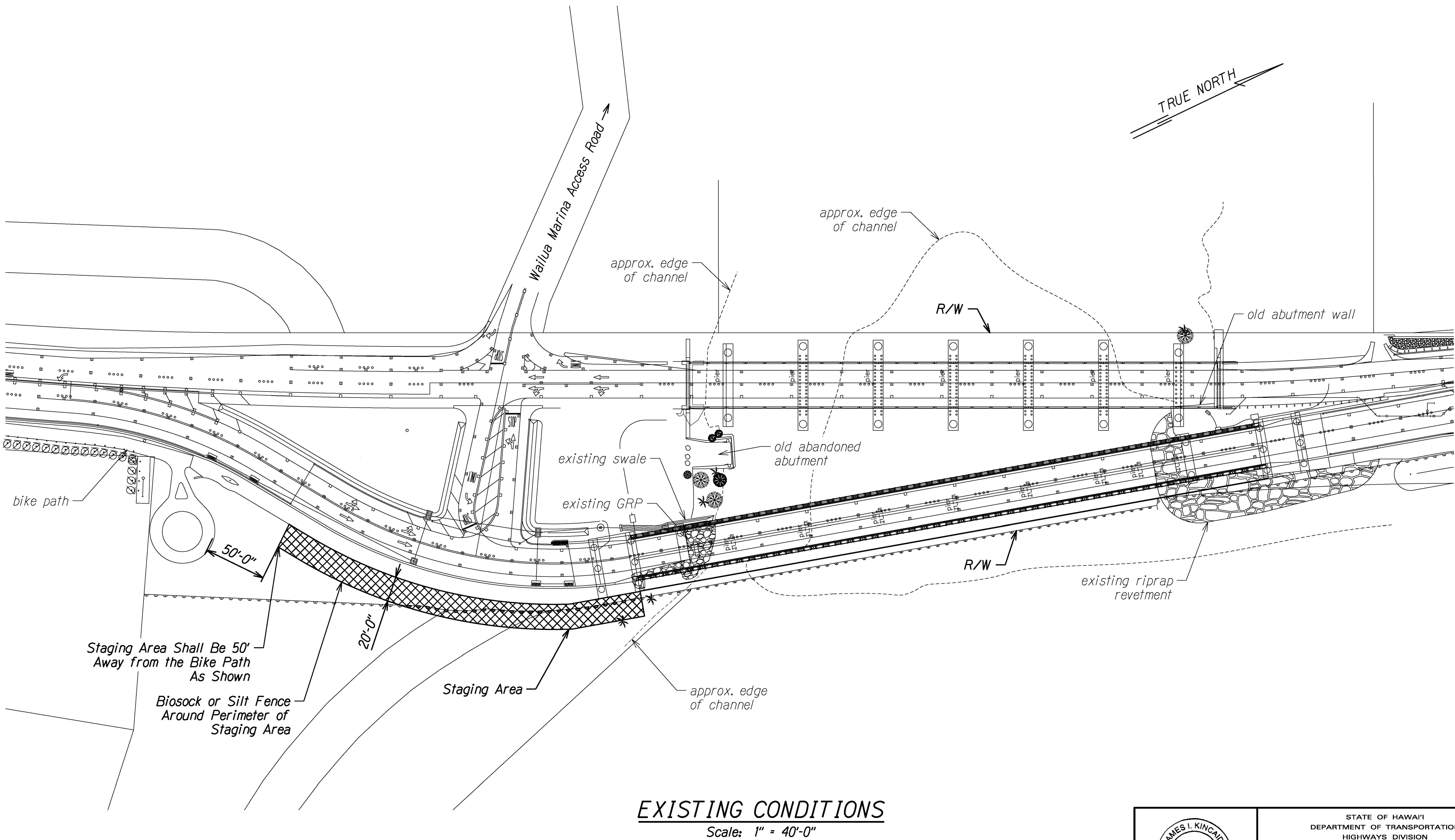


FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-23(001)	2021	25	109



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EXISTING CONDITIONS #

STAGING AREA

KUHIO HIGHWAY

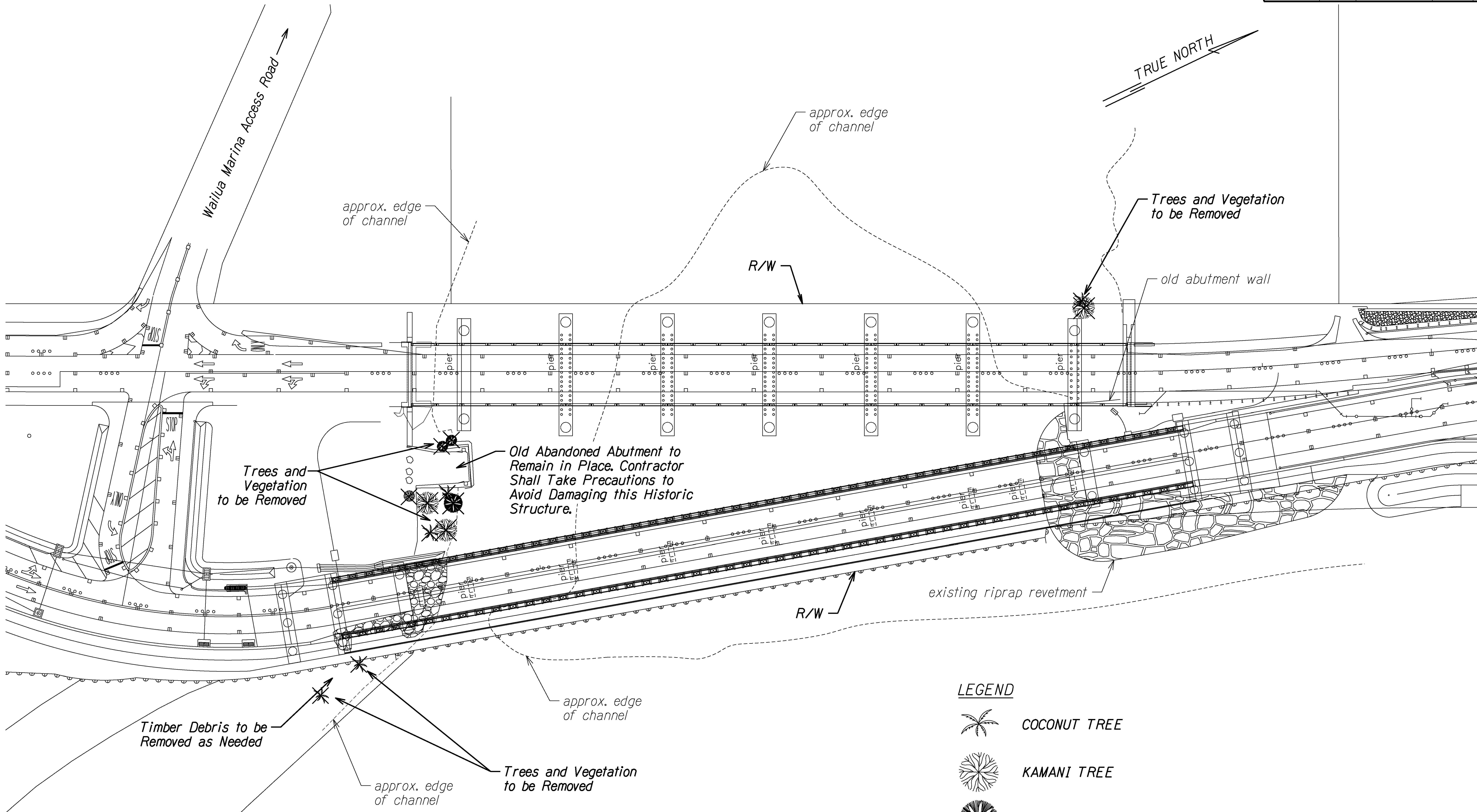
Repairs to Wailua River Bridge

Fed. Aid Project No. ER-23(001)

Scale: As Noted Date: Apr. 2021





SHEET No. H-2 OF 15 SHEETS


FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
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DEMOLITION PLAN Scale: 1" = 30'-0"

- LEGEND**
-  COCONUT TREE
 -  KAMANI TREE
 -  LAUHALA TREE
 -  MILO TREE



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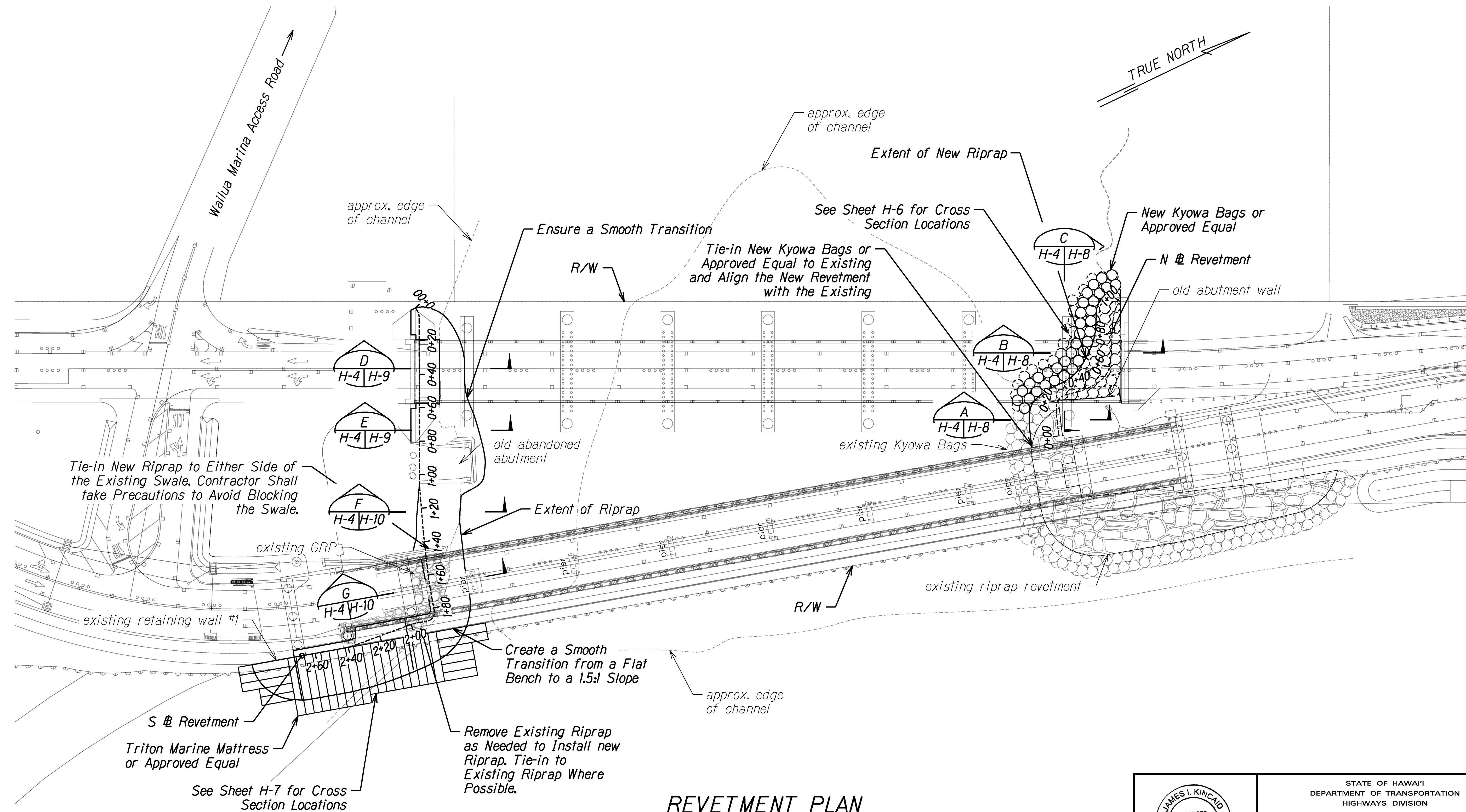
DEMOLITION PLAN

KUHIO HIGHWAY
Repairs to Wailua River Bridge
Fed. Aid Project No. ER-23(001)

Scale: As Noted Date: Apr. 2021

SHEET No. H-3 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-23(001)	2021	27	109



