

SOUTH WAILUA BRIDGE

(HONOLEWA STREAM BRIDGE)

1911



Preliminary Recommendation: Maintain for continued vehicular use.

	EXISTING	PRELIMINARY RECOMMENDATION	COMMENTS
Load Rating	15 tons (posted)		
Sufficiency Rating	37.1		
Structure			
Width (between railings)	15.5 feet		
Type	Concrete tee beam and slab		
Railing			
Style	Solid concrete parapet		
Height	24" (original) 20" (from existing pavement)		
Color	White paint		
Inscription	"AD 1911" on outside of downstream parapet		
Guardrail			
Rail	CRM		
End treatment	Rock wall		
Abutment	Concrete		
Bridge Supports	1, concrete arched central pier		
Wing Walls	None		
Construction Access			
Traffic Control			
Traffic Lane	Single (unstriped)		
Aprons	--		
Signage	Single-lane (2), Yield (2) Load limit (2), Reflectors (4)		

PU'UHAO'A BRIDGE

1910



Preliminary Recommendation: Demolish and reconstruct new bridge in the same location.

	EXISTING	PRELIMINARY RECOMMENDATION	COMMENTS
Load Rating	12 tons (posted)	20 tons	
Sufficiency Rating	11.6	--	
Structure			
Width (between railings)	14.4 feet	16 feet (widen either or both sides)	To be determined in design
Type	Concrete tee beam and slab	Concrete girders and slab	
Railing			
Style	Open concrete balustrade	Open concrete balustrade resembling original	
Height	38" (original) 30" (from existing pavement)	38"	
Color	White paint	Untreated concrete	
Inscription	"1910, 20 TONS", End piers	"Pu'uha'o'a AD 200X" End Pier, Inside	Inscription content/location flexible
Guardrail			
Rail	None	Rock Wall design	
End treatment	None	Free-standing adjacent to railing	
Abutment	Formed concrete	Formed concrete	
Bridge Supports	0	0	
Wing Walls	CRM	Concrete faced with original rubble	
Construction Access		Temporary bypass bridge or ford	If feasible
Traffic Control			
Traffic Lane	Single (unstriped)	Single (striped 12-ft)	
Aprons	--	2-foot each side	
Signage	Single-lane (2), Yield (2) Load limit (2), Reflectors (4)	For single lane operation.	To be determined during design.

WAI'ELE BRIDGE

(PAEHALA STREAM BRIDGE)

1910



Preliminary Recommendation: Preserve makai facing of arch and rail. Construct new slab over existing bridge.

	EXISTING	PRELIMINARY RECOMMENDATION	COMMENTS
Load Rating	5 tons (posted)	20 tons	
Sufficiency Rating	12.0	--	
Structure			
Width (between railings)	12.5 feet	16 feet (widen mauka)	
Type	Masonry Arch	New slab deck over existing deck	
Railing			
Style	Solid concrete parapet	Solid concrete parapet resembling original (mauka) and free-standing steel railing inside existing (makai)	
Height	30" (original) 28" (from existing pavement)	32"	
Color	White paint	Untreated concrete	
Inscription	"AD 1910" on makai facing	"AD 1910" to remain	
Guardrail			
Rail	CRM	Rock Wall design	Reuse original rubble in replacement if feasible
End treatment	None	Free-standing adjacent to railing	
Abutment	CRM	Hidden concrete abutments behind existing	
Bridge Supports	0	0	
Wing Walls	CRM	Concrete faced with original rubble	
Construction Access		Temporary bypass bridge	If feasible
Traffic Control			
Traffic Lane	Single (unstriped)	Single (striped 12-ft)	
Aprons	--	2-feet each side	
Signage	Single-lane (2), Yield (2) Load limit (2), Reflectors (4)	For single lane operation.	To be determined during design.

MAHALAWA BRIDGE

(KAKIWEKA STREAM BRIDGE)
1910



Preliminary Recommendation: Maintain for continued vehicular use.

