



Legislative Report on Life-Cycle Cost Analyses

January 2012



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Legislative Report on Life-Cycle Cost Analyses

Introduction

This report is in response to Minn. Stat. 174.185, which requires a life-cycle cost analysis (LCCA) for every project in the reconditioning, resurfacing and road repair funding categories. The LCCA is a comparison of life-cycle costs among competing paving materials using equal design lives and equal comparison periods. An LCCA is required for all projects constructed after July 1, 2011.

Documentation required by the statute includes:

- Lowest life-cycle cost
- All alternatives considered
- Chosen strategy
- Documentation justifying the chosen strategy if it isn't the low-cost strategy

Report Development Cost

As required in Minn. Stat. 3.197, this document must contain the cost of preparing the report, including any costs incurred by another agency or another level of government.

MnDOT staff costs were less than \$2,000 to produce this report.

To request this document in an alternative format, please contact MnDOT's Affirmative Action Office at 651-366-4718 or 1-800-657-3774 (Greater Minnesota); 711 or 1-800-627-3529 (Minnesota Relay). You may also send an e-mail to ADArequest.dot@state.mn.us.



Implementation

The Minnesota Department of Transportation has had a process for performing LCCA on roadway rehabilitation projects since 1999. The existing LCCA process, presented in Technical Memorandum 07-17-MAT-01, was modified to meet the detailed requirements of the legislation and presented in Technical Memorandum 10-04-MAT-01.

This memorandum requires that an LCCA consistent with Federal Highway Administration guidelines is performed on all projects in the reconditioning, resurfacing and road repair funding categories. The memorandum limits the LCCA requirement to projects greater than two miles in length or more than 30,000 square yards. The memorandum also limits the requirement for an LCCA to projects that include placing more than 2" thickness of pavement material. Thin overlays (2" or less) are considered short-term preventive maintenance and do not have a viable concrete alternative with an equal design life.

The memorandum requires that the LCCA includes at least one Portland cement concrete (PCC) and one hot-mix asphalt (HMA) alternate with equal design lives. To best determine the most cost-effective design, the memorandum also allows the LCCA to include additional alternatives with other design lives.

Results

There were a total of 30 projects in the reconditioning, resurfacing and road repair funding categories with construction beginning after July 1, 2011, that required an LCCA according to Technical Memorandum 10-04-MAT-01.

An HMA option was the low-cost option in all of the submitted LCCAs. For four projects the chosen option was not the low-cost option. In each of these instances the low-cost option was HMA, and the chosen option was also HMA but with a longer design life. When the low-cost option was not chosen a signed exception form documenting the justification was provided. Four projects did not select an option because the selected option will be determined in the alternate bidding process.

Attached is a table of LCCA results, copies of the LCCAs submitted by the districts, and the signed exception forms.



Discussion

HMA options are the low-cost option of all these projects, primarily for two reasons:

1. It is difficult for concrete options to be competitive with bituminous options for many projects in these funding categories. PCC options typically have a greater initial cost than HMA options but become competitive by typically having lower maintenance costs. The relatively short design lives of these rehabilitation-type projects don't allow the PCC options to exploit its relative advantage with HMA options. PCC options that have longer design lives than HMA alternates are more competitive than PCC options with the equal design lives as required by the statute.
2. MnDOT has substantial experience with the design and performance of HMA options. However, MnDOT has limited experience with PCC options and, presently, there is a lack of design tools and maintenance history for PCC rehabilitation options. To respond to these challenges, MnDOT has begun a pooled-fund study to develop a tool for the design of thin PCC overlays, with expected completion in spring 2012. MnDOT has also developed standardized maintenance schedules for PCC.

Four projects did not have a final option selected because they are following the alternate bidding process. The alternate bidding process is used on projects with pavement $\geq 4"$ to $< 7"$, which are likely to have competitive bituminous and concrete options.