REVETMENT PLAN
Scale: 1" = 30'-0"

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REVETMENT PLAN

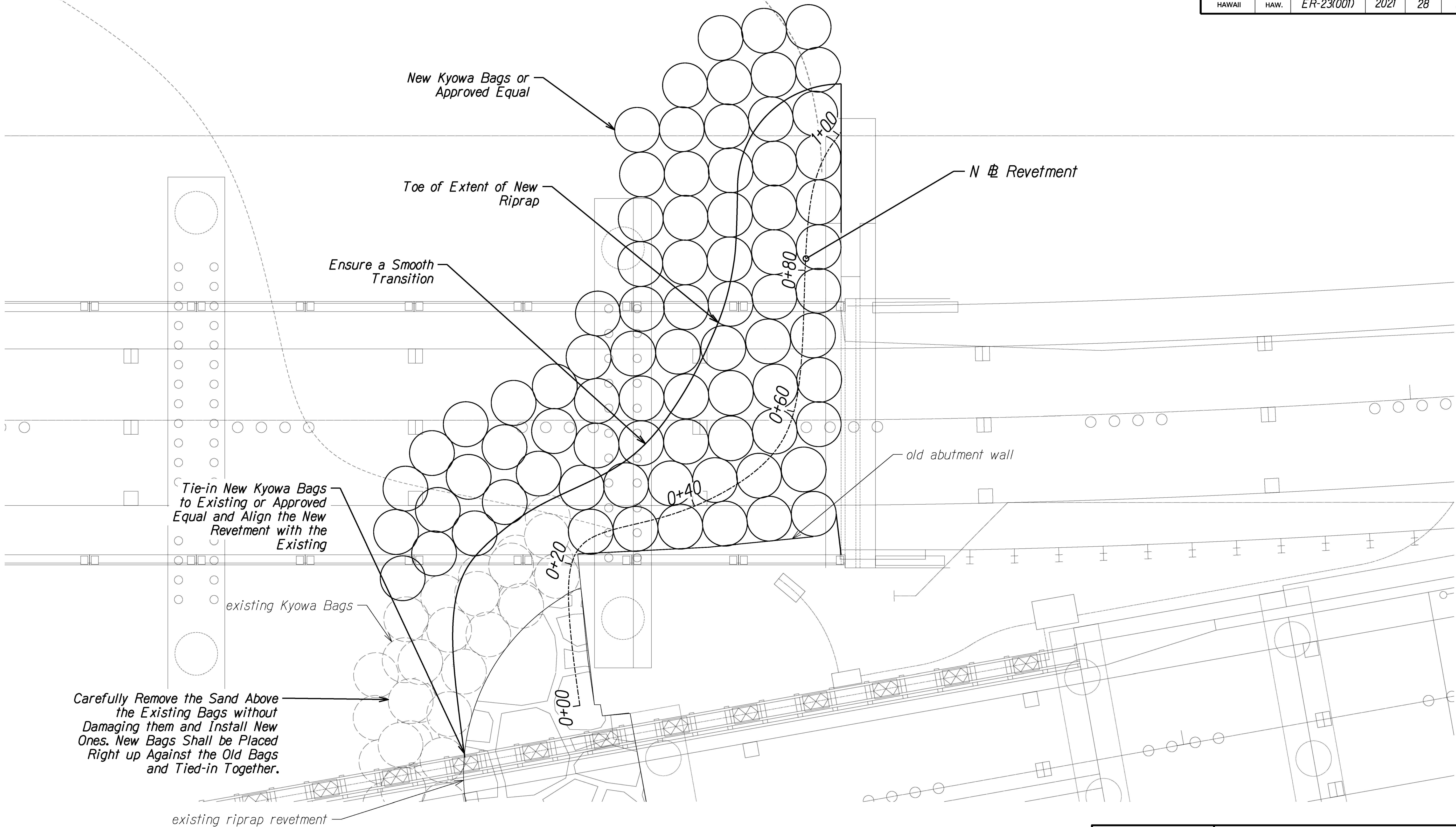
KUHIO HIGHWAY
Repairs to Wailua River Bridge
Fed. Aid Project No. ER-23(001)

Scale: As Noted Date: Apr. 2021

SHEET No. **H-4** OF **15** SHEETS

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FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-23(001)	2021	28	109



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KYOWA BAGS LIFT 1 LAYOUT
 Scale: 1" = 7'-0"

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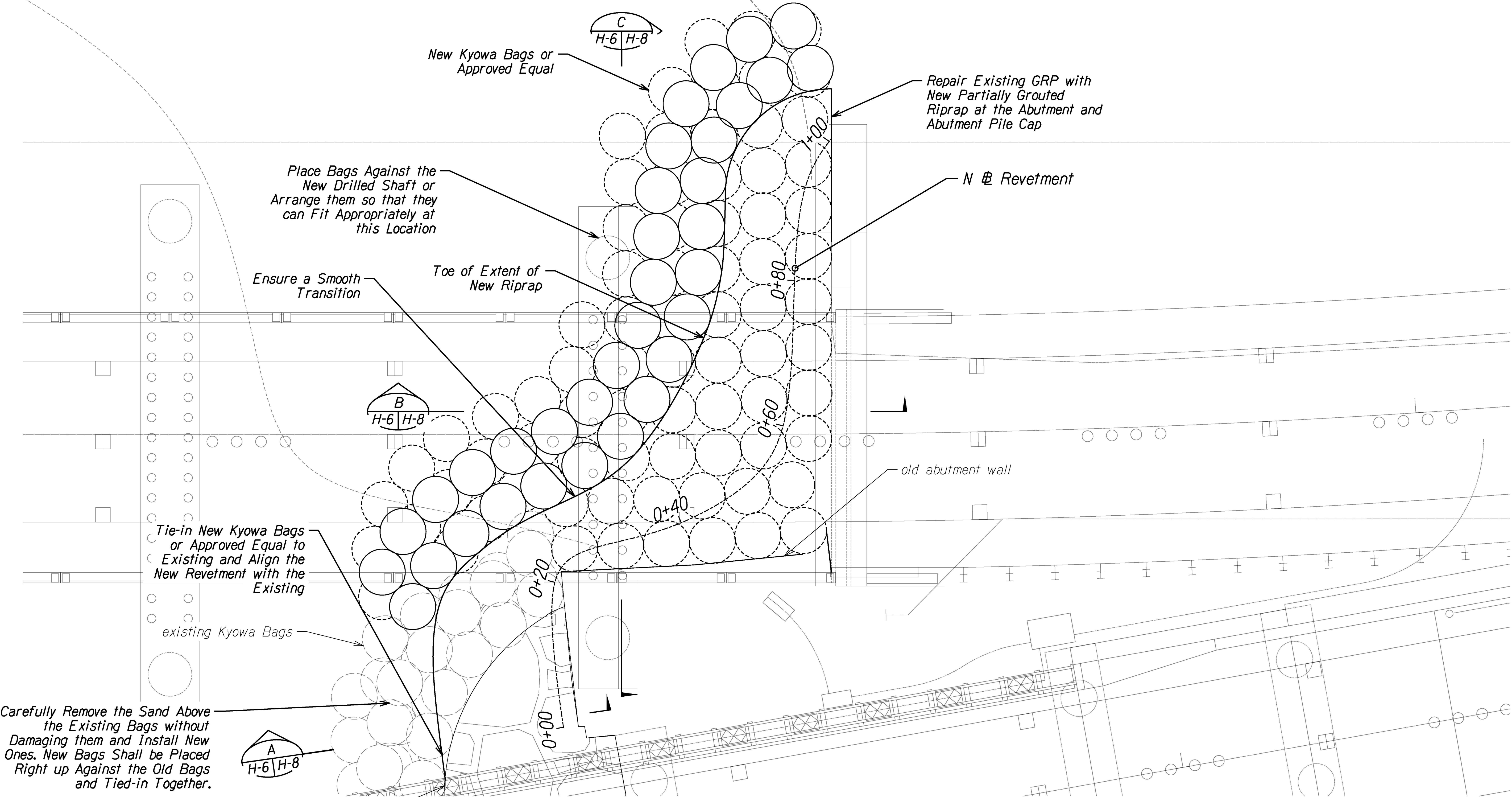
KYOWA BAGS LIFT 1 LAYOUT

KUHIO HIGHWAY
Repairs to Wailua River Bridge
Fed. Aid Project No. ER-23(001)

Scale: As Noted Date: Apr. 2021

SHEET No. *H-5* OF *15* SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-23(001)	2021	29	109



KYOWA BAGS LIFT 2 LAYOUT
 Scale: 1" = 7'-0"

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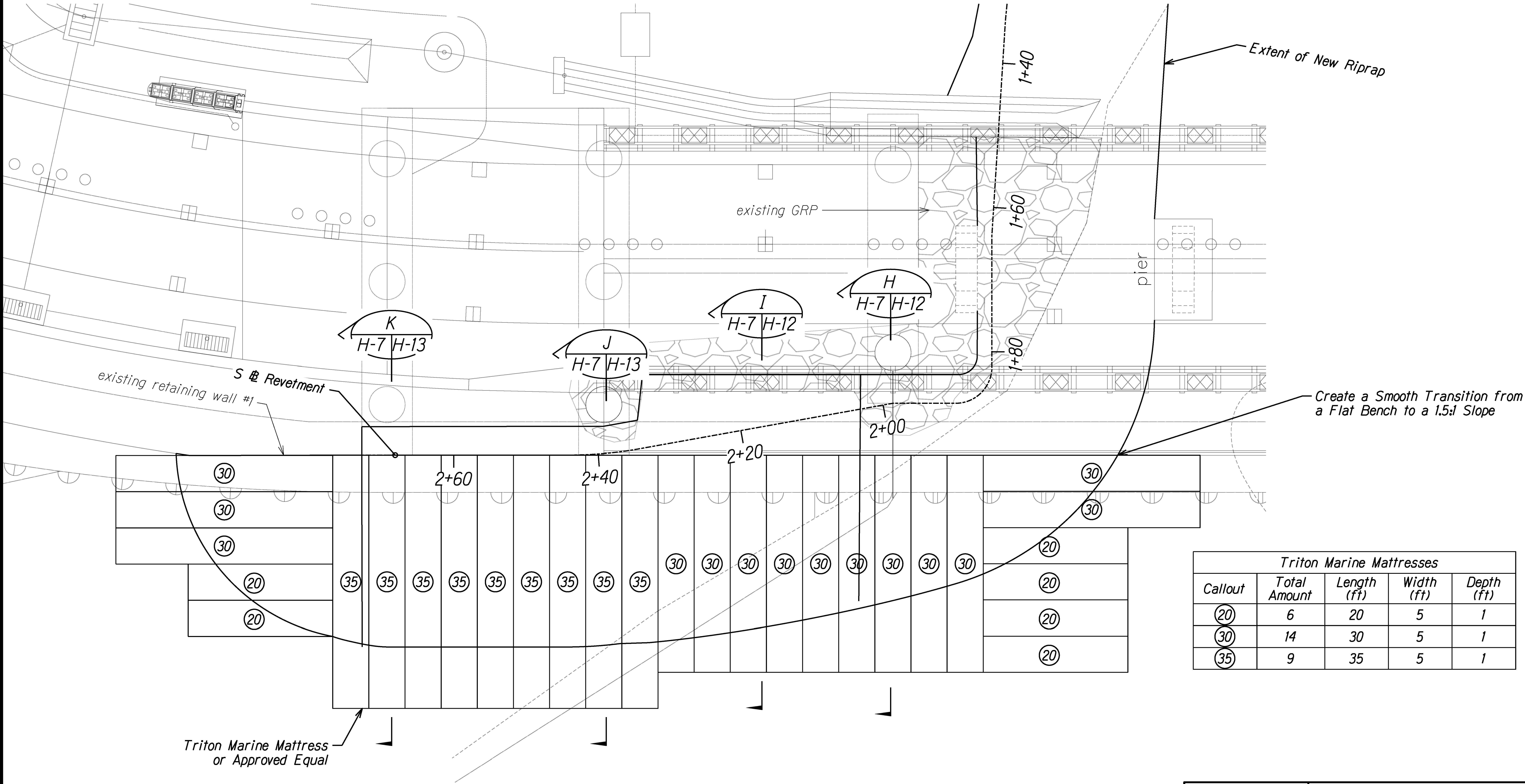
KYOWA BAGS LIFT 2 LAYOUT