	EXISTING	PRELIMINARY RECOMMENDATION	COMMENTS
Load Rating	N/A		
Sufficiency Rating	18.8		
Structure			
Width (between railings)	13.8 feet		
Type	Concrete tee beam and slab		
Railing			
Style	Solid concrete parapet		
Height	24" (original) 20" (from existing pavement)		
Color	White paint		
Inscription			
Guardrail			
Rail	CRM		
End treatment	CRM		
Abutment	Formed concrete		
Bridge Supports	0		
Wing Walls	CRM		
Construction Access			
Traffic Control			
Traffic Lane	Single (unstriped)		
Aprons	--		
Signage	Single-lane (2), Yield (2) Load limit (2), Reflectors (4)		

HĀHĀLAWE BRIDGE

1910



ALTERNATIVE A

Preliminary Recommendation: Construct new bridge mauka of existing. Existing bridge to remain in place.

	EXISTING	PRELIMINARY RECOMMENDATION	COMMENTS
Load Rating	4 tons (posted)	20 tons	
Sufficiency Rating	5.3	--	
Structure			
Width (between railings)	14.4 feet	16 feet	
Type	Masonry Arch	Concrete girders and slab	
Railing			
Style	Solid concrete parapet	Solid concrete parapet	
Height	24" (original)	32"	
Color	White paint	Untreated concrete	
Inscription	"AD 1910" on outside of makai parapet	"Hāhālawe AD 200X" center outside makai	Inscription content/location flexible
Guardrail			
Rail	CRM	Rock Wall design	Reuse original rubble in replacement if feasible
End treatment	None	Free-standing adjacent to railing	
Abutment	CRM	Concrete	
Bridge Supports	0		
Wing Walls	CRM	Concrete faced with original rubble	
Construction Access		Use existing bridge	
Traffic Control			
Traffic Lane	Single (unstriped)	Single (striped 12-ft)	
Aprons	--	2-feet each side	
Signage	Single-lane (2), Yield (2) Load limit (2), Reflectors (4)	For single lane operation.	To be determined during design.

HĀHĀLAWE BRIDGE

1910



ALTERNATIVE B

Preliminary Recommendation: Preserve makai facing of arch and rail. Construct new slab over existing bridge.

	EXISTING	PRELIMINARY RECOMMENDATION	COMMENTS
Load Rating	4 tons (posted)	20 tons	
Sufficiency Rating	5.3	--	
Structure			
Width (between railings)	14.4 feet	16 feet (widen mauka)	
Type	Masonry Arch	New concrete slab over existing deck	
Railing			
Style	Solid concrete parapet	Solid concrete parapet resembling original (mauka) and free-standing steel railing inside existing (makai)	
Height	24" (original)	32"	
Color	White paint	Untreated concrete	
Inscription	"AD 1910" on outside of downstream parapet	"AD 1910" to remain	
Guardrail			
Rail	CRM	Rock Wall design	Reuse original rubble in replacement if feasible
End treatment	None	Free-standing adjacent to railing	
Abutment	CRM	Hidden concrete abutments outside existing	
Bridge Supports	0		
Wing Walls	CRM	Concrete faced with original rubble	
Construction Access		Temporary bypass bridge	If feasible
Traffic Control			
Traffic Lane	Single (unstriped)	Single (striped 12-ft)	
Aprons	--	2-foot each side	
Signage	Single-lane (2), Yield (2) Load limit (2), Reflectors (4)	For single lane operation.	To be determined during design.

KOUKOU‘AI BRIDGE

(KAUKAU‘AI STREAM BRIDGE)

1911



ALTERNATIVE A

Preliminary Recommendation: : Construct new bridge mauka of existing. Existing bridge to remain in place.

