

# 2011 Project Achievement Award Winner

## The Versatility of Concrete Pipe and Boxes Spotlited on Minnesota Highway Project

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A section of [CSAH 21<sup>1</sup>](#), south of Minneapolis St. Paul is a showcase for the versatility of concrete pipe and boxes in the context of complex environmental considerations and increased dead load cover of an existing concrete sanitary sewer. Concrete pipe and boxes were specified for standard and specialized applications in the final phase of the 20-year plan to extend the Scott County arterial roadway. Underground construction included large diameter reinforced concrete pipe (RCP) for a sanitary sewer bypass, and 12-inch to 60-inch concrete pipe for storm sewers, and culverts. Precast boxes were used for pedestrian and wildlife crossings. A stream crossing that called for a low flow, smaller box culvert beside a larger box culvert at a higher elevation had a special design. The two adjacent culverts have a dual purpose of channelling high volume spring flows, but the larger culvert provides passage for pedestrians and wildlife during the rest of the year. [Cretex Concrete Products<sup>2</sup>](#) of Maple Grove shipped 32,300 feet of 12-inch to 60-inch diameter RCP, 700 feet of reinforced concrete arch pipe, 186 feet of boxes for pedestrian and wildlife passes, 516 feet of (8-foot x 8-foot) precast boxes, 470 feet of (14-foot x 7-foot) precast boxes, 364 feet of (12-foot x 10-foot) precast boxes, and 550 manhole and inlet structures of various sizes.

The cost effectiveness of designing with concrete was demonstrated with the use of 60-inch diameter, 4000-D RCP casing pipe to re-align an existing 42-inch diameter RCP sanitary sewer interceptor line under a 37-foot embankment. When the dead load of the cover was increased from 15 to 37 feet, the new load exceeded the structural capacity of the existing sanitary sewer that had been installed in 1974. The 42-inch pipe was slid inside the 60-inch pipe to complete the new alignment and connect with the existing sewer on either side of the highway without any interruption to flow. The original 42-inch RCP was not lined or produced with any interior protective coating. Sections of the excavated pipeline were delivered to Cretex where they were inspected and tested. The company reported that the tests showed that there was no degradation of the pipe over the 37-year service life.

RCP and precast boxes reduced the timeframe for work in environmentally sensitive areas and stream beds. The project required 18 separate permits from seven government agencies, as well as project approval from the Mdewakanton Sioux, the cities of Minneapolis and St. Paul, [Mn-DOT<sup>3</sup>](#), and Scott County. The owners of the project are Scott County and Mn/DOT. The Engineer was [WSB & Associates<sup>4</sup>](#) of Minneapolis. The Contractor was [Enebak Construction Company<sup>5</sup>](#) of Northfield, Minnesota.

**AWARD SUBMISSION:** To view the original document, [click here](#).

### LINKS

1. [http://www.co.scott.mn.us/RoadsTransport/Roads/CompletedStudies/CH21Ext/CH21DEIS/CH21DEIS\\_Chapter2.pdf](http://www.co.scott.mn.us/RoadsTransport/Roads/CompletedStudies/CH21Ext/CH21DEIS/CH21DEIS_Chapter2.pdf)
2. <http://www.cretexconcreteproducts.com>
3. <http://www.dot.state.mn.us/>
4. <http://www.wsbeng.com>
5. <http://www.enebak.com>

### Learn More About Buried Infrastructure

- **Keyword Search on American Concrete Pipe Association Website**  
(Durability, performance, culverts, RCP, sanitary, storm.)  
[www.concrete-pipe.org](http://www.concrete-pipe.org)
- **Concrete Pipe Design Manual**  
<http://www.concrete-pipe.org/designmanual.htm>



Box culverts being constructed at different grades.



Pipe and box outfall under increased load embankment.



Section of 37-year-old RCP sanitary sewer pipeline inspected and tested.