KUHIO HIGHWAY
Repairs to Wailua River Bridge
Fed. Aid Project No. ER-23(001)

Scale: As Noted Date: Apr. 2021

SHEET No. *H-6* OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-23(001)	2021	30	109



Triton Marine Mattresses				
Callout	Total Amount	Length (ft)	Width (ft)	Depth (ft)
(20)	6	20	5	1
(30)	14	30	5	1
(35)	9	35	5	1

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TRITON MATTRESS LAYOUT
 Scale: 1" = 7'-0"

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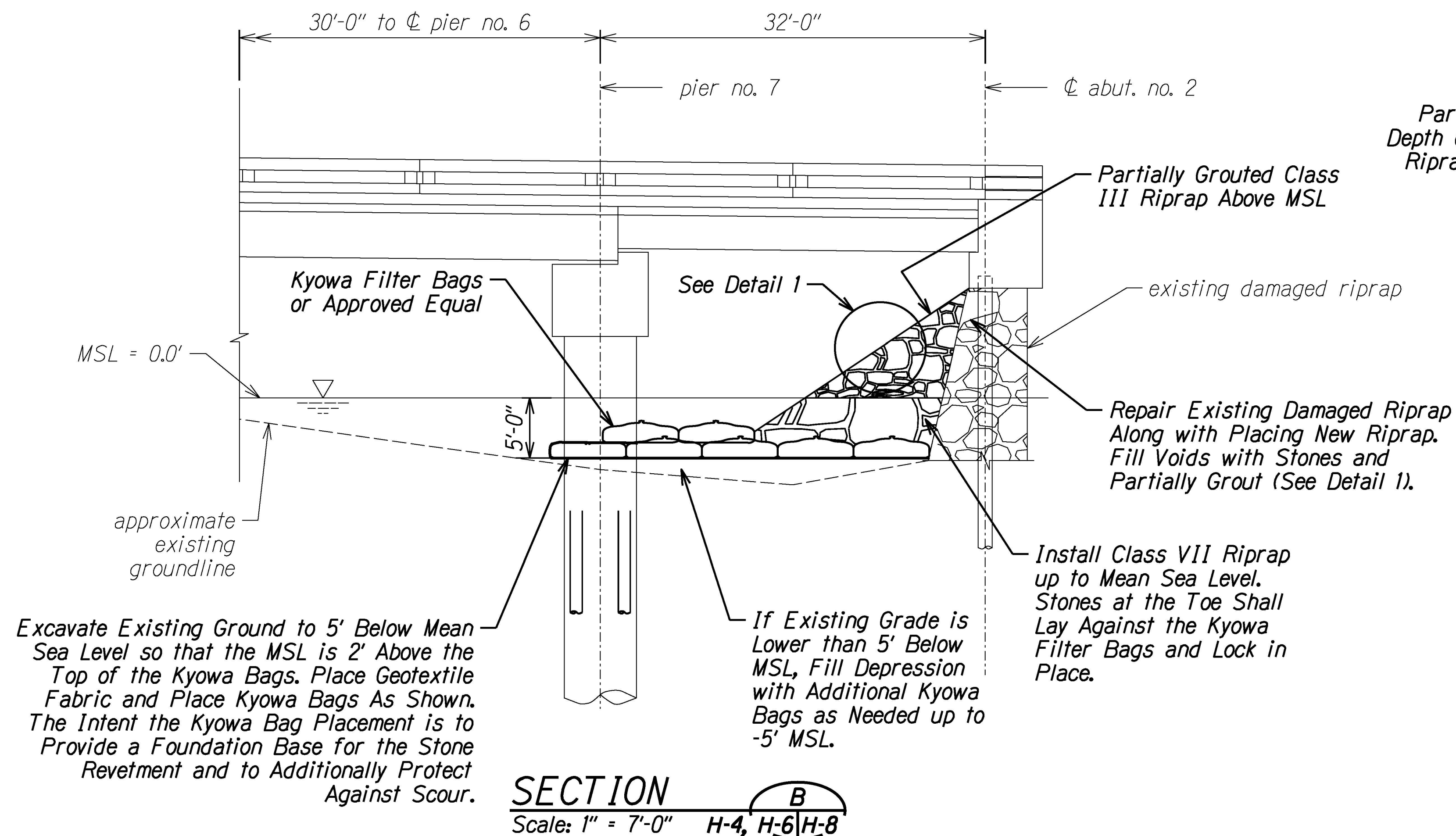
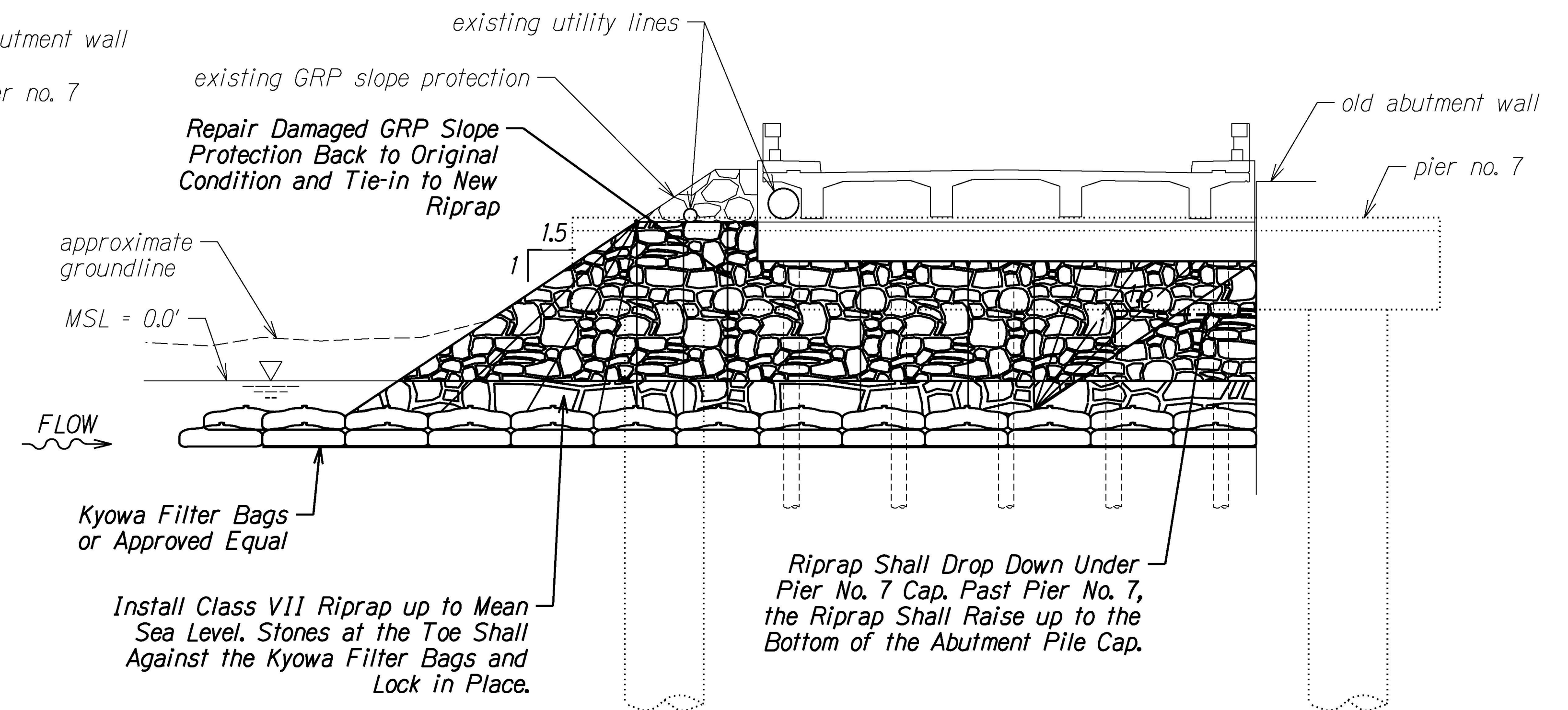
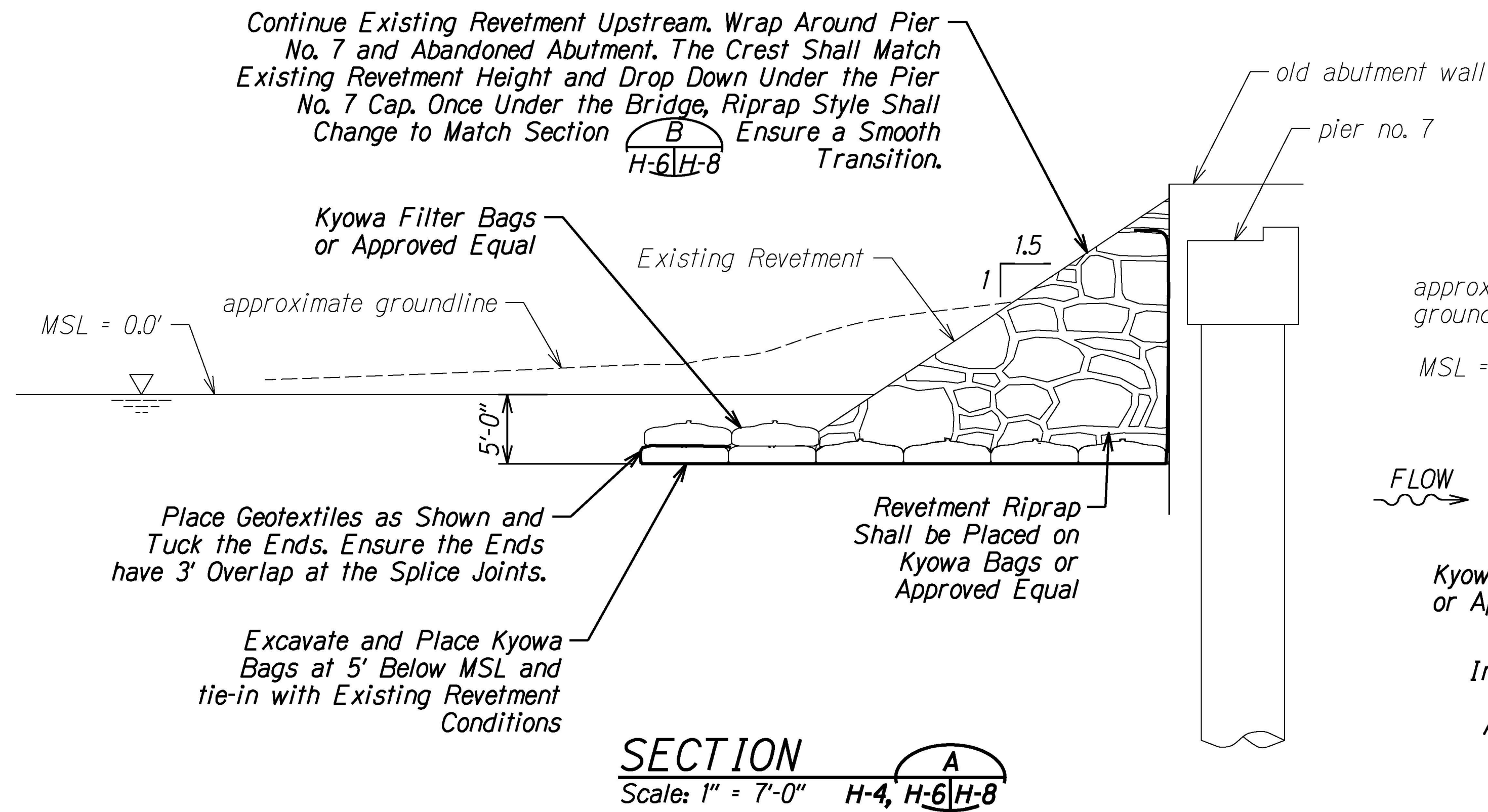
TRITON MATTRESS LAYOUT

