

# SPECIAL EXPERIMENTAL PROJECT (SEP-14)

## Alternative Pavement Bidding

Michigan Department of Transportation  
I-94 Project Final Report  
Control Section 77111 Job Number 80911A

Prepared by:

Scott Singer, P.E.  
Operations Engineer, Macomb-St. Clair TSC  
Michigan Department of Transportation

March 21, 2013

## **Introduction**

The Michigan Department of Transportation (MDOT) submitted a final SEP-14 report for the use of alternative pavement bidding on M-6 in August, 2001. The SEP-14 work plan was developed in September of 2000 to allow both the concrete and asphalt paving industries to compete for the paving work on M-6, a new limited access freeway near Grand Rapids, MI.

MDOT's typical process selects one pavement option early in the design based on the results of a life cycle cost analysis. The SEP-14 work plan permits MDOT to develop structurally equivalent concrete and hot mix asphalt (HMA) pavement cross sections for a project. HMA and concrete paving contractors are then allowed the opportunity to competitively bid on the project. This process is intended to increase competition which may result in more favorable bids for MDOT and cost savings for MDOT and FHWA.

In 2008, MDOT requested to pilot an alternate pavement bidding program based on the original SEP-14 work plan developed for M-6. The pilot program allows a limited number of highway projects to proceed with an alternate pavement bidding component. In 2008, 2009 and 2010, the FHWA approved adding projects to the SEP-14 work plan developed for M-6. Several of these projects have since been removed as alternate pavement bidding candidate projects. A list of all APB projects and their current status is provided in Exhibit 1.

This report provides detailed information on the alternate pavement bidding project along I-94 in St. Clair County.

### **I-94 Project Background (MDOT Control Section 77111, Job No. 80911A)**

The I-94 freeway corridor in St. Clair County was constructed with reinforced concrete in the 1960's. Since that time, there have been various patching projects to address the cracking and spalling problems associated with this type of pavement. In 2008, the 3.62 mile segment from Fred Moore Highway to Allington Road was programmed for a reconstruct.

In addition to the roadway reconstruction, the project included reconstruction of the Fred Moore Interchange including four ramps and the reconstruction of two bridges. Design of the project was accomplished throughout most of 2009, the project was let in September of 2009, and construction was substantially complete in the 2010 construction season.

### **I-94 Project Procedures**

#### **Life Cycle Cost Analysis**

MDOT developed the concrete and hot mix asphalt (HMA) pavement designs through the department's standard procedures, which utilize the 1993 AASHTO Guide for Design of Pavement Structures. During the advertisement of this project, contractors were not permitted to propose changes to the design of the pavement structure or to the maintaining traffic scheme. In order to account for the varying life cycle costs of each pavement structure, MDOT developed equations that would consider the initial construction costs, future maintenance costs, and user

delay costs for each pavement alternative. The equations convert a contractor's bid to an Equivalent Uniform Annual Cost (EUAC) for each pavement type. The contractor whose bid equated to the lowest EUAC would be selected for the project. The initial construction costs and the user delay costs were to be provided by the contractor in their bid. MDOT estimated future maintenance costs based on historical data. The contractor's bid was then entered into the equation associated with the specified pavement type. The contractor's bid included all work to construct the project including the pavement, earthwork, signing, restoration, etc. Exhibit 2 contains the pay items used on this project.

To account for delays to the traveling public, MDOT incorporated user delay costs into the project. The user delay cost were calculated by using the Construction Congestion Cost software known as CO3. Contractors were required to include a lump sum dollar amount in their bid that would reflect the cost of the delays to the public for both freeway and ramp traffic. MDOT provided the daily rates contractors would be charged for each day they had lane restrictions on I-94 or on ramps within the project limits. Exhibit 3 contains the final Alternate Pavement Bid Calculations and Lane Rental Special Provision used on this project.

The I-94 project incorporated MDOT's frequently used special provisions and also unique special provisions for concrete paving and HMA paving. (Exhibit 4)

Two sets of plans were prepared, one showing the concrete reconstruction alternative, and one showing the HMA reconstruction alternative. Two separate proposals were prepared as well, one for each pavement type. The typical cross sections used were those developed through the Life Cycle Cost Analysis process. MDOT's Construction & Technology division followed the 1993 AASHTO "Guide for Design of Pavement Structures" and used AASHTO pavement software DARWin Version 3.1, 2004. The Equivalent Uniform Annual Cost calculation is based on the revised pavement selection process as approved by the Engineering Operations Committee on June 3, 1999.

#### Contracting Industry Involvement

Through this project, MDOT has reinforced the concept that coordination with industry is critical when venturing into new methods of contract procurement. As part of the SEP-14 process, a packet of information which included the project title sheet, typical cross sections for both pavement designs (including ramp typicals), notice to bidders and special provisions relative to the alternative bid, the maintaining traffic plan, and the EUAC equation with background calculations was prepared for industry. This information was given to industry during the design process to solicit comments prior to completing the plans for advertisement. No Contractor comments were received during the design of the project.

#### I-94 Bid Evaluation

Four (4) contractors bid on the I-94 project. Bidders were to bid on either the concrete or HMA design, but not both. The first four placed bids were for the concrete pavement design while no bids were placed for HMA pavement. MDOT speculates that an HMA pavement structure was cost prohibitive due to the additional earthwork required to construct the project with an HMA pavement. The four bids are listed below.

	<u>Material</u>	<u>Bid Price</u>
Low Bid	Concrete	\$25,682,077
Second Bid	Concrete	\$28,753,020
Third Bid	Concrete	\$28,923,639
Fourth Bid	Concrete	\$30,372,602

One of the final bids received were under the engineer's estimate which was \$27,243,094.

MDOT estimates the alternate pavement bidding component of the project added approximately 25% to the development of the I-94 contract. Additional costs to develop the alternate pavement bidding component were not higher because the profiles were held constant for both pavement designs. The additional effort needed was in developing typical sections for two separate pavements and cost associated with different Pay Items and Special Provisions.

### **Final Evaluation of the I-94 Alternative Pavement Project**

Once awarded the contract, the contractor submitted an alternate traffic control plan. The plan included maintaining an additional lane in the East Bound direction to increase mobility and reduce the contractors user delay cost associate with lane rental. The new traffic control plan did not change the number of days with lane closures submitted in the original bid. The project was constructed with concrete pavement, including the ramps at the interchange.

### **Update on Other Current Alternate Pavement Bidding Projects**

In 2013, MDOT will let an assortment of alternate pavement bid projects throughout the state. FHWA has approved the following projects and no longer considers the APB process to be experimental.

## **Update on Other Current Alternate Pavement Bidding Projects**

In May 2013, MDOT is planning to let an alternate pavement bidding project on US-10 in the Bay Region.

In September 2013, MDOT is planning to let an alternate pavement bidding project on I-196 in the Southwest Region.

In October 2013, MDOT is planning to let an alternate pavement bidding project for M-231 (new roadway) in the Grand Region.

In November 2013, MDOT is planning to let an alternate pavement bidding project on US-127 in the University Region.

In December 2013, MDOT is planning to let an alternate pavement bidding project on I-75 in the Bay Region.

In February 2014, MDOT is planning to let an alternate pavement bidding project on I-69 in the Bay Region.

MDOT is in the process of developing an alternate pavement bidding project on US-24 in Metro Region.

Additional reports will no longer be written (required) since FHWA has determined that alternate pavement bidding is no longer considered experimental.