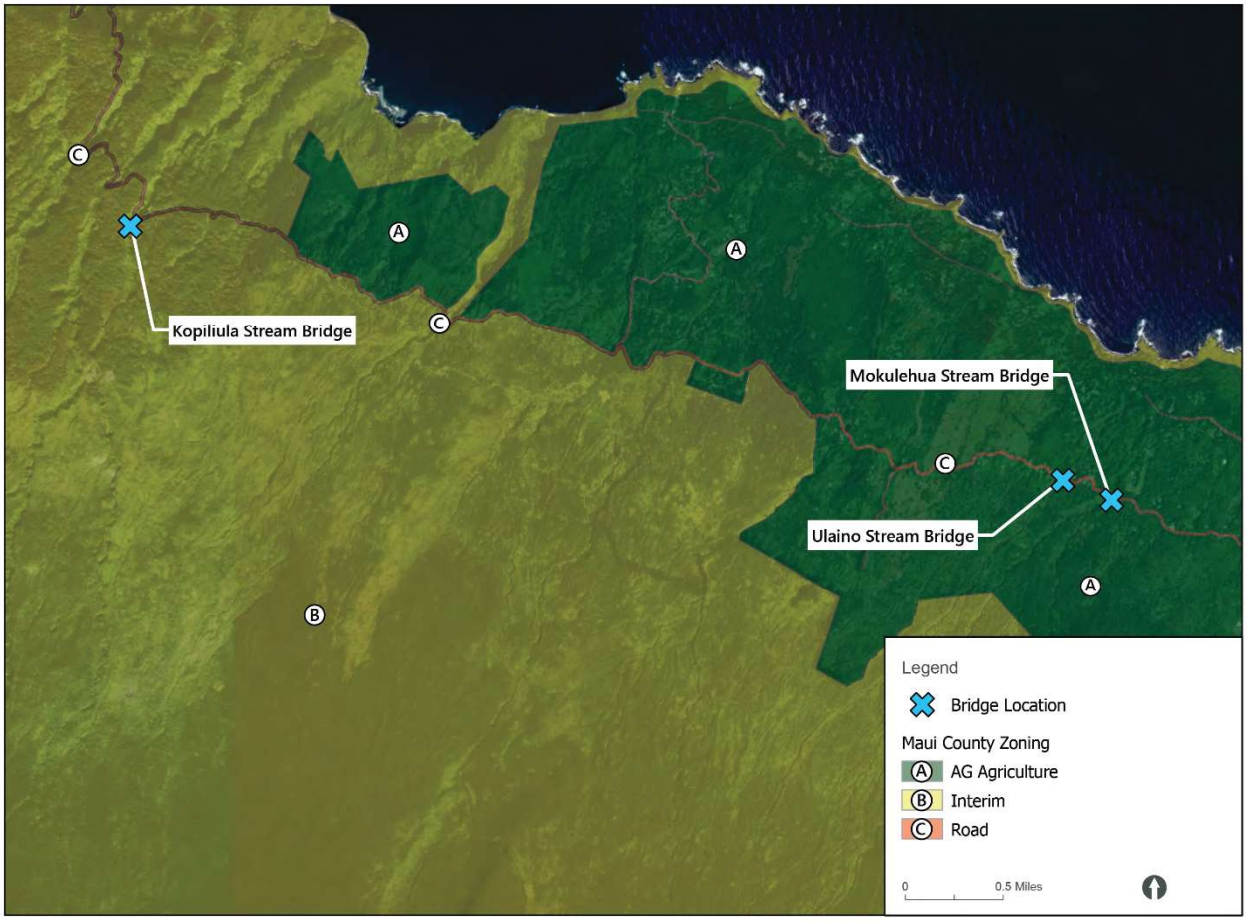


Figure 4-4. County of Maui Zoning Map – Kopiliula, Ulaino, and Mokulehua Stream Bridges