KUHIO HIGHWAY
Repairs to Wailua River Bridge
Fed. Aid Project No. ER-23(001)

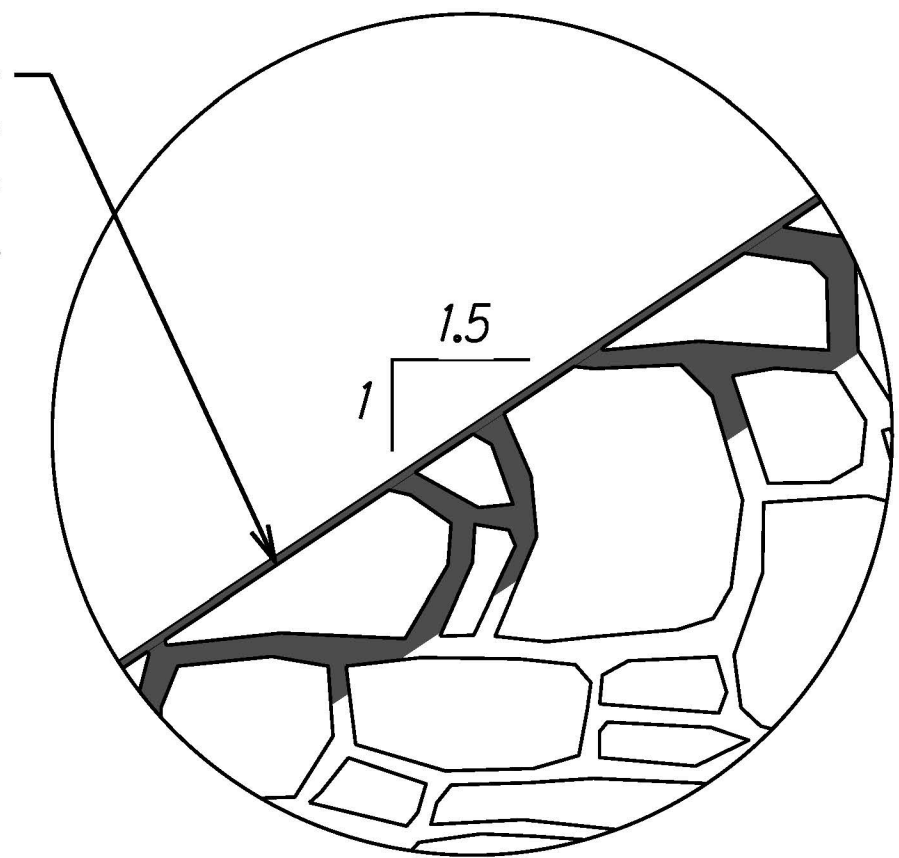
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SHEET No. *H-7* OF *15* SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-23(001)	2021	31	109



Partially Grout by Filling 1/3 of the Depth of the Void (or Thickness of the Riprap Layer). Do Not Fully Grout the Riprap.



Detail 1
Not to Scale

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LICENSED PROFESSIONAL ENGINEER
No. 12562-CE
HAWAII, U.S.A.

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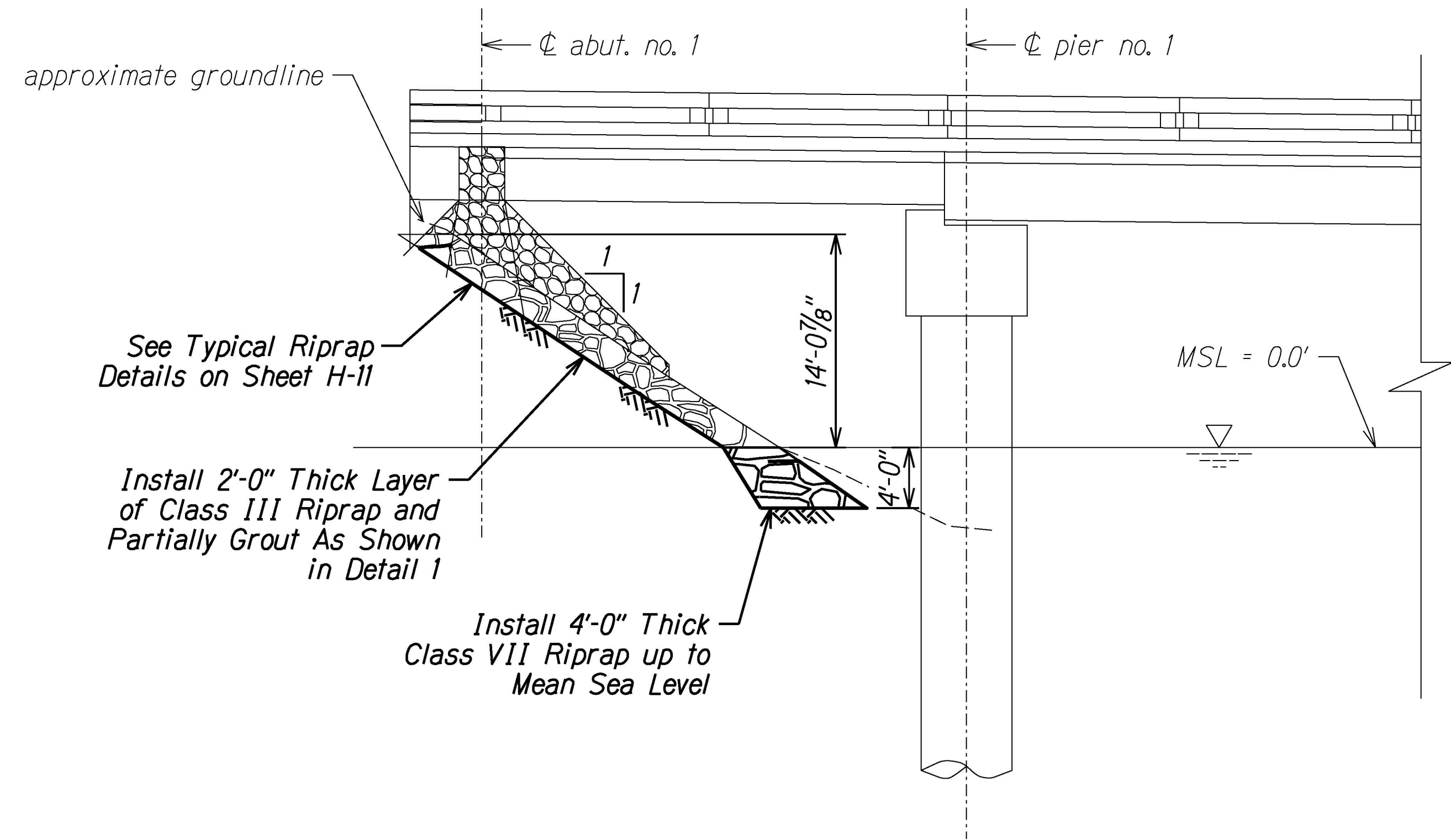
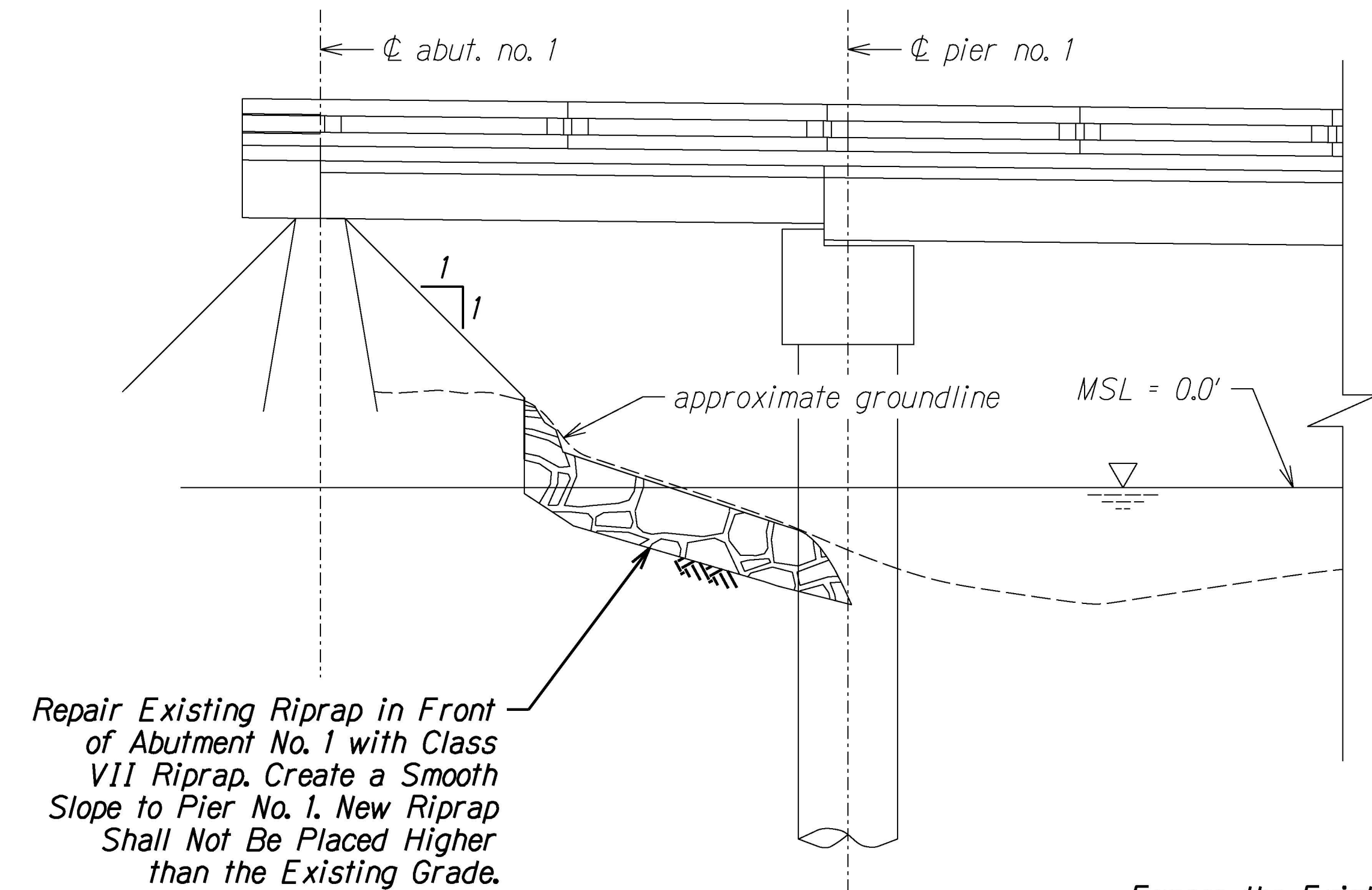
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HIGHWAYS DIVISION

WAILUA RIVER RIPRAP -
SECTIONS A, B, & C
KUHIO HIGHWAY
Repairs to Wailua River Bridge
Fed. Aid Project No. ER-23(001)
Scale: As Noted Date: Apr. 2021

