

Montana Department of Transportation
Research Programs
April 2012

Experimental Project Final Report

**EVALUATION OF HIGH DENSITY POLYETHYLENE PIPE (HDPE) CULVERT IN A
MAINLINE APPLICATION**

Project Name: Angela North & South
Project Number: STPP 18-1(9)18
FHWA Project Number: MT 00-09
Project Location: Secondary Highway 59 (P-18); C000018, Rosebud
County, Glendive District – RP 23.5-24
Description: Experimental trial using High Density Polyethylene Pipe
(HDPE) culverts in a mainline application
Date of Installation: August 2007
Report Period: Spring 2012 – Final Evaluation
Principal Investigator: Craig Abernathy
Experimental Program Manager

Objective

The objectives of the annual and final reports are to document the performance of the experimental feature since construction. To visually document the condition of the HDPE pipe culvert and to assess any change in interior pipe diameter (deflection), joint integrity, buckling, or other visual physical attributes.

Experimental Design

Three sizes of diameter pipe were installed in this project; 750mm (approximately 30"), 900mm (approximately 36") and 1200mm (approximately 48") respectively. The product chosen is the Advanced Drainage System (ADS) N-12WT IB corrugated watertight, and soil-tight smooth interior polyethylene pipe.

Observation

Installation of the HDPE pipes was completed in the summer of 2007. Research was present to document the installation as a baseline for performance. To date all sections are performing well based on visual observations and measurements. No changes in pipe condition were noted from the previous inspections as compared to initial construction. No discolorations, buckling of the interior walls or deterioration of the connections or progressive material failure were observed. All flared-end terminals (FETS) were tight with proper placement, no additional internal deflection (specifically the 1200mm/48" HDPE) was observed since construction. Initial random deflection measurements were also taken on the 30" and 36" pipe (within eight feet of entrance) and during the 2011 inspection, no detectable change was noticed. Maintenance crews have done a good job in keeping vegetation relatively clear from the outlets and inlets of the culverts. The wattles were in good condition.

During construction it was noted that the completed HDPE installations had a slight oval shape viewed internally. Specifically, measurements taken at random spots within the interior of the 1200mm pipe showed that, on average, the horizontal walls of the pipes had deflected inwardly up to 13mm (.5") to 38mm (1.5") with the vertical (top to bottom) deflection ranging from 13mm (.5") to 19mm (.75"). This initial structural deflection was caused by the compaction process during installation. Refer to the 2007 construction report for more details

Measurements taken during the 2007 installation and compared at the same locations within the 48" (1200mm) HDPE accumulative through the 2008-2012 inspections revealed no appreciable change in interior deflection. At this last inspection, as stated earlier, the interior of the culverts display no discoloration other than from hydraulic activity. Joints are intact with no evidence of movement, no buckling is noticeable. The flared-end terminals (FETS) are stable and tight. The project, to date, has been rated as performing well.

This report and other information regarding this project may be found at:

<http://www.mdt.mt.gov/research/projects/angela.shtml>

The following are representative images taken during the April 2012 inspection:

750mm (30") Inlet



750mm (30") Outlet



900mm (36") Inlet



900mm (36") Outlet



1200mm (48") Inlet



1200mm (48") Outlet