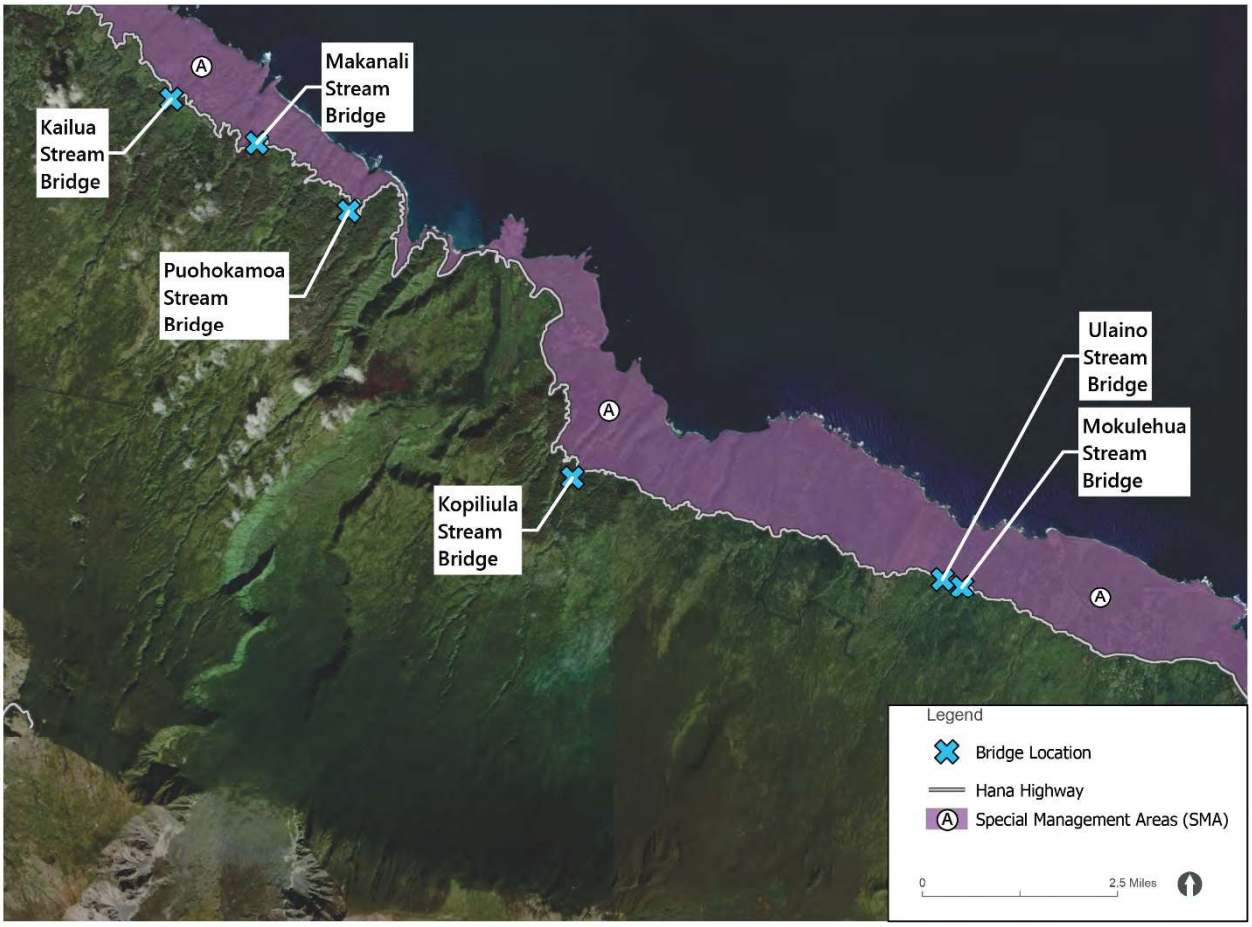


4.2.3 Special Management Area

The CZM objectives and policies (HRS Chapter 205A-2) were developed to preserve, protect, and, where possible, restore the natural resources of Hawaii's coastal zone. Any development within the SMA boundary requires an SMA Use permit administered by the county. The permitting process provides heightened scrutiny to ensure consistency with SMA objectives.

Hana Highway appears to be the dividing line for the SMA boundary. An SMA assessment would be prepared for the project, and, if necessary, an SMA Use permit would be obtained prior to project implementation. Figure 4-5 shows the SMA.

Figure 4-5. Project Bridges in Relation to Special Management Area



CHAPTER 5 Anticipated Determination

In accordance with HRS Chapter 343 and HAR Section 11-200.1, HDOT anticipates issuing a Finding of No Significant Impact for the proposed project. This assessment is based on an evaluation of project impacts (as discussed in Chapter 3 of this EA) concerning the significance criteria specified in HAR Section 11-200.1-13 (as discussed in Chapter 6 of this EA). HDOT will make a final determination after consideration of comments on the Draft EA.

CHAPTER 6 Findings and Reasons Supporting the Anticipated Determination

HAR Section 11-200.1-13 outlines those factors agencies must consider when determining whether a proposed action may have a significant effect on the environment. Agencies are to "consider and evaluate the sum of effects of the proposed action on the quality of the environment" and "consider every phase of a proposed action, the expected impacts, and the proposed mitigation measures."