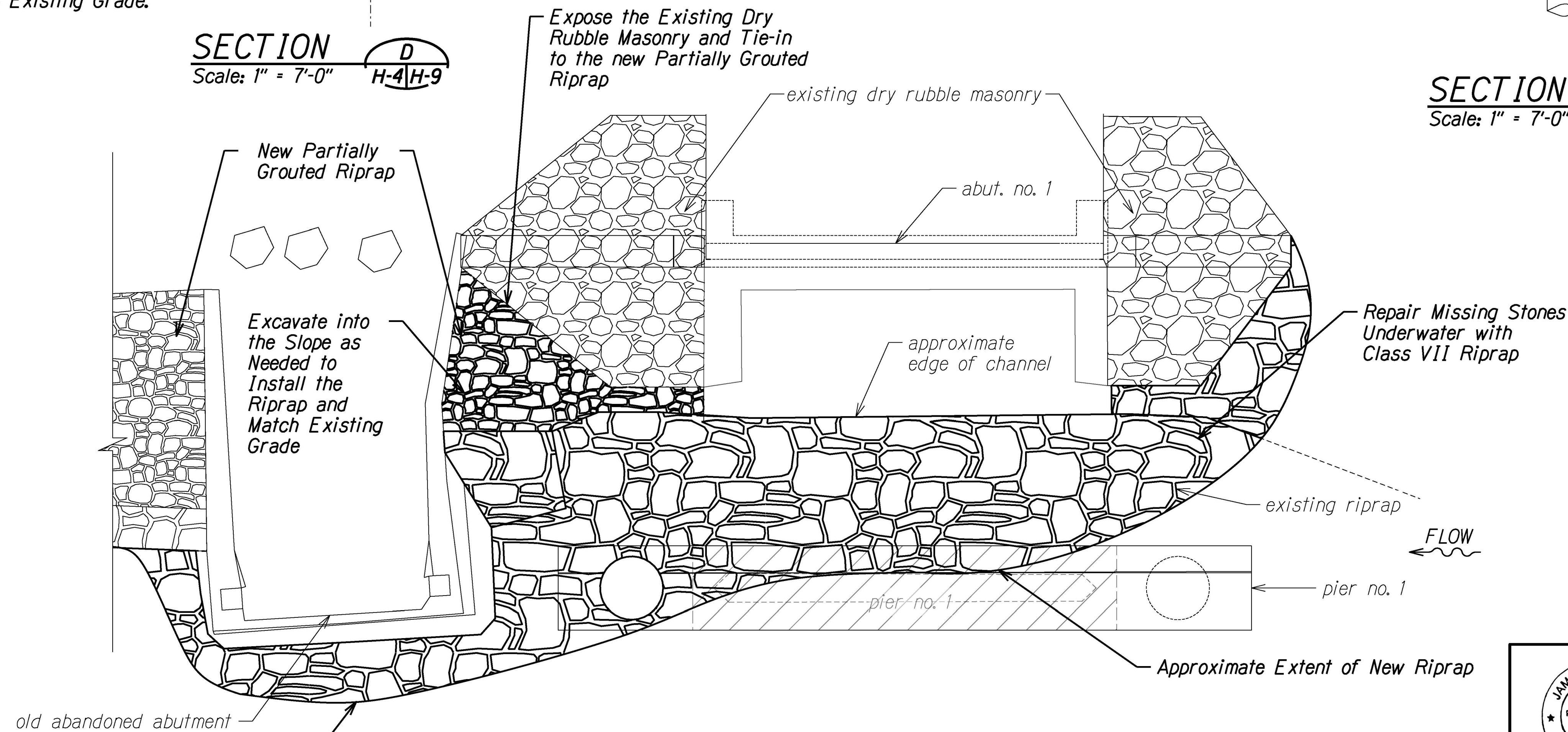
SHEET No. H-8 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-23(001)	2021	32	109



SECTION D
Scale: 1" = 7'-0"

SECTION E
Scale: 1" = 7'-0"



WAILUA RIVER BRIDGE PLAN VIEW
(ABUT. NO. 1 & PIER NO. 1)

Scale: 1" = 7'-0"

Notes:

- Contractor to Verify Extent of Existing Riprap and Slope Between Abutment No. 1 and Pier No. 1.
- Contractor to Verify Damages to Existing Riprap on the Upstream Side Below Water Level.

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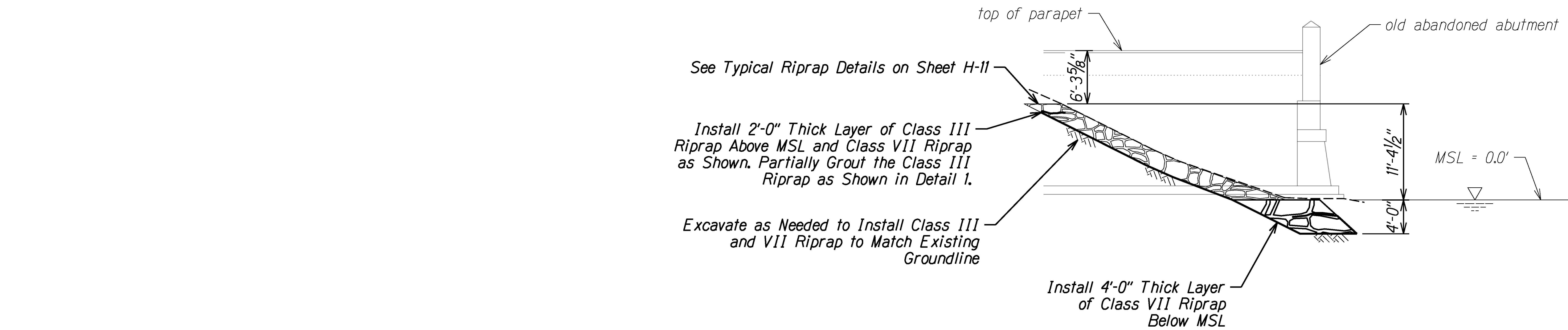
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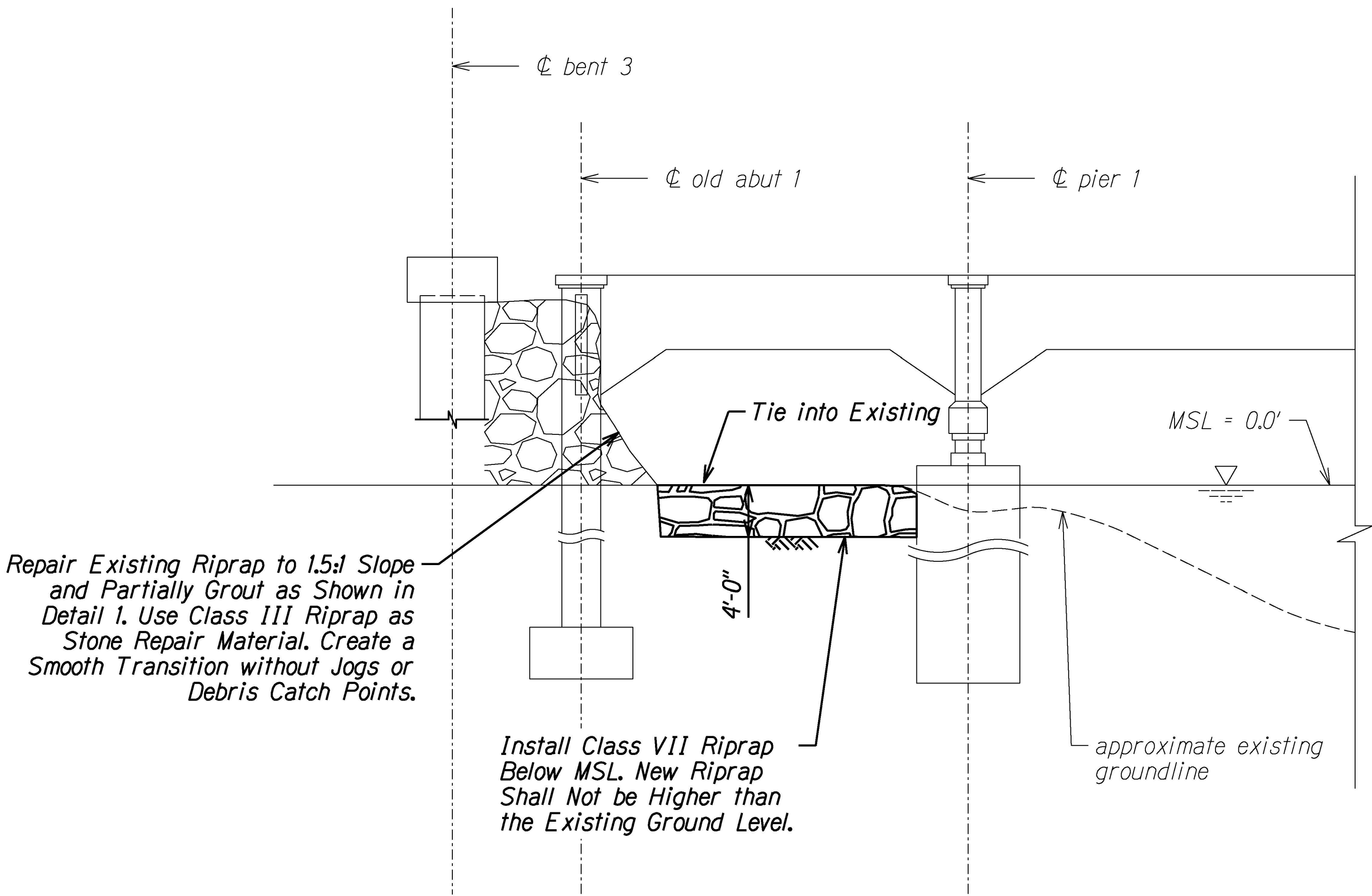
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HIGHWAYS DIVISION

WAILUA RIVER RIPRAP -
SECTIONS D & E
KUHIO HIGHWAY
Repairs to Wailua River Bridge
Fed. Aid Project No. ER-23(001)
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FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-23(001)	2021	33	109