The alternate bidding process is similar to using an LCCA to determine the low-cost option. However, instead of using an estimate for the initial cost of an option, alternate bidding uses actual bid prices. Steps in the alternate bidding process are:

1. A project is bid with two options, one HMA and one PCC.
2. An adjustment factor is calculated. This is the difference between the maintenance costs of the two options.
3. Bids are received and the low-cost bidder is determined after adding the adjustment factor to the alternate with the greatest maintenance costs.

Conclusion

MnDOT has implemented the requirements of the law with a technical memorandum. MnDOT will work to ensure that all future projects meet the requirements of the technical memorandum. In addition, MnDOT has introduced the alternate bidding process to create competition to get the most cost-effective pavement design and materials.

MnDOT will continue to provide this report on an annual basis as required by law.



Attachments


- Technical Memorandum 10-04-MAT-01 (Implements requirements of legislation)
- Technical Memorandum 07-17-MAT-01 (LCCA procedure prior to legislation)
- Memorandum on Pavement Rehabilitation Selection (Sept. 28, 1999)
- LCCA Summary: A summary of all the LCCAs in the required funding categories for projects constructed after July 1, 2011
- Individual LCCAs (Attachments A & B)
- Signed exception forms





MINNESOTA DEPARTMENT OF TRANSPORTATION
Policy, Safety, and Strategic Initiatives Division
Technical Memorandum No. 10-04-MAT-01
January 28, 2010

To: Distribution 57, 612, 618, 650

From:  Khani Sahebjam
Deputy Commissioner and Chief Engineer

Subject: Life Cycle Cost Analysis (LCCA) of Pavement Preservation Projects

Expiration

This Technical Memorandum supersedes Technical Memorandum No. 07-17-MAT-01. It will remain in effect until January 28, 2015 unless it is superseded.

Implementation

This technical memorandum applies to all *pavement* preservation projects in the reconditioning, resurfacing, and road repair funding categories. Projects that meet the criteria of the Pavement Selection Process will continue to follow that process.

Introduction

To comply with the requirements of legislation and Mn/DOT policy; a Life Cycle Cost Analysis (LCCA) must be submitted with the project Materials Design Recommendation (MDR). The submitted LCCA must include at least one PCC and one HMA option with equal pavement design lives (in years) and analysis periods.

Purpose

This Technical Memorandum implements the requirements of Minnesota state legislation for LCCA of alternate pavement materials and updates LCCA procedures required by Mn/DOT policy.

In 2008, the Minnesota State Legislature passed bill HF 3486 (Chapter 287). This legislation requires a life cycle cost analysis (LCCA) be performed for all pavement projects in the reconditioning, resurfacing, and road repair funding categories that are to be constructed after July 1, 2011. The LCCA are to use equal design lives and equal comparison periods to compare competing paving materials. If the chosen option does not have the lowest life cycle cost, the justification is required to be documented. The legislation requires that the commissioner report annually to members of the Senate and House of Representatives the results of the analyses. The full text of the legislation that applies to the requirement for LCCA is attached in Appendix A.

Guidelines

A LCCA is not required for preventive maintenance projects or for short projects. Preventive maintenance projects include projects that place 2" or less of paving material. Short projects meet the following criteria:

Two-Lane Roadways: Projects less than **2 miles** long
Multi-Lane Roadways: Projects less than **30,000 square yards**

The project length/size listed above is determined using only the driving lanes, no turn lanes, parking lanes or ancillary lanes.

Follow sections I and II to develop a LCCA to submit with the MDR. However, to make the best use of LCCA, perform the LCCA early in the project development process.

I. Procedure

1. Establish Design Life and Pavement Design Alternatives

- For all LCCA, develop at least one HMA and one PCC pavement design alternative with equal design lives. The alternatives should be pavement designs that are capable of meeting the design life required by the scope of the project and meet Mn/DOT pavement design policy and procedures. However, the design life that best meets the scope of the project may have only one available pavement material alternate that conforms to Mn/DOT pavement design policies and procedures. In such a case, compare the alternate design with the selected design life to at least one HMA and one PCC pavement alternate developed using the closest available design life that provides both a HMA and a PCC alternate.