The significance criteria specified in HAR Section 11-200.1-13 are listed below in italics, followed by a discussion of the project concerning each criterion.

1. ***Irrevocably commit a natural, cultural, or historic resource***

   The proposed project involves the replacement of character-defining features of an NRHP-listed historic district, with anticipated effects of "adverse effect" under Section 106 and "effects, with proposed mitigation commitments" under HRS 6E-8. Project-specific and context-sensitive design elements to be compatible with the historic roadway are being incorporated into the project. In addition, a Section 106 MOA will be developed and implemented to resolve adverse effects. No other eligible historic properties or cultural resources were found in the project area.

   The proposed project would not cause any loss of sensitive natural resources or critical habitat. BMPs and avoidance and minimization measures, identified in consultation with the USFWS, will be implemented to avoid any potential adverse effects on special-status species.

2. ***Curtail the range of beneficial uses of the environment***

   Most of the proposed project occurs within the existing ROW, apart from minor, permanent improvements adjacent to Bridge #19—Kopiliula Stream Bridge and temporarily impacted areas that may be needed for work areas or to maintain traffic during construction. All temporarily disturbed areas would be revegetated. The project helps to improve the safety and functionality of an already established transportation corridor and does not curtail the range of beneficial uses of the environment.

3. ***Conflict with the State's environmental policies or long-term environmental goals established by law***

   The proposed project is consistent with the state's environmental policies and long-term environmental goals, as demonstrated in Section 4.1. More resilient infrastructure would be provided.

4. ***Have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and State***

   The proposed project would not have an adverse effect on the economic or social welfare nor the cultural practices of the community or state. Rather, the project would support the community's social welfare by improving the reliability of bridges along an essential transportation facility.

5. ***Have a substantial adverse effect on public health***

   The proposed project would not adversely affect public health. The bridges are along Hana Highway and are part of a highway system that is a critical component of East Maui's emergency response and recovery capabilities. Preserving this transportation system would benefit public health and safety.

6. ***Involve adverse secondary impacts, such as population changes or effects on public facilities***

   The proposed project involves improvements at isolated bridge locations and would not lead to increased traffic volumes or a change in vehicle mix that may be associated with secondary impacts. The project has no potential to induce development of the area, lead to population growth, or generate increased demands for public facilities.

7. ***Involve a substantial degradation of environmental quality***

   The proposed project would not substantially degrade environmental quality. By design and function, the proposed structures would provide safe stream crossings while minimizing harm to the surrounding environment.

8. ***Be individually limited but cumulatively have substantial adverse effect upon the environment or involves a commitment for larger actions***

   The proposed project is a complete, independent project and would not result in commitments to other projects, nor would it result in cumulative, considerable environmental impacts.

9. ***Have a substantial adverse effect on a rare, threatened, or endangered species or its habitat***

   The proposed project would not adversely affect rare, threatened, or endangered species or its habitat. As described in Section 3.7.2, avoidance and minimization measures would be implemented during construction to avoid potential adverse impacts.

10. ***Have a substantial adverse effect on air or water quality or ambient noise levels***

    The proposed project's potential impact on air quality, water quality, and ambient noise levels is anticipated to be short-term, resulting from direct construction-related activities. These impacts would be minimized through implementing BMPs and adherence to permit requirements.

11. ***Have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters***

    Portions of the project are within a FEMA-designated floodplain. The structures are being designed in accordance with standards and guidelines appropriate to the geologic, hydrologic, and seismic setting and would have improved resiliency. No adverse effects on the floodplain would occur.

12. ***Have a substantial adverse effect on scenic vistas and view planes, during day or night, identified in county or state plans or studies***

    The proposed project is being designed to be visually compatible with the surrounding environment and provide visually similar bridge elements for those to be replaced. The visual scale and spatial relationships would also be maintained, and no scenic vistas would be adversely affected. Further design refinements to the bridges and bridge elements that may be identified and agreed upon through the Section 106 consultation process, such as treatments to the non-vehicle facing sides of bridge rails, would also be incorporated into the project.

13. ***Require substantial energy consumption or emit substantial greenhouse gases***

    Construction of the proposed project would not require substantial energy consumption or emit substantial greenhouse gases. The proposed action would not involve any long-term changes in roadway operations or traffic volumes. Minor construction-related air emissions and fuel consumption for the operation of construction vehicles and equipment would be required, but these effects would be short-term and managed by implementing vehicle and manufacturing regulatory controls.