SECTION F
Scale: 1" = 7'-0" H-4 | H-10



SECTION G
Scale: 1" = 7'-0" H-4 | H-10

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WAILUA RIVER RIPRAP -

SECTIONS F & G

KUHIO HIGHWAY

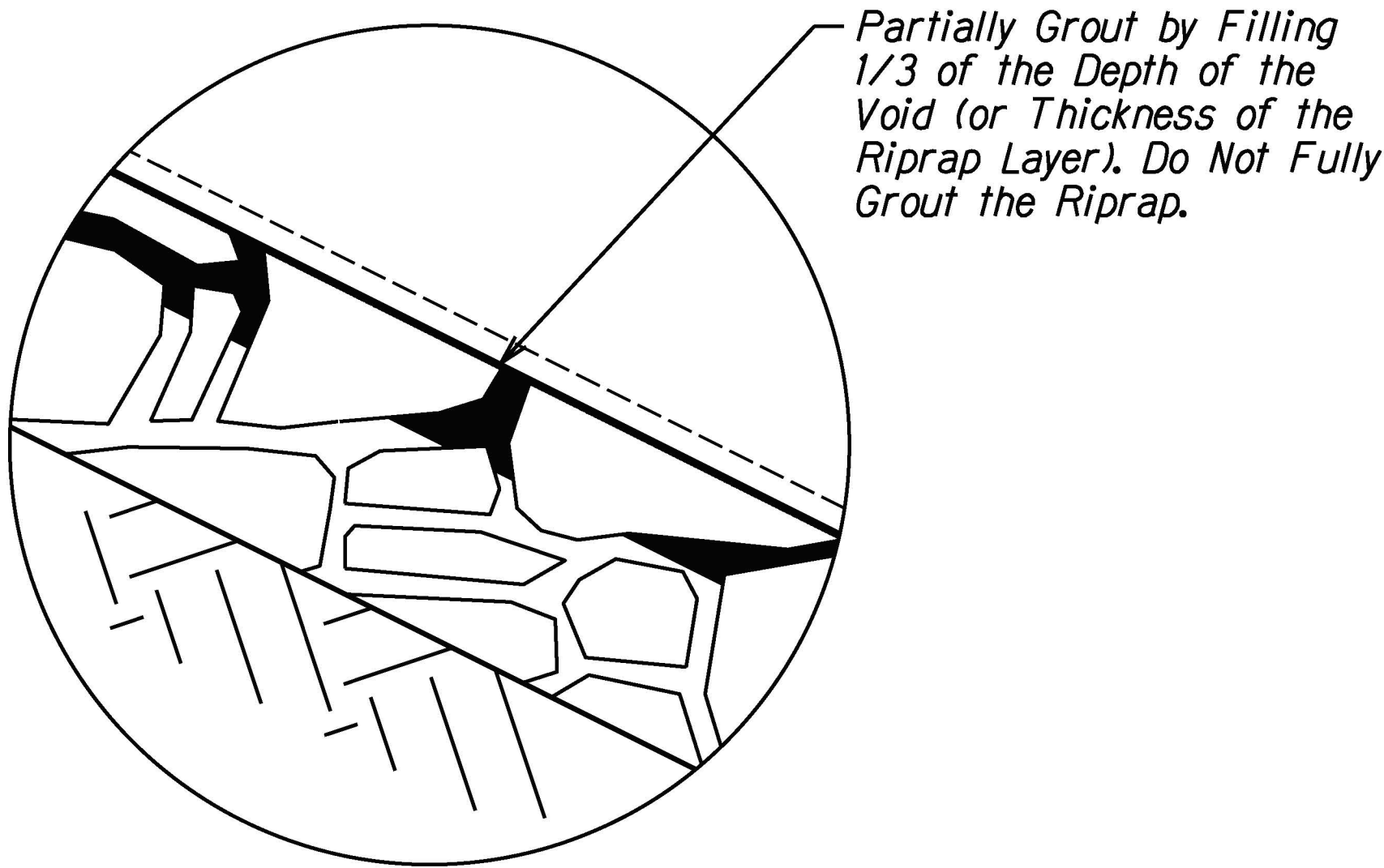
Repairs to Wailua River Bridge

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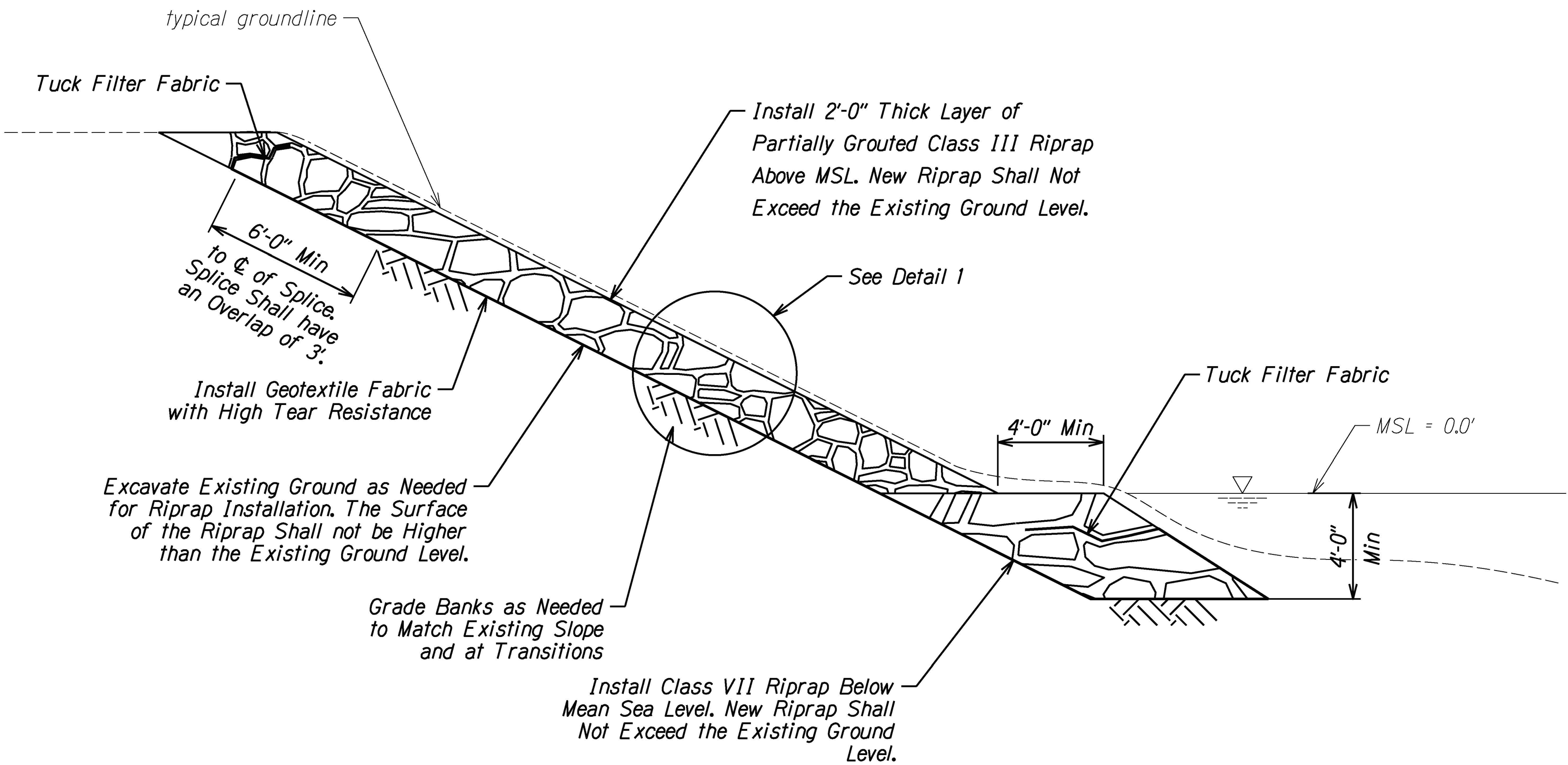
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SHEET No. H-10 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-23(001)	2021	34	109



DETAIL 1



TYPICAL RIPRAP DETAILS

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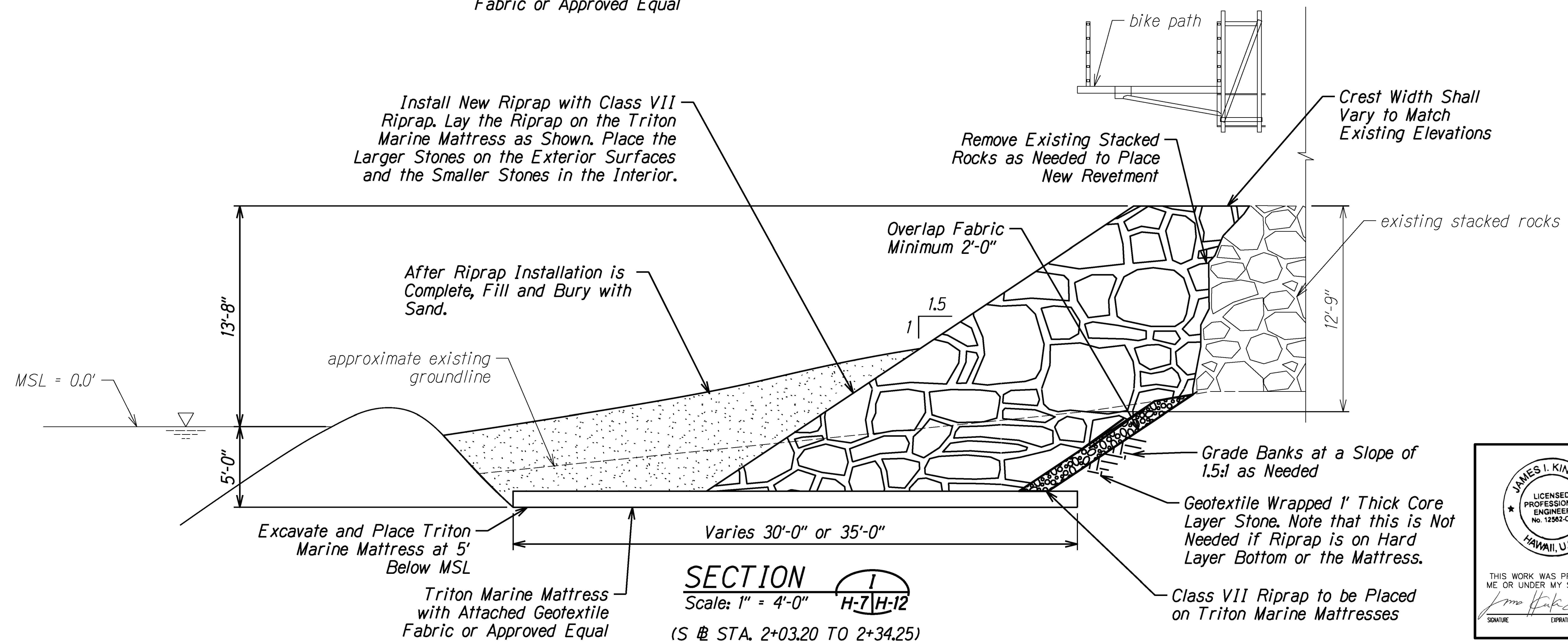
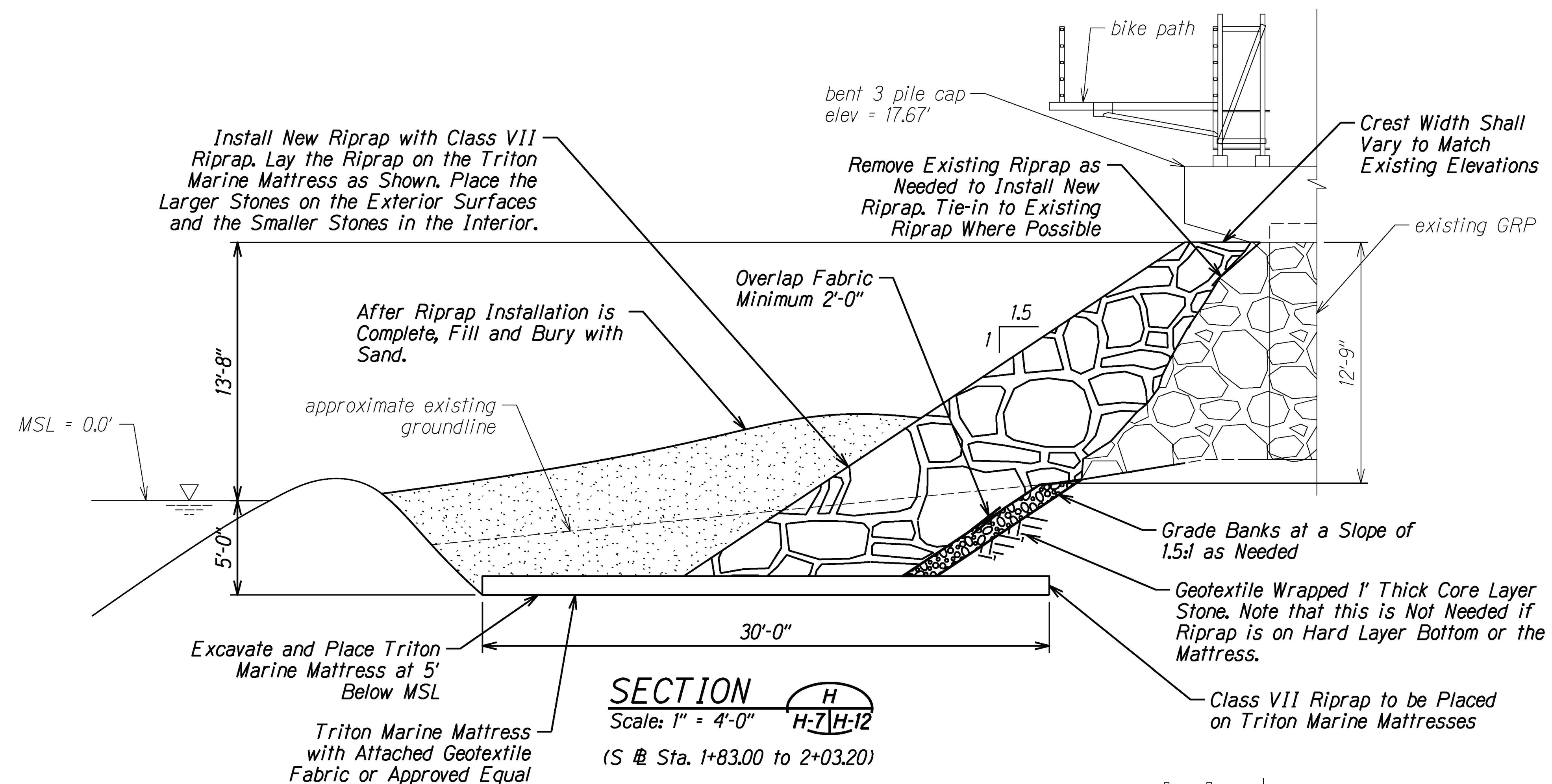
TYPICAL RIPRAP DETAILS

KUHIO HIGHWAY
Repairs to Wailua River Bridge
Fed. Aid Project No. ER-23(001)