2. Determine Activity Timing

- Use District experience, Pavement Manual – Appendix E, and/or HPMA data.

3. Estimate Costs

- Only costs that demonstrate the differences between alternatives need to be explored.
- The District will develop the initial and activity costs based on their data and experience.
- Do not include user costs.

4. Compute Life Cycle Costs

- Calculate the present worth, of the initial construction and maintenance activities, of each of the pavement alternatives on a cost per mile basis.
- The present worth will be calculated using a discount rate equal to the real interest rate on 30-year treasury bonds as published each year by the federal Office of Management and Budget (OMB). The value to be used each year will be determined by the Mn/DOT Office of Investment Management and kept on file in the Mn/DOT Estimating Unit.
- Include any remaining life value of the pavement alternative that remains at the end of the analysis period. Remaining life value is calculated as the prorated share of the cost of the last activity based on the service life that extends past the analysis period.
- Do not include an inflation rate.

5. Analyze Results

- Unless there is justification for an exception, choose the low cost alternative. If the chosen alternative does not have the lowest life cycle cost, the District Engineer or designee shall sign off on the supporting justification.

II. Pavement Alternatives

HMA Overlay

Description

- HMA overlay (or mill and overlay) of existing HMA or PCC pavement that will restore ride and reduce pavement distresses. The thickness of a HMA overlay may be designed to improve the load carrying capacity of an existing roadway so that it does not require a seasonal load restriction.

Design

- To remove the requirements for spring load restrictions on a roadway, Mn/DOT has a thickness design procedure based on FWD pavement deflections. A design life is not part of this design procedure. For design life, there is no formal design procedure as the performance of the overlay is very dependent on the condition of the existing pavement. Instead of a design life, HMA overlays have an expected life. Base the expected life on HPMA data and engineering judgment. The expected life of a HMA overlay is typically from 7 to 19 years.

LCCA

- Schedule the 1st overlay or reconstruction at the end of the overlay's functional life.
- Each successive overlay has 1 year less life than the previous overlay.
- Minimum of a 35 year analysis period.

HMA on Base (No Work on Subgrade)

Description

- These projects place HMA on new or existing material that behaves as base in the pavement section. These types of projects include CIR, FDR, crack and seat, full mill and repave, or new base without working the subgrade. Typically, very specific engineering requirements need to be met to make these options practical. Only consider the options that are practical in the LCCA.

Design

- Design these pavements with the Mn/DOT procedures used for new HMA pavement. Some adjustments may need to be made for the properties of the base.
- Design these projects to carry 20 years of accumulated traffic loading.

LCCA

- Use the maintenance schedule provided in the pavement selection memo.
- Minimum of a 35 year analysis period.

PCC Overlay

Description

- These projects place PCC on existing HMA (whitetopping) or existing PCC with a stress relief layer (unbonded overlay). A PCC overlay will functionally and structurally improve an existing pavement.

Design

- Follow Mn/DOT design procedures for either whitetopping or unbonded overlays.
- The design life of these projects may be from 15-35 years.

LCCA

- If the Mn/DOT design procedure results in a thickness less than the minimum PCC thickness allowed by Mn/DOT policy, contact the Pavement Design Unit.
- An intermediate minor CPR project may add an additional 5 years until major CPR or replacement is required.
- For PCC overlay projects, the pavement should receive its first major CPR or reconstruction at the end of its design life.
- Use a life expectancy of about half the pavement design life for major CPR.
- Minimum of a 35 year analysis period.

PCC Pavement (No Work on Subgrade)

Description

- These projects place new PCC pavement on new or existing base and do not involve working the subgrade.

Design

- Follow Mn/DOT design procedures for PCC pavement.
- The preferred design life is 35 years for these projects.

