

FED. ROAD DIST. NO.	STATE	FED AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-080-1(012)	2014	33	82

RIVET REPLACEMENT AND NEW BOLT INSTALLATION:

Materials:

1. Button head high strength tension-controlled bolts shall conform to ASTM A325 and F1852 and shall be mechanically galvanized. Button head bolts shall be used for all rivets replaced above deck.
2. Standard high strength bolts shall conform to ASTM A325 Type 1. Bolts, nuts and washers shall be hot-dipped galvanized. High strength bolts shall be used for rivet replacement below deck.
3. Each gusset plate consists of multiple plates of different sizes and thicknesses. Bolt lengths will vary. See installation Note 3 below.

Rivet Replacement Guidelines:

1. There is no prying action from applied stress or crevice corrosion which tends to separate the connected parts.
2. Where crevice interface corrosion between connected parts is present the rivets adjacent to that area shall be replaced after cleaning between the parts regardless of the condition of the rivets.
3. All rivets with head section loss greater than 10% of full-size driven head shall be replaced.
4. Existing rivet diameter may vary. Replacement bolt diameter shall match original rivet diameter.

Installation:

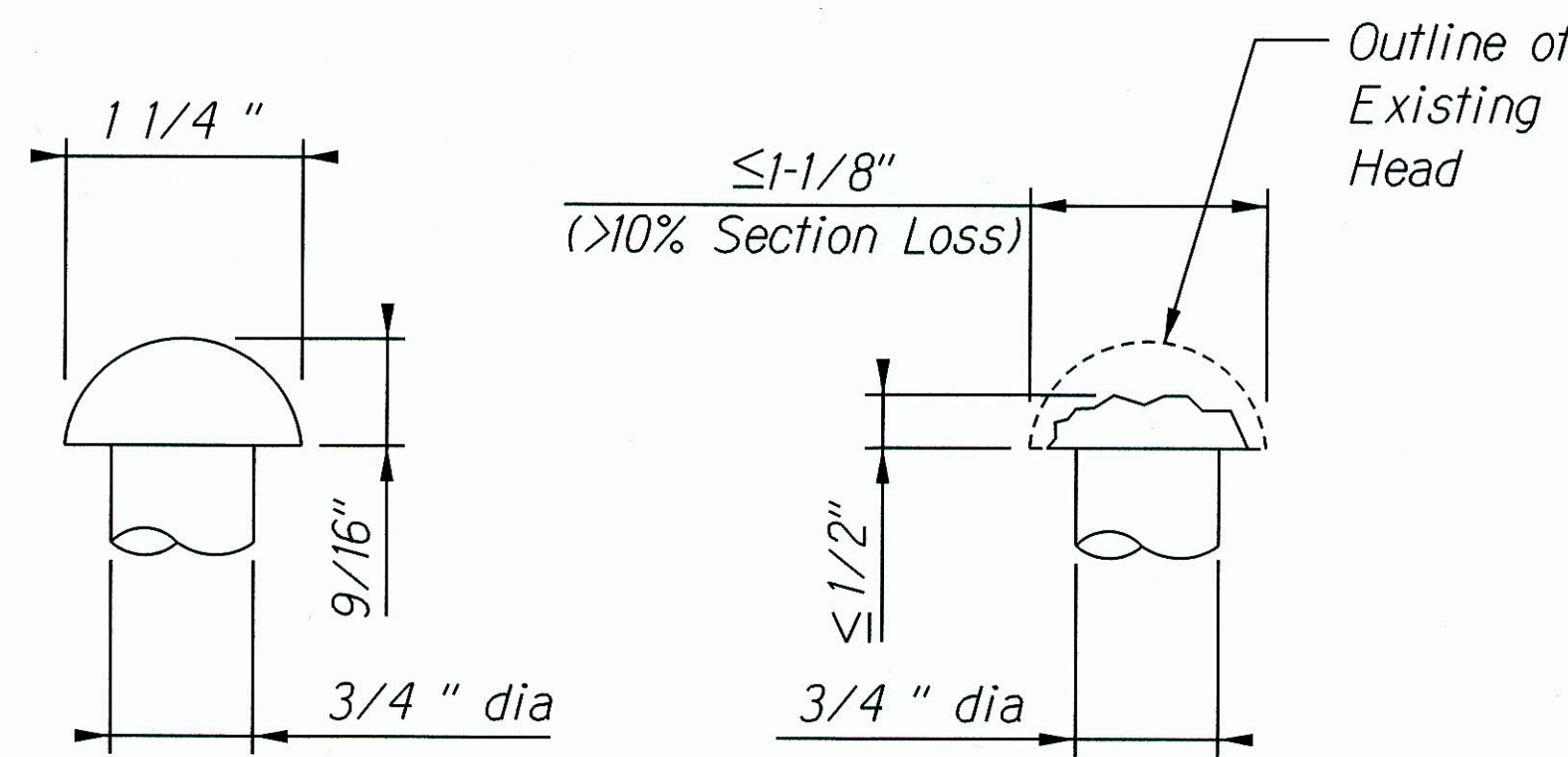
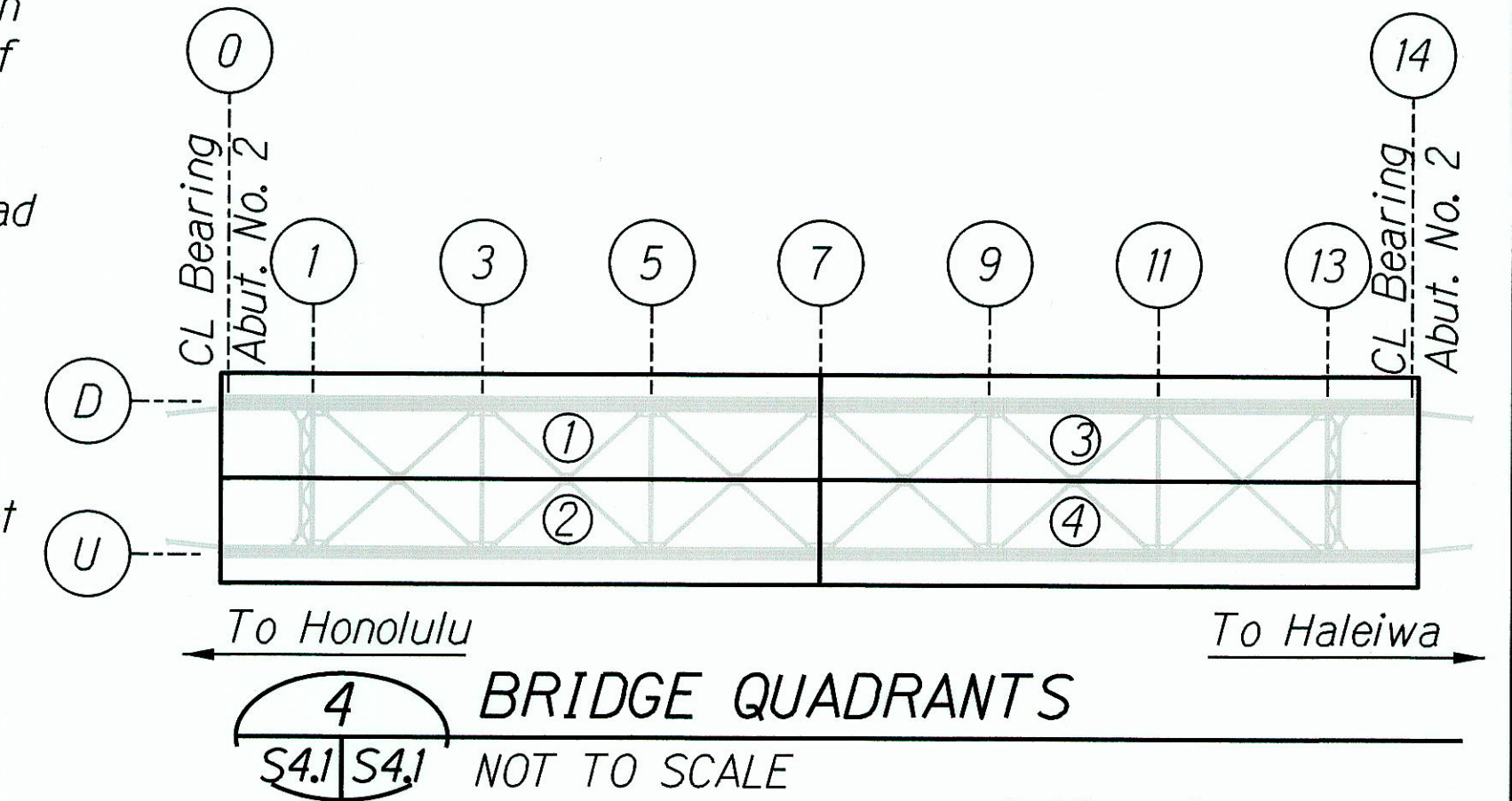
1. Existing rivets shall be removed without damaging the base metal. The remainder of the rivet head shall be ground flush with the base metal and the shaft drilled for removal. If necessary, the rivet head on the opposite side shall be removed in the same manner. Pneumatic rivet breakers, punching of rivet shanks and flame cutting will not be allowed, unless it can be demonstrated that the base metal will not be damaged. *Note 1 Cont. below.*
2. Paint shall be removed for a minimum distance of 4 inches on each side of the centerline of work location. Refer to Special Provisions Section 695 "Lead In Construction".
3. New bolts shall have the same diameter as the rivets they replace. Bolts shall have washers placed under both the head and the nut. No more than one existing rivet shall be removed and replaced with a bolt at a time, unless removal of multiple rivets at a time is approved by the Engineer. Bolts shall have a minimum length as to extend beyond face of nut, but not more than 1/2 thickness of the nut per Standard Specifications Section 501.03.
4. High strength bolts shall be installed after the corrosion, nicks, burrs, and foreign substances that might interfere with seating of the bolt head and nut washers are removed. Light grinding may be ordered by the Engineer.
5. If the bolt will not fit in the rivet hole, the hole may be drilled or reamed sufficiently to accommodate the bolt, but only with the approval of the Engineer. If the rivet hole is damaged it may be reamed to a larger diameter to eliminate the damage and to accommodate the next larger sized diameter bolt (7/8" dia). Suspected cracks or scoring at holes shall be confirmed with non-destructive methods such as dye penetrant.
6. New bolt holes shall be drilled or reamed sufficiently (1/16" larger than the bolt diameter) to accommodate additional new bolts.

Note 1 Cont.: Removal of rivets by air carbon arc gouging is acceptable provided that temperature monitoring of the base metal is performed. Temperature of the base metal shall be monitored using an infrared thermometer for 1 out of every 8 rivets removed. Base metal temperature shall not exceed 350°F.

7. Bolts shall be installed with a hardened washer under the head and nuts and pretensioned in accordance with Standard Specifications Section 501 and the "Specification for Structural Joints using ASTM A325 or A490 Bolts". Provide direct tension indicator washers for ASTM A325, Type 1 high-strength bolts. When necessary, washers may be clipped on one side to a point not closer than 7/8" of bolt diameter from the center of the washer.
8. Nuts and washers shall conform to 2005 Hawaii Standard Specifications for Road and Bridge Construction Sections 718.03 and 718.04.

Special Note:

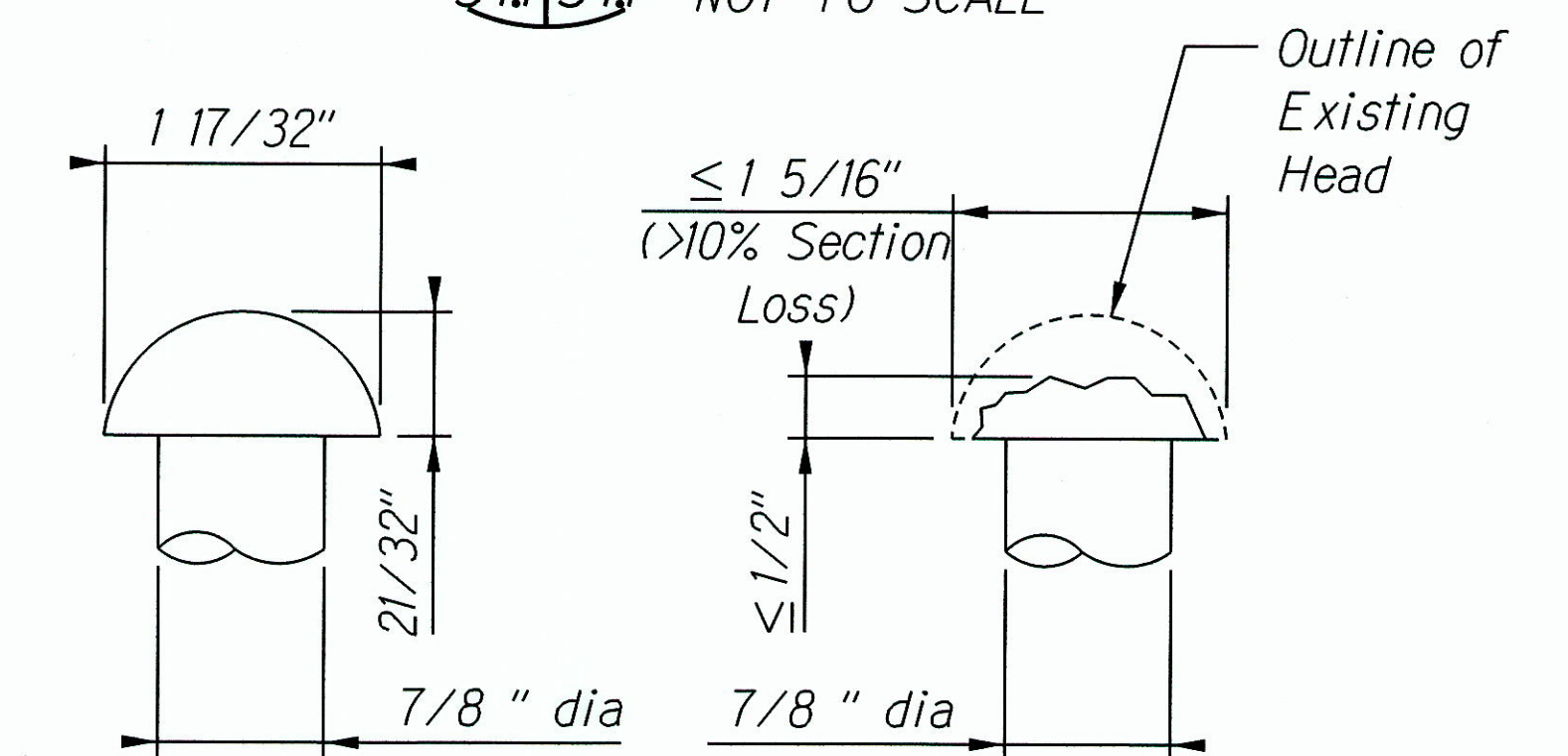
Prior to starting work, contractor shall identify and mark all rivets to be replaced. Contractor shall provide total quantity of rivet replacement per quadrant of bridge, see 4. Contractor shall obtain approval from Engineer before starting work. This item shall be incidental to various pay items.