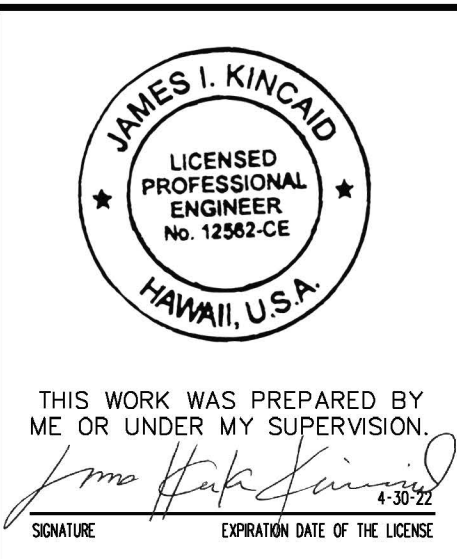
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SHEET No. *H-11* OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-23(001)	2021	35	109



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STATE OF HAWAII
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HIGHWAYS DIVISION

**WAILUA RIVER RIPRAP -
CROSS SECTIONS H # 1**

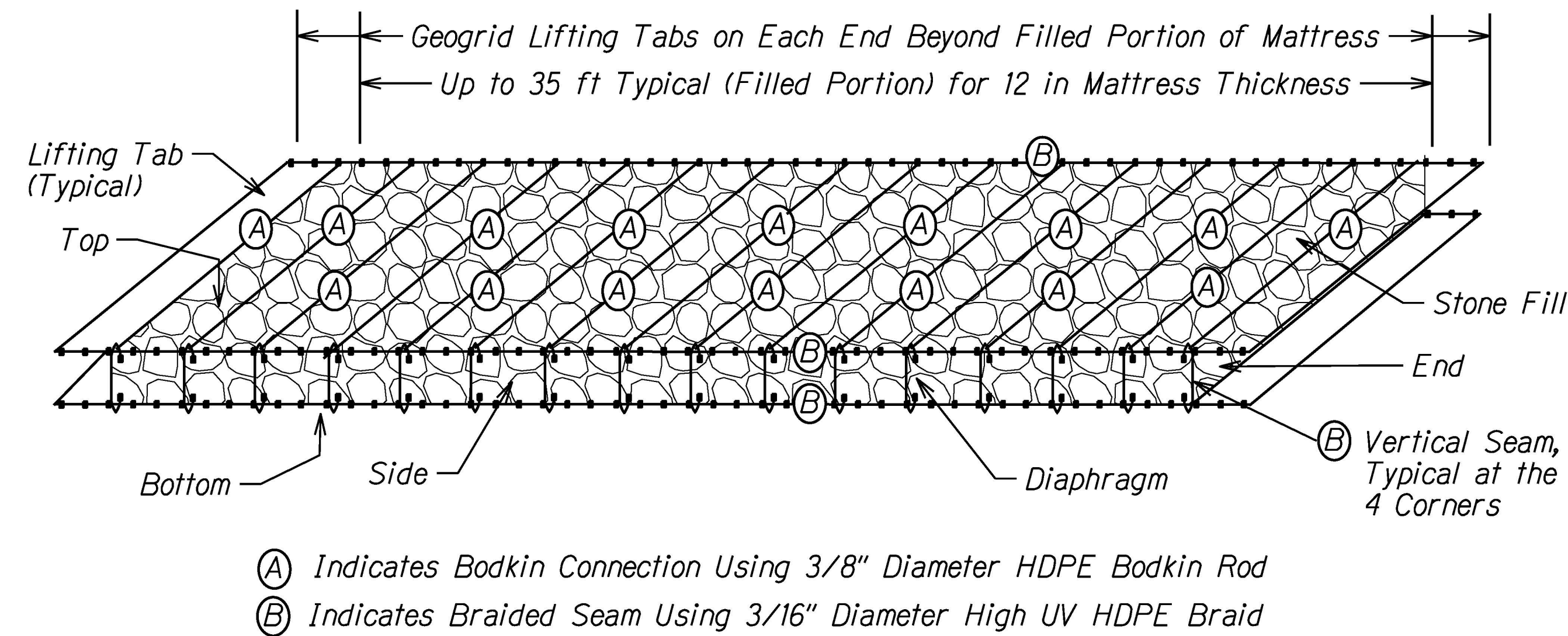
KUHIO HIGHWAY

Repairs to Wailua River Bridge

Fed. Aid Project No. ER-23(001)

Scale: As Noted Date: Apr. 2021

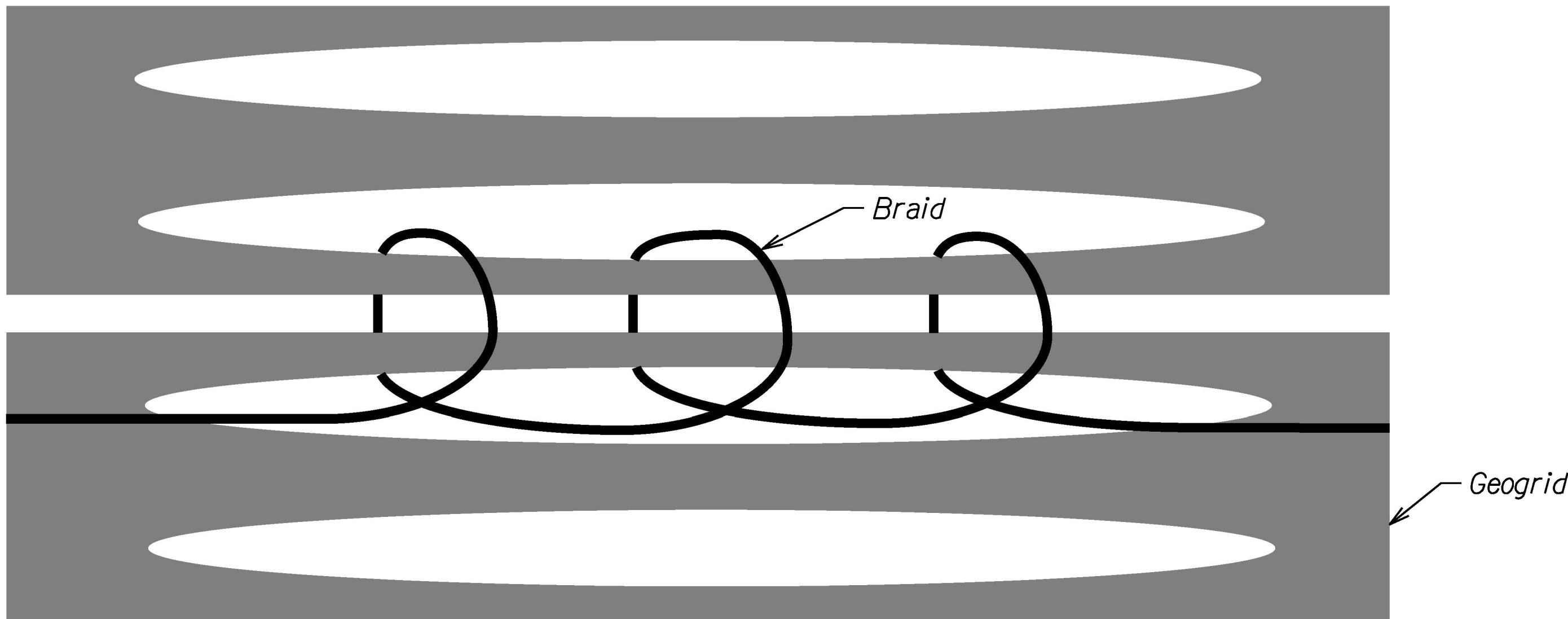
FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-23(001)	2021	37	109



TYPICAL CONFIGURATION OF FILLED MATTRESS UNITS

Notes:

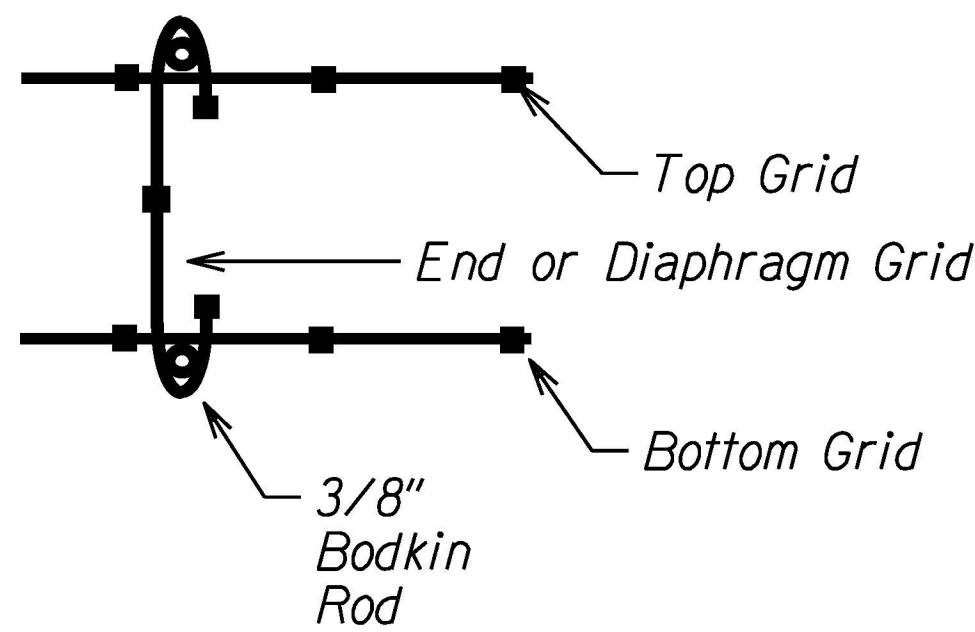
- Ends, top, bottom, sides, and any extra length used for lifting or anchoring purposes shall be composed of Tensar UXTriton200 Geogrid.
- Internal diaphragms shall be composed of Tensar UXTriton100 Geogrid.
- Nominal width of units: 5 ft (filled), 4.4 ft (unfilled).
- Nominal thickness (filled): 12 inches.
- Plastic cable ties may be used to secure bodkin connectors in position prior to tensioning or filling of mattress units.



TYPICAL LOCK-STITCH BRAIDING CONFIGURATION FOR MATTRESS FABRICATION

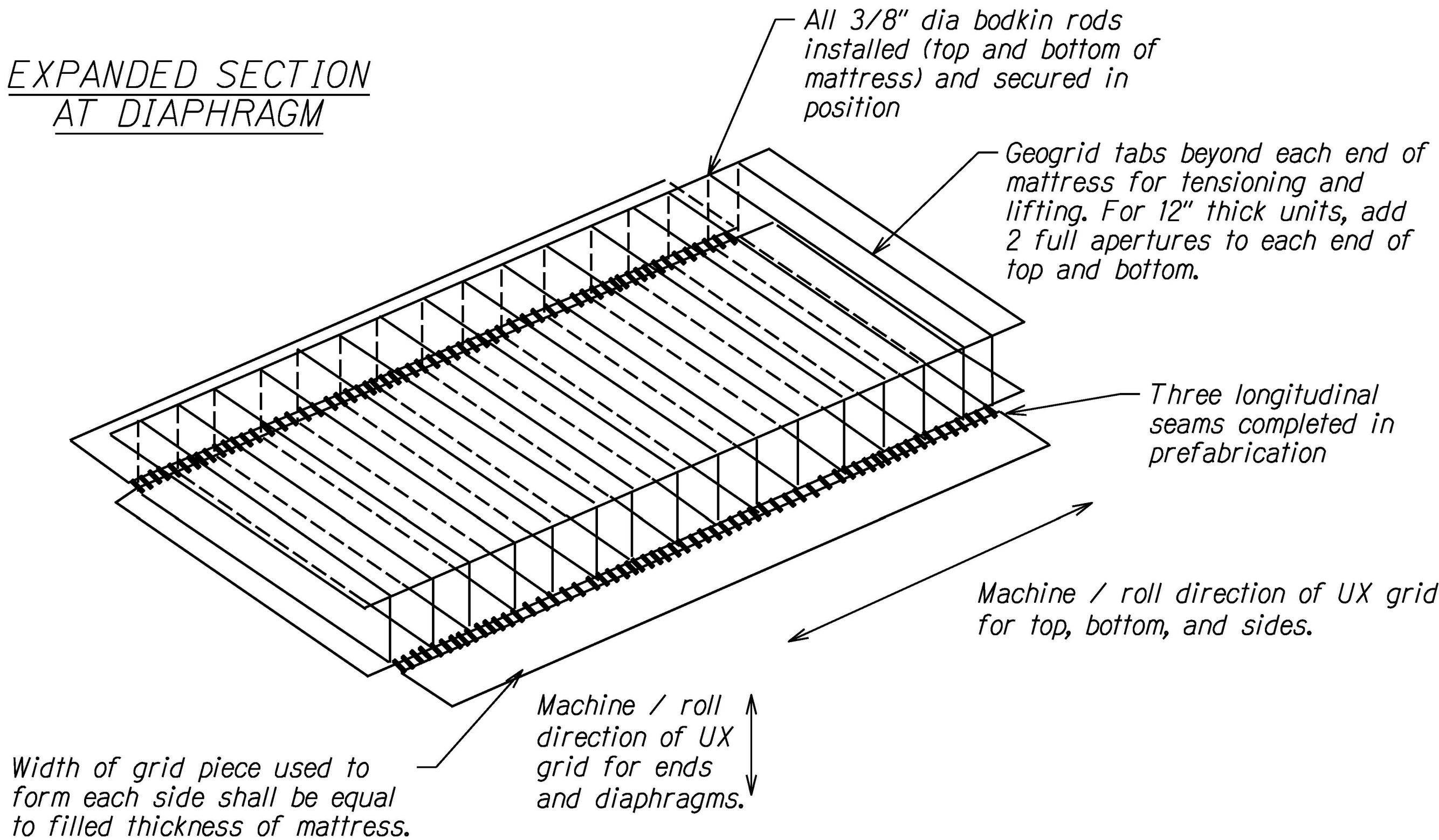
Notes:

- All cut ends of braid material shall be knotted within 1/2" to 2" of the end to prevent raveling of braid.
- At all ends of all braided seams the braid shall be securely knotted to the geogrid.
- At all ends of all pieces of braid material used, the braid shall be knotted to splice it to the next piece of braid, or to secure it to the geogrid. Each braided seam shall be continuous, with securely knotted splices allowed. The braid shall be securely knotted to the geogrid at a spacing not to exceed 3 ft along any seam.
- The braid shall be stitched through each pair of apertures along the seam at least once, and the minimum number of stitches per foot along the seam shall be six (6). The spacing of stitches along each seam shall be reasonably uniform.
- All knots shall be tied in a manner to prevent slipping and cinching.
- The wraps along the seam shall be sufficiently tight to close the gap between the adjacent pieces of geogrid,



EXPANDED SECTION AT DIAPHRAGM

See typical configuration of filled mattresses for additional dimensions and material types.



TYPICAL CONFIGURATION OF PREFABRICATED MATTRESSES

Note: Typical spacing of diaphragms is every three aperture lengths ($\pm 19"$). A shorter spacing may be used in order to match the required mattress length. Length of end pieces and internal diaphragm pieces shall be 2 grid apertures long for 12" (filled) mattress thickness.

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STATE OF HAWAII
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TRITON MARINE MATTRESS

TYPICAL DETAILS

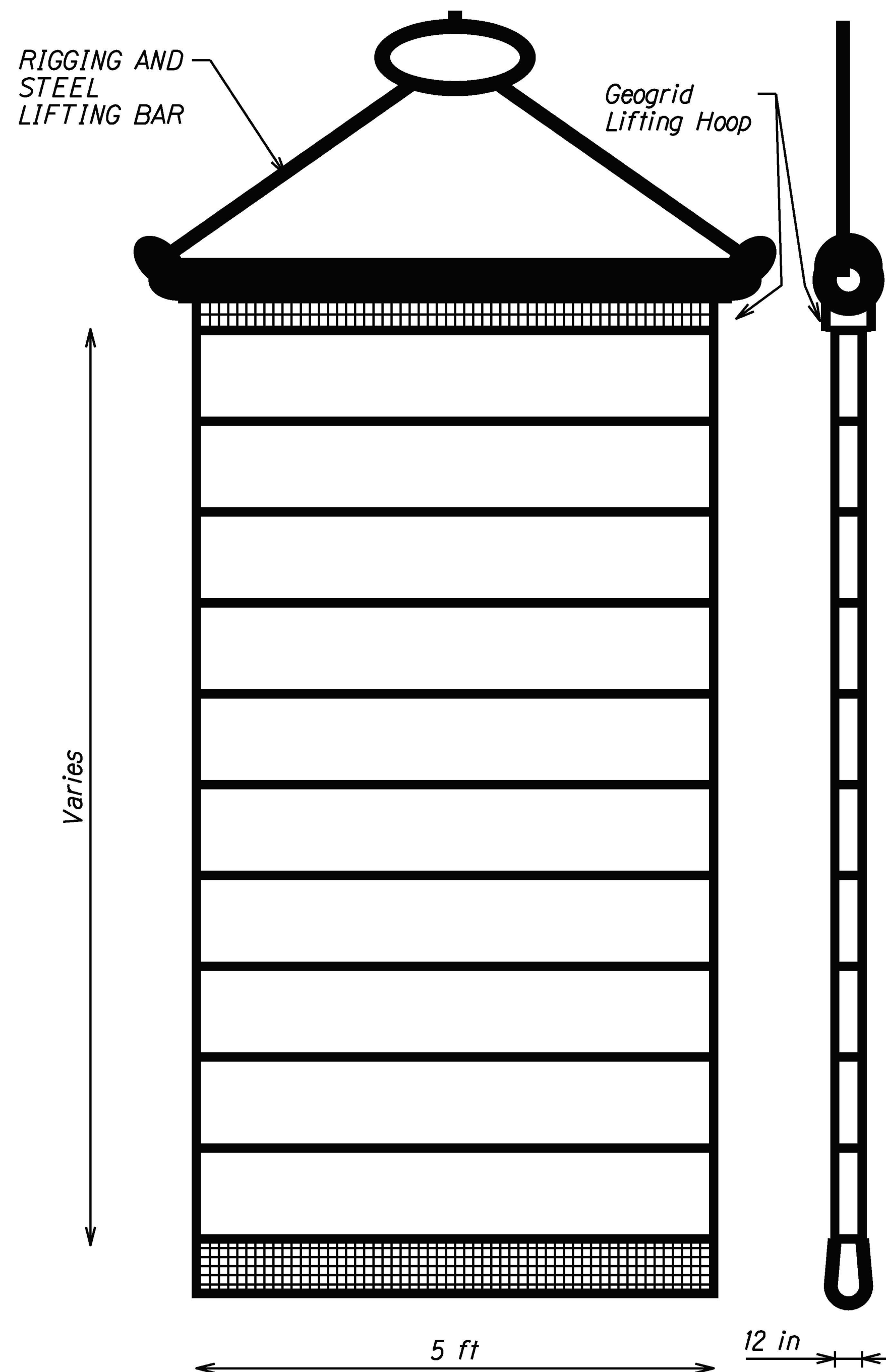
KUHIO HIGHWAY

Repairs to Wailua River Bridge

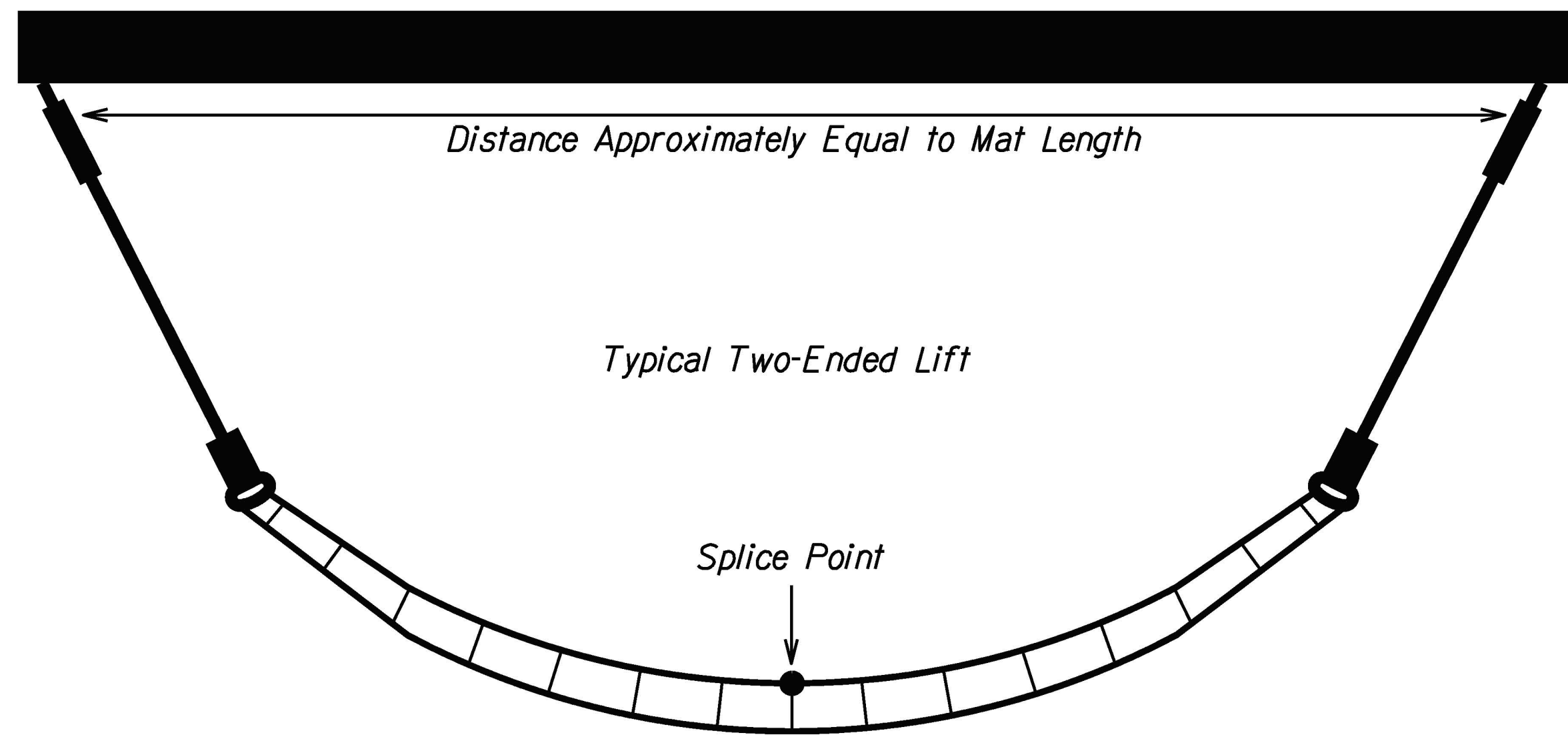
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FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-23(001)	2021	38	109



Typical One-Ended Lift



Typical Two-Ended Lift

General Notes:

- Lifting bar, rigging and handling must be suitable to distribute the lifting loads uniformly to the geogrid. Lifting apparatus to be proposed by contractor. Handling and lifting of grid materials and mattresses shall be avoided when the ambient temperature is lower than 5 degrees below zero, c.
- Use a bodkin connection to form the lifting hoops.
- Use cable ties (or similar) to prevent the connector piece from sliding out when tension is not applied.
- The hoop may be configured in 2 ways:
 - On each end of the unit, connect the pair of lifting tabs directly to each other; or
 - On each end of the unit, use a separate piece of the same type of grid to form a longer hoop. Connect each end of the separate piece of grid to one of the lifting tabs. (This type of hoop may be more advantageous for some conditions.)
- See the project specifications regarding stonefill materials.
- Filling shall be accomplished such that the average thickness of each mattress does not exceed 12 inches.
- Marine Mattresses shall be lifted in accordance with the manufacturer's recommendations.

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DATE	

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LICENSED PROFESSIONAL ENGINEER
No. 12562-CE
HAWAII, U.S.A.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRITON MARINE MATTRESS

TYPICAL LIFT DETAILS

KUHIO HIGHWAY

Repairs to Wailua River Bridge

Fed. Aid Project No. ER-23(001)

Scale: As Noted Date: Apr. 2021