LCCA

- For 35 year designs, use the maintenance schedule provided in the pavement selection memo.
- For designs for less than 35 years, follow the same maintenance schedule guidelines as for PCC overlays.
- Use a 50 year analysis period.

Questions

Contact Jerry Geib, **Pavement Design Engineer**, at (651) 366-5496, for information on the technical contents of this memorandum.

Any questions regarding publication of this Technical Memorandum should be referred to the Design Standards unit, designstandards@dot.state.mn.us. A link to all active and historical Technical Memoranda can be found at <http://www.dot.state.mn.us/design/tech-memos/index.html>.

To add, remove, or change your name and/or address on the Technical Memoranda mailing list, write or call the Mn/DOT Central Office Mail Room G-18 Transportation Building, 395 John Ireland Blvd., St. Paul, MN 55155, phone number (651) 366-3051.

Appendix A

Sec. 71. [174.185] PAVEMENT LIFE-CYCLE COST ANALYSIS.

Subdivision 1. **Definitions.** For the purposes of this section, the following definitions apply:

- (a) "Life-cycle cost" is the sum of the cost of the initial pavement project and all anticipated costs for maintenance, repair, and resurfacing over the life of the pavement. Anticipated costs must be based on Minnesota's actual or reasonably projected maintenance, repair, and resurfacing schedules, and costs determined by the Department of Transportation district personnel based upon recently awarded local projects and experience with local material costs.
- (b) "Life-cycle cost analysis" is a comparison of life-cycle costs among competing paving materials using equal design lives and equal comparison periods.

Subd. 2. **Required analysis.**

For each project in the reconditioning, resurfacing, and road repair funding categories, the commissioner shall perform a life-cycle cost analysis and shall document the lowest life-cycle costs and all alternatives considered. The commissioner shall document the chosen pavement strategy and, if the lowest life cycle is not selected, document the justification for the chosen strategy. A life-cycle cost analysis is required for projects to be constructed after July 1, 2011. For projects to be constructed prior to July 1, 2011, when feasible, the department will use its best efforts to perform life-cycle cost analyses.

Subd. 3. **Report.**

The commissioner shall report annually to the chairs and ranking minority members of the Senate and House of Representatives' committees with jurisdiction over transportation finance beginning on January 1, 2012, the results of the analyses required in subdivision 2.



MINNESOTA DEPARTMENT OF TRANSPORTATION
Engineering Services Division
Technical Memorandum No. 07-17-MAT-01
December 11, 2007

To: Distribution 57, 612, 618 and 650
From: Rick Arnebeck
Director, Technical Services Division

A handwritten signature in black ink, likely belonging to Rick Arnebeck, is placed over the 'From:' line of the memorandum.

Subject: Life Cycle Cost Analysis for Trunk Highway Preservation Projects

Expiration

This is a new Technical Memorandum. It will remain in effect until January 1, 2011 unless it is superseded or the information contained herein is placed in the Mn/DOT Pavement Manual.

Implementation

The criteria for computing a Life Cycle Cost Analysis (LCCA) for Preservation type projects will be effective immediately.

This Technical Memorandum applies to all pavement projects with the following exceptions:

- Projects covered under the Pavement Selection Technical Memorandum.
- Preventive Maintenance Projects defined as low cost strategies performed on a pavement while it is still in relatively good condition to retard deterioration, reduce the need for more costly rehabilitation and prolong pavement life. Examples include crack/joint sealing, surface treatments, thin overlays and minor concrete rehabilitation.
- Reactive Maintenance defined as work done to keep a rapidly deteriorating poor pavement in a safe drivable condition.
- Projects less than 2 miles in length or less than 30,000 square yards.

Introduction

It is the responsibility of Mn/DOT to invest wisely in the infrastructure of the Trunk Highway system. Not all investments are equal, and because pavements are rehabilitated and/or constructed with public funds, the economics of alternative type repairs should be examined carefully and be part of the pavement analysis process.