	EXISTING	PRELIMINARY RECOMMENDATION	COMMENTS
Load Rating	8 tons (posted)	20 tons	
Sufficiency Rating	2.0	--	
Structure			
Width (between railings)	15.1 feet	16 feet	
Type	Concrete Arch	Concrete girders and slab	
Railing			
Style	Solid concrete parapet	Solid concrete parapet	
Height	32" (original) 12" (from existing pavement)	32"	
Color	White paint	Untreated concrete	
Inscription	"AD 1911" on makai facing	"Koukou'ai AD 200X" center outside makai	Inscription content/location flexible
Guardrail			
Rail	None	Rock Wall design	
End treatment	None	Free-standing adjacent to railing	
Abutment	CRM	Formed concrete	
Bridge Supports	0	0	
Wing Walls	None	Concrete faced with original rubble	
Construction Access		Use existing bridge	
Traffic Control			
Traffic Lane	Single (unstriped)	Single (striped 12-ft)	
Aprons	--	--	
Signage	Single-lane (2), Yield (2) Load limit (2), Reflectors (4)	For single lane operation.	To be determined during design.

KOUKOU‘AI BRIDGE

(KAUKAU‘AI STREAM BRIDGE)

1911



ALTERNATIVE B

Preliminary Recommendation: Construct new concrete girders and slab over existing bridge, widen deck makai and retain arch and mauka railing.

	EXISTING	PRELIMINARY RECOMMENDATION	COMMENTS
Load Rating	8 tons (posted)	15 tons	
Sufficiency Rating	2.0	--	
Structure			
Width (between railings)	15.1 feet	16 feet (widen both sides)	New deck to cantilever from understructure
Type	Concrete Arch	Concrete girders and slab within existing	Concrete arch to remain in place, as non-load bearing
Railing			
Style	Solid concrete parapet	Solid concrete parapet resembling original	
Height	32" (original) 12" (from existing pavement)	32"	
Color	White paint	Untreated concrete	
Inscription	"AD 1911" on makai facing	"Koukou'ai AD 200X" center outside makai	
Guardrail			
Rail	None	Rock Wall design	
End treatment	None	Free-standing adjacent to railing	
Abutment	CRM	Hidden concrete abutments outside existing	
Bridge Supports	0	0	
Wing Walls	None	Concrete faced with original rubble	
Construction Access		Temporary bypass bridge (mauka)	If feasible
Traffic Control			
Traffic Lane	Single (unstriped)	Single (striped 12-ft)	
Aprons	--	--	
Signage	Single-lane (2), Yield (2) Load limit (2), Reflectors (4)	For single lane operation.	To be determined during design.

KOUKOU‘AI BRIDGE

(KAUKAU‘AI STREAM BRIDGE)

1911



ALTERNATIVE C

Preliminary Recommendation: Rehabilitate understructure with composite materials, widen deck makai and retain mauka railing.

	EXISTING	PRELIMINARY RECOMMENDATION	COMMENTS
Load Rating	8 tons (posted)	15 tons	
Sufficiency Rating	2.0	--	
Structure			
Width (between railings)	15.1 feet	16 feet (widen both sides)	New deck to cantilever from understructure
Type	Concrete Arch	Rehabilitated concrete arch	Use of composite materials
Railing			
Style	Solid concrete parapet	Solid concrete parapet resembling original	
Height	32" (original) 12" (from existing pavement)	32"	
Color	White paint	Untreated concrete	
Inscription	"AD 1911" on makai facing	"Koukou'ai AD 200X" center outside makai	Inscription content/location flexible
Guardrail			
Rail	None	Rock Wall design	
End treatment	None	Free-standing adjacent to railing	
Abutment	CRM	Remain in place	
Bridge Supports	0	0	
Wing Walls	None	Concrete faced with original rubble	
Construction Access		Temporary bypass bridge (mauka)	If feasible
Traffic Control			
Traffic Lane	Single (unstriped)	Single (striped 12-ft)	
Aprons	--	--	
Signage	Single-lane (2), Yield (2) Load limit (2), Reflectors (4)	For single lane operation.	To be determined during design.