# Section 17 – Underground Structures

## Corrugated Metal Culvert Procedures for Invert Repair

### XS Sheet Numbers
XS17-060

### Description of Component
Repair Corrugated Metal Pipe (or Arch) culverts by paving the damaged invert due to corrosion and abrasion.

### Standard Drawing Features
The single sheet standard plan shows the details of the invert pavement and construction procedures.

### Design/General Notes
AASHTO LRFD Bridge Design Specifications, 6th Edition and CA Amendments.

### Additional Drawings Needed to Complete PS&E
District plans of highway drainage design

### Contract Specifications
Standard Specifications Section 15, 53, SSP 15.6

### Restrictions on Use of Standard Drawings
The XS sheet plan is used for metal pipe invert repair damaged mainly around the invert of the CMP, CMPA, CSSPP and CSSPPA with a maximum central angle of 120 degrees (to the 4 o'clock and 8 o'clock positions of the circular culvert).

### Special Considerations
Some special considerations for the procedures and calculations are given below:

1. Obtain applicable Culvert Investigation Corrosion Report thru Corrosion Technology Branch (METS) and Soils Report from Geotechnical Engineer. Determine existing pipe wall thickness of the metal or structural steel plate pipe and the soil backfill density.
2. From Shear Stud Selection Chart, select number of studs required to support the compression ring in the pipe wall.
3. Based on soil and water PH, and abrasion level obtained from District Hydraulics Engineer based on HDM Table 855.2A, determine required concrete patch thickness from HDM Table 855.2F, a minimum of 3 inches above the pipe crest.
4. Fill voids underneath culvert with slurry cement backfill or grouting.

5. The selected number of Welded Headed Studs attached to the corrugated culvert crest will provide a safety factor of 2.0.