All projects should undergo a rehabilitation selection process. For new construction and reconstruction, this process is as described currently in Technical Memorandum No. 04-19-MAT-02. There is no formal statewide selection process for proposed Preservation repairs. District Materials Engineers consider total cost, local roadway past performance, aggregate availability and quality, total funding availability, and traffic impacts amongst other factors when determining the appropriate repair strategy for a highway. Individual Districts have internal processes to select their list of candidate projects, but there is no uniformity across the State.

A Life Cycle Cost Analysis was previously required on Federal funded roadway rehabilitation projects under TEA-21. When TEA-21 expired and the current Federal funding legislation, SAFETEA-LU was enacted, the requirement for LCCA on roadway Preservation type construction was not perpetuated. In 1999, the Director of the Office of Materials and Road Research (OMRR), Gerald Rohrbach, issued a memo to the Districts requiring a LCCA be included in every Materials Design Recommendation Letter (MDR). After Mn/DOT's Change Management process in 2002, Districts were delegated MDR approval authority. Subsequent to that, LCCA become an option for the Districts to include in the MDR. As a minimum, it makes good engineering sense to conduct an economic analysis by means of a LCCA.

Through this Technical Memorandum, a LCCA will be required on all future Preservation candidates.

Purpose

The purpose of this Technical Memorandum is to provide direction on the application of LCCA for proposed Preservation roadway repairs.

Guidelines

A Life Cycle Cost Analysis shall be conducted on Preservation type roadway projects under the following guidelines:

- Both concrete and bituminous surfacing materials should be considered as alternative repairs.
- LCCA should be analyzed for a minimum 30 year period from the time of construction.
- Initial construction cost as well as subsequent preventive maintenance costs should be included in analysis.
- Project initial and preventive maintenance costs will be based upon District experience.
- Discount rate used to calculate LCCA will be supplied by the OIM annually.
- The LCCA should originate in the District.
- The low cost alternative need not be selected as the appropriate repair with supporting justification.
- User costs will not be formally evaluated in the LCCA .
- The LCCA will be included with the Materials Design Recommendation.
- LCCA should include any repair strategy salvage value in calculations when applicable.

Upon completion of each LCCA, a copy will be sent to the Pavement Design Engineer for compilation into periodic reports as needed.

The LCCA is a required item in a complete Materials Design Recommendation. When lowest life cycle cost is not the selected fix, the District Engineer or designee shall sign off on the supporting justification documentation.

Questions

For information on the technical contents of this memorandum, please contact **Jerry Geib, Pavement Design Engineer, at (651) 366-5496.**

Any questions regarding publication or distribution of this Technical Memorandum should be referred to the Design Standards unit, designstandards@dot.state.mn.us. A link to all active Memoranda and a list of historical Technical Memoranda can be found at <http://www.dot.state.mn.us/atoz.html>.



Minnesota Department of Transportation

MEMO

Office of Materials & Road Research
Mailstop 645
1400 Gervais Avenue
Maplewood, MN 55109-2044

DATE: September 28, 1999

TO: Transportation District Engineers/Metro Division Engineer

FROM: Gerald J. Rohrbach, Director *GJR*
Office of Materials & Road Research

PHONE: 651-779-5590

SUBJECT: Pavement Rehabilitation Selection

Under the current Mn/DOT programming process, Districts and Metro Division have a great deal of flexibility in the methods used to select construction projects and pavement rehabilitation types. However, regardless of the methods used, a life cycle cost analysis (LCCA) is necessary to insure that the alternate selected is cost effective.