CHAPTER 7 Consultation and Coordination

This chapter summarizes public and agency consultation and coordination activities that have been conducted to date for this project. Consultation and coordination activities included meetings and correspondence with several agencies, organizations, and individuals who may have an interest in the project or have special expertise or jurisdiction relevant to the project.

7.1 Agencies and Organizations Consulted

The following agencies and organizations were contacted during early project development and preparation of the Draft EA. They received preliminary project information and were asked to provide comments relative to specific environmental regulatory compliance (such as NHPA or ESA compliance) or for general assistance in preparing the Draft EA. An asterisk (*) appears next to those agencies that provided a response letter. Comment letters received are provided in Appendix E. Where indicated, standard agency comments provided on the DOH website were consulted for the project.

Federal

- U.S. Fish and Wildlife Service*

State of Hawaii

- Department of Accounting and General Services
- Office of Planning and Sustainable Development*
- Hawaii Tourism Authority
- Department of Defense, Hawaii Emergency Management Agency
- Department of Education*
- Department of Education, Maui District Office
- Department of Hawaiian Home Lands
- HDOH, Clean Air Branch (Standard Comments Provided Online)
- HDOH, Clean Water Branch (Standard Comments Provided Online)
- HDOH, Indoor and Radiological Health Branch (Standard Comments Provided Online)
- Department of Land and Natural Resources*
- Office of Hawaiian Affairs

County of Maui

- Department of Environmental Management
- Department of Fire and Public Safety
- Department of Parks and Recreation*
- Department of Planning*
- Department of Public Works
- Department of Transportation*
- Department of Water Supply
- Emergency Management Agency
- Police Department*

Utilities

- Hawaiian Electric Company, Maui Engineering Department*
- Hawaiian Telcom

7.1.1 Regulatory Coordination

The following coordination and consultation activities are being conducted because the project must comply with certain federal and state environmental laws and regulations. See Appendix F for copies of written correspondence referenced in the discussions below.

Section 106 of the National Historic Preservation Act and Hawaii Revised Statutes Chapter 6E-8

Section 106 of the NHPA of 1966 (as amended) requires federal agencies to consider the effects on historic properties of projects that they carry out, assist, fund, permit, license, or approve. Section 106 establishes a process for review of a project's effects on historic properties (which are defined as properties eligible for listing or listed in the NRHP). The Section 106 process involves coordination and consultation with the SHPO, NHOs, and other agencies and organizations that have an interest in or are mandated to protect historic properties. At the state level, HRS Chapter 6E-8 places similar responsibilities on state agencies to evaluate its projects. Since the project is a federal and state action, both regulations apply.

Section 3.8 of this EA summarizes the project area's historic properties and potential effects.

Early and continuous consultation has occurred throughout the project development process because of the historic significance of the Hana Highway and the subject project bridges. The following consultation and coordination activities were conducted:

- Letter dated October 1, 2019, from FHWA-CFLHD to SHPD, to initiate Section 106 consultation, consult on the APE and survey scope and methodology, and request information on additional persons or organizations that should be consulted.
- Letters dated October 9, 2019, and December 22, 2021, from FHWA-CFLHD to NHOs and other individuals/organizations with cultural and lineal ties to the project area and knowledgeable stakeholders, inviting them to share information and participate in the Section 106 consultation for the project. A list of recipients is noted in Appendix F.
- Letter dated November 1, 2019, from SHPD to FHWA-CFLHD, providing concurrence on the undertaking's APE and input into the proposed field survey methodology.
- Letter dated November 15, 2019, from Historic Hawaii Foundation to FHWA-CFLHD, requesting additional project information, commenting on the APE, and sharing information regarding potential bridge improvements and Preservation Plan outcomes.
- Letter dated September 8, 2020, from FHWA-CFLHD to SHPD, submitting the AIS for the project and requesting concurrence on FHWA-CFLHD's eligibility determinations regarding historic properties.
- Letters dated February 12, 2019, October 17, 2019, January 31, 2020, October 21, 2021, November 18, 2021, and February 9, 2022, from FHWA-CFLHD to Maui County Cultural Resources Commission (MCCRC), regarding the project.

- Letter dated September 6, 2023, from FHWA-CFLHD to SHPD, submitting a revised Draft AIS with updated Section 106 and HRS Chapter 6E-8 findings.

FHWA-CFLHD and HDOT have also participated in several consultation meetings with SHPD and Historic Hawaii Foundation to discuss the project, potential effects, and mitigation efforts, which will continue through the final design and project implementation. The project was also discussed at the following MCCRC meetings: March 7, 2019, November 4, 2021, and January 6, 2022. Consultation with the MCCRC will also continue.

Section 7 of the Endangered Species Act and HRS Chapter 195D

Section 7 of the ESA requires that federal agencies ensure that its actions do not jeopardize the continued existence of any threatened or endangered species or adversely modify designated critical habitat. HRS Chapter 195D, the state counterpart law to the ESA, protects aquatic life, wildlife, or land plant species that are indigenous to Hawaii.

The following consultation and coordination activities have been conducted to date with the USFWS, DAR, and DOFAW:

- Letter dated April 8, 2019, from FHWA-CFLHD to USFWS requesting a list of threatened, endangered, proposed, and candidate plant and animal species and critical habitat for the project area, as well as input on avoidance and minimization measures that should be considered for the project.
- Letter dated April 16, 2019, from USFWS to FHWA-CFLHD, with listed species in the vicinity of the project area and recommended avoidance and minimization measures for the project.
- Letter dated April 22, 2019, from FHWA-CFLHD to DAR, requesting input on the project, information regarding known or potential species or habitats, and avoidance and minimization measures that should be considered.
- Letter dated December 12, 2019, from FHWA-CFLHD to DOFAW, requesting input on the project, information regarding known or potential species or habitats, and avoidance and minimization measures that should be considered.
- Letter dated March 21, 2020, from DOFAW to FHWA-CFLHD, with information regarding species with the potential to occur in the project vicinity and recommended avoidance and minimization measures.
- Letter dated May 15, 2020, from DAR to FHWA-CFLHD, providing comments on the project and sharing information regarding aquatic resources from DAR-conducted site inspections at each project bridge.

7.2 Public Involvement

Three rounds of public informational meetings were held for this project. These meetings were supplemental to earlier planning meetings for corridor-wide bridges held during the development of the 2015 Preservation Plan. Project-specific meetings were held to share project information and obtain input at various stages of project development. The meetings were primarily publicized through newspaper notices and mailings to nearby landowners, past meeting attendees, and individuals who requested to be on the project mailing list. A summary of each meeting is provided below, with more detailed notes in Appendix G.

Public Meeting #1: Meetings were held in Hana, Wailuku, and Keanae on March 5, March 6, and March 7, 2019, respectively. The meeting's purpose was to provide an overview of the project scope, partner agencies, project development process, and project background and obtain early input from the community on issues and considerations relevant to the project. Approximately 33 attendees attended the meetings.

Public Meeting #2: Meetings were held in Hana, Keanae, and Paia on January 14, January 15, and January 16, 2020, respectively. The goal of the meeting was to provide a project update and gather public input on the purpose and need, design considerations, and preliminary alternative concepts. In addition, it provided a forum for questions and answers with the project team. Approximately 22 attendees attended the meetings.

Public Meeting #3: Two virtual meetings were held on September 21 and September 22, 2021. The meeting's purpose was to provide an overview of the alternative evaluation process, share the recommended alternative, solicit feedback, and discuss bridge construction methods and potential traffic impacts.

The primary themes and comments shared by the public through the series of public meetings are summarized below. Appendix G contains more detailed notes with individual comments provided at each meeting.

- Traffic Impacts
  - Roadway closures were a common area of interest. Daytime closures would impact tourists and residents commuting to and from school, jobs, and commercial areas. Night-time closures should be timed so that people who commute along Hana Highway in the early morning and late evening hours can be accommodated. Emergency services require passage through the corridor. Daytime delays should be kept to a minimum.
  - Closures for more than one bridge need to consider residents located between the bridges.
- Aesthetics
  - A preference for an eye-pleasing design was stated by many people, with a solution that best matched the existing roadway and bridges.
  - There was a strong negative reaction to the double railing concept, except for one community member who preferred it for its ability to preserve the historic rails. Negative public feedback on the double railing concept was on aesthetics, as well as safety concerns.
- Reliability/Durability
  - Community members want a long-lasting solution. They see the challenges of maintaining the roadway, so they want a lasting fix that provides reliability for future generations.
- Natural Resources
  - It was expressed in meetings that the streams are important to community members, especially since many are flowing more regularly because of reduced East Maui Irrigation water diversions. Minimize impacts on streams and aquatic resources.
  - Minimize tree removal.
- Development

– The further east along Hana Highway, the more common this refrain was—a solution should not allow for increased development potential. The feedback focused primarily on the load rating of bridges, with some input on minimizing bridge widening.

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