Full Size Driven Rivet Head

Limit for Rivet Replacement

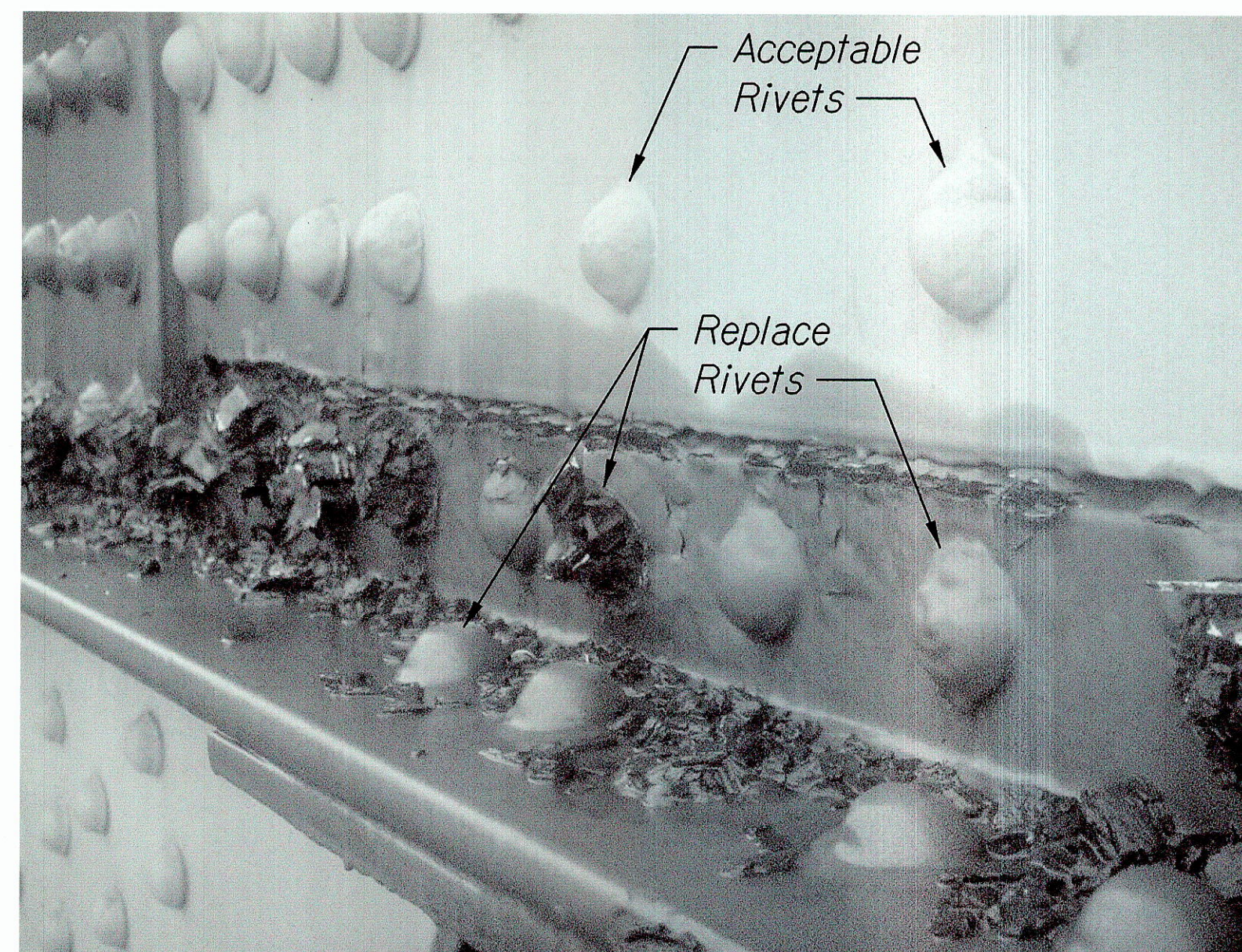
1 3/4" DIA RIVETS
SCALE: 1'-0" = 1'-0"



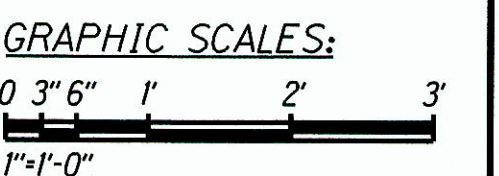
Full Size Driven Rivet Head

Limit for Rivet Replacement

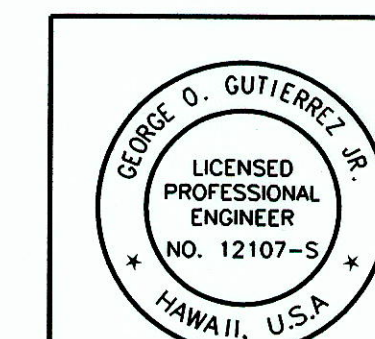
2 7/8" DIA RIVETS
SCALE: 1'-0" = 1'-0"



3 EXAMPLE PHOTO - RIVET REPLACEMENT
SCALE: 1'-0" = 1'-0"



DATE
DESIGNED BY
CHECKED BY
NO.



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RIVET REPAIR NOTES AND DETAILS

KAMEHAMEHA HIGHWAY
Repair and Repaint Karsten Thot Bridge
Federal Aid Project No. BR-080-1(012)

Scale: As Noted Date: Sept 2014

SHEET No. S4J OF 7 SHEETS

"AS-BUILT"