



Overpass Culvert Replacement Results in Safer Road

Full Mitigation Best Practice Story

State-wide, Michigan



Charlevoix County, MI - With over 2,700 vehicles using it daily, Thumb Lake Road is the second-busiest road in Charlevoix County. Previously the road’s overpass of the Boyne River was a site of continual flooding, but it was restructured to ensure safer travel and eliminate repetitive repairs. Thanks to the cooperation of the County Road Commission and FEMA Region V, funds were allocated through the Hazard Mitigation Grant Program (HMGP) to help rebuild the structure and reduce future risk.

The success of this project can be attributed to not one person, but instead to the cooperation of numerous people, groups and agencies, along with the HMGP. Without every one of these players, the project would not have been as successful. In particular, FEMA Region V and the Charlevoix County Road Commission worked closely throughout the project in overseeing its plan development, construction, and closeout.

The project consisted of several mitigation techniques on the overpass. The main target was replacing two 48-inch culverts. The culverts had inadequate capacity to accommodate storm-water flow during significant precipitation events. Additionally, erosion had caused sediment to build up in the culvert, and storm water run-off had left debris at the inlet, further exacerbating the problem. The project replaced the twin pipe culverts with a 22-foot-wide concrete box culvert. Concrete headwalls were also installed and stream-bank stabilization measures, such as rip-rap, were taken.

The project solved various issues related to the previous design of the bridge. The reduction of water overtopping the bridge was a particularly serious problem, with damages of \$10,000 per event being prevented in the future. Not only was it successful in a financial respect, but the safety of the thousands of people who cross the overpass daily was secured. Problems with the hydraulics of the water flowing under the roadway, which resulted in debris back-ups, were also resolved with the new, larger culvert.

While this project may seem like a small one compared with other mitigation projects, the importance of this roadway should not go overlooked. Thousands of people traverse the overpass annually, and while the costs of the project may be small, the unforeseen and immeasurable benefits are vast. The safety of all those people has been secured for a relatively low price. This proves that mitigation comes in many sizes and shapes, but the end result is always the same – risk reduction.

This project is an excellent example of FEMA's ability to cooperate and work with numerous agencies and groups. Here FEMA Region V worked directly with the county road commission to secure the roadway; however, other groups and individuals should still take note of the flexibility of the HMGP.

Thanks to cooperation between FEMA and the Charlevoix County Road Commission, the mitigation of the Thumb Lake Road crossing will result in flood damage prevention ranging between 95 and 100 percent. This means less expense for the county and a safer road for motorists to drive on.

Activity/Project Location

Geographical Area: **State-wide**

FEMA Region: **Region V**

State: **Michigan**

Key Activity/Project Information

Sector: **Public**
Hazard Type: **Winter Storm; Severe Storm; Flooding**
Activity/Project Type: **Flood-proofing; Elevation, Structural; Flood Control**
Structure Type: **Concrete, Reinforced**
Activity/Project Start Date: **11/2001**
Activity/Project End Date: **Ongoing**
Funding Source: **Hazard Mitigation Grant Program (HMGP)**
Funding Recipient: **Local Government**
Funding Recipient Name: **Charlevoix County Road Commission**

Activity/Project Economic Analysis

Cost: **\$280,000.00 (Actual)**
Non FEMA Cost:

Activity/Project Disaster Information

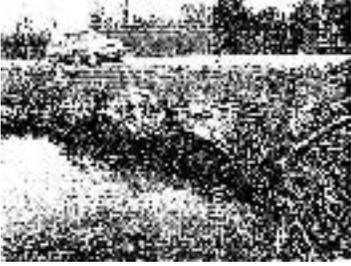
Mitigation Resulted From Federal Disaster? **Yes**
Federal Disaster #: **1346 , 10/17/2000**
Value Tested By Disaster? **Unknown**
Repetitive Loss Property? **Unknown**

Reference URLs

Reference URL 1: <http://www.charlevoixcounty.org/>
Reference URL 2: <http://www.floodsmart.gov/>

Main Points

- Formerly the Thumb Lake Road's overpass of the Boyne River was a sight of continual flooding due to inadequate culverts and poor drainage atop the road.
- County Road Commission and FEMA Region V allocated funds through the Hazard Mitigation Grant Program (HMGP).
- The main target was replacing two 48 inch culverts, to replace the twin pipe culverts, install concrete headwalls, and to take stream bank stabilization measures.
- \$10,000 of future damages per event have been prevented.



Before mitigation.



After mitigation.