This construction season we became aware of some concrete pavement restoration (CPR) projects that have relatively high construction costs and relatively short service lives compared to other types of typical pavement rehabilitations. An LCCA of the CPR and other rehabilitation alternatives were not included in the Design Recommendation Memo for these projects. We recognize that Districts may develop economic evaluations of alternates at different times in the project development process. However, the economic analysis of the rehabilitation alternatives must be documented in the Design Recommendations Memo as required by Mn/DOT Geotechnical & Pavement Manual. Appendix E of the Geotechnical & Pavement Manual provides excellent guidance for selecting service lives and performing appropriate economic analyses for rehabilitation alternatives.

Although the Mn/DOT requirements for documenting rehabilitation selections have not changed since 1994, we are seeing less and less or no discussion of alternatives in Design Recommendations Memos.

Therefore, effective October 15, 1999, all Design Recommendation Memos must include an economic analysis of rehabilitation alternatives in accordance with the Geotechnical & Pavement Manual. Omission of the economic analysis will result in a delay of the review and approval of the Design Recommendations Memo until the analysis is submitted.

District Engineers
Materials Engineers
Soils Engineers
September 28, 1999
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Determining the appropriate rehabilitation fixes for pavements typically requires a thorough evaluation of the in-place pavement, including coring of the pavement and joints/cracks and developing an understanding of the deterioration causes and remedies.

As in the past, our Maplewood Specialty Offices are eager and willing to provide assistance in selecting the most appropriate rehabilitation strategy. Please contact the Bituminous, Concrete, Grading & Base, or Pavement Design Offices to utilize their experience and expertise.

Thanks for your cooperation. With a team effort, we will obtain better performing and more cost effective pavements.

cc: J.N. Meade
P. Hughes
District/Division Materials Engineers
District/Division Soils Engineers
Assistant District Engineers
Maplewood Specialty Offices
File

LCCA SUMMARY

SP #	Existing Pavement	Low Cost Option Selected	Design Life	Option Description	Present Worth per Rdway mile	Selected Option	Option Material	Options for Alternate Bid
1212-30	HMA	Alternate Bid	20	7" PCC Overlay	\$1,137,306.00		PCC	
			20	8" HMA w/Agg Base	\$719,756.00		HMA	✓
			35	8" PCC Overlay	\$1,098,922.00		PCC	✓
1305-23	HMA	Yes	15	3" HMA Overlay	\$390,112.00	✓	HMA	
			15	6" PCC Overlay	\$525,451.00		PCC	
1403-24	HMA	Alternate Bid	15	5" PCC Overlay	\$522,713.00		PCC	✓
			20	5" HMA Overlay	\$335,455.00		HMA	
			20	7" PCC Overlay	\$569,362.00		PCC	✓
			25	FDR w/8" HMA	\$400,576.00		HMA	
			25	5.5" HMA Reconstruction	\$450,698.00		HMA	
			35	7.5" PCC Reconstruction	\$505,968.00		PCC	
1802-48	HMA	Yes	15	3.5" HMA Overlay	\$359,440.00	✓	HMA	
			20	FDR w/4" HMA	\$376,989.00		HMA	
			20	5" PCC Overlay	\$499,364.00		PCC	
1928-64	HMA	Yes	20	12" PCC Overlay	\$864,635.00	✓	PCC	
			20	4"HMA Overlay	\$436,564.00		HMA	
1982-150	A. HMA	Yes	10	A. 3.5" HMA Overlay	\$788,954.00	✓	HMA	
	B. PCC		10	B. 4" HMA Overlay	\$625,235.00		HMA	
			20	A. FDR w/ 10" HMA	\$1,265,361.00		HMA	
			20	B. Rubblize w/8" HMA	\$1,083,722.00		HMA	
			20	A. 10.5" PCC Overlay	\$1,173,806.00		PCC	
			20	B. 7" PCC Overlay	\$889,209.00		PCC	
2006-27	HMA	Alternate Bid	15	3.5" HMA Overlay	\$272,631.00		HMA	
			20	SFDR w/4" HMA	\$273,553.00		HMA	✓
			20	FDR w/ 5" HMA	\$315,441.00		HMA	
			20	6" PCC Overlay	\$421,183.00		PCC	✓
2304-47	HMA	Yes	15	3" HMA Overlay	\$240,535.00	✓	HMA	
			20	6" PCC Overlay	\$458,072.00		PCC	
			20	4.5" HMA Overlay	\$271,557.00		HMA	
2312-14	HMA	Yes	15	3.5" HMA Overlay	\$270,454.00	✓	HMA	
			20	4.5" HMA Overlay	\$280,340.00		HMA	
			20	7" PCC Overlay	\$427,103.00		PCC	

SP #	Existing Pavement	Low Cost Option Selected	Design Life	Option Description	Present Worth per Rdway mile	Selected Option	Option Material	Options for Alternate Bid
2503-30	HMA	Exception*	10	1.5" HMA Overlay	\$226,356.00	✓	HMA	
			15	3" HMA Overlay	\$244,572.00		HMA	
			20	5" PCC Overlay	\$398,608.00		PCC	
			20	FDR w/ 5" HMA	\$312,638.00		HMA	
			20	SFDR w/ 4" HMA	\$358,746.00		HMA	
			30	6" PCC Overlay	\$421,183.00		PCC	
2509-22		Yes	16	4" HMA Overlay	\$263,156.00	✓	HMA	
			20	5.5" PCC Overlay	\$402,377.00		PCC	
			20	FDR w/ 4.5" HMA	\$272,690.00		HMA	
			20	SFDR / 7.5" HMA	\$300,825.00		HMA	
3612-21	HMA	Yes	15	5" HMA Overlay	\$464,793.00	✓	HMA	
			20	7" PCC Overlay	\$469,211.00		PCC	
			20	FDR w/7" HMA	\$557,947.00		HMA	
3706-39	HMA	Alternate Bid	20	7" PCC Overlay	\$1,071,274.00		PCC	
			20	8" HMA w/ Agg Base	\$636,968.00		HMA	✓
			35	8" PCC Overlay	\$912,789.00		PCC	✓
4306-15	PCC	Yes	15	4" HMA Overlay	\$523,803.00	✓	HMA	
			20	6" PCC Reconstruction	\$1,258,660.00		PCC	
			35	7" PCC Reconstruction	\$1,148,297.00		PCC	
			20	Rubblize w/ 6" HMA	\$632,301.00		HMA	
5008-30	HMA	Yes	17	4" HMA Overlay	\$268,871.00	✓	HMA	
			20	5" HMA Overlay	\$279,411.00		HMA	
			20	7.5" PCC Overlay	\$436,883.00		PCC	
5580-86	PCC	Yes	15	3" HMA overlay	\$236,914.00	✓	HMA	
			20	4.5" HMA Overlay	\$255,448.00		PCC	
			20	8.5" PCC overlay	\$486,286.00		PCC	
5609-09	HMA	Yes	15	6" PCC Overlay	\$501,530.00	✓	PCC	
			15	3" HMA Overlay	\$229,523.00		HMA	
			22	7.5" PCC Reconstruction	\$544,823.00		PCC	
			23	FDR w/ 5" HMA	\$393,433.00		HMA	
			25	5.5" HMA Reconstruction	\$393,433.00		HMA	
5680-126	PCC	Exception*	8	3" HMA Overlay	\$434,367.00	✓	HMA	
			9	3.5" HMA Overlay	\$406,459.00		HMA	
			9	1.5" HMA Overlay	\$175,964.00		HMA	
			20	7" PCC Overlay	\$453,924.00		PCC	
			20	5" HMA Overlay	\$491,744.00		HMA	
			25	8" HMA Reconstruction	\$582,977.00		HMA	

SP #	Existing Pavement	Low Cost Option Selected	Design Life	Option Description	Present Worth per Rdway mile	Selected Option	Option Material	Options for Alternate Bid
6012-44	PCC	Yes	17	3" HMA Overlay	\$476,011.00	✓	HMA	
			17	5" PCC Overlay	\$548,898.00		PCC	
			20	6" HMA Reconstruction	\$748,567.00		HMA	
			35	7" PCC Reconstruction	\$711,587.00		PCC	
6614-26	HMA	Yes	15	3.0" HMA Overlay	\$242,203.00	✓	HMA	
			20	5.5" PCC Overlay	\$382,055.00		PCC	
			20	FDR w/ 8" HMA	\$436,344.00		HMA	
6802-28	HMA	Yes	15	3" HMA Overlay	\$419,345.00	✓	HMA	
			18	4.5" HMA Overlay	\$446,685.00		HMA	
			20	FDR/ 4.5" HMA	\$401,211.00		HMA	
			20	6" PCC Reconstruction	\$640,986.00		PCC	
			35	6.5" Reconstruction	\$677,628.00		PCC	
7305-118	HMA	Yes	14	3" HMA Overlay	\$361,979.00	✓	HMA	
			15	5" PCC Overlay	\$494,825.00		PCC	
			15	3" HMA Overlay	\$329,745.00		HMA	
			17	5" PCC Overlay	\$447,748.00		PCC	
7380-222	HMA	Yes	15	4" HMA Overlay	\$551,296.00	✓	HMA	
			15	10.5" PCC Overlay	\$992,703.00		PCC	
7403-29	HMA	Yes	15	3" HMA Overlay	\$240,535.00	✓	HMA	
			20	4.5" HMA Overlay	\$269,445.00		HMA	
			20	5.5" PCC Overlay	\$420,248.00		PCC	
7404-09	HMA	Yes	15	3" HMA Overlay	\$257,517.00	✓	HMA	
			20	5.5" PCC Overlay	\$383,173.00		PCC	
			20	4.5" HMA Overlay	\$284,872.00		HMA	
7501-30	PCC	Exception*	14	3" HMA Overlay	\$210,297.00	✓	HMA	
			17	4.5" HMA Overlay	\$240,357.00		HMA	
			20	4.5" HMA Overlay	\$224,002.00		HMA	
			20	5" PCC Overlay	\$408,750.00		PCC	
			23	6" HMA Overlay	\$270,844.00		HMA	
			28	5.5" HMA Reconstruction	\$359,199.00		HMA	
			35	7" PCC Reconstruction	\$579,651.00		PCC	
7505-21	HMA	Yes	20	6.5" PCC Overlay	\$430,232.00	✓	PCC	
			20	CIR w/3" HMA Overlay	\$246,995.00		HMA	
7908-29	HMA	Yes	17	3" HMA Overlay	\$263,476.00	✓	HMA	
			17	5" Whitetopping	\$412,599.00		PCC	
			22	FDR w/ 5" HMA	\$332,601.00		HMA	

SP #	Existing Pavement	Low Cost Option Selected	Design Life	Option Description	Present Worth per Rdway mile	Selected Option	Option Material	Options for Alternate Bid
8001-38	HMA	Yes	12	2" HMA overlay	\$533,085.00	✓	HMA	
			20	5" PCC Overlay	\$747,842.00		PCC	
			20	5" HMA Overlay	\$594,962.00		HMA	
8707-51	HMA	Exception*	15	4" HMA Overlay	\$402,528.00	✓	HMA	
			20	6" PCC Overlay	\$475,075.00		PCC	
			20	CIR w/4" HMA	\$408,157.00		HMA	

* Exception: A signed exception form is attached to the report stating the reason that the low cost option wasn't selected.

Definitions:

HMA = Hot-Mix Asphalt
PCC = Portland Cement Concrete
FDR = Full-Depth Reclamation (recycle existing HMA and Base as new base)
SFDR = Stabilized Full-Depth Reclamation (recycle existing HMA and Base as new base w/ a stabilizer)
CIR = Cold-in-Place Recycling (Recycle a layer of existing HMA with Cold-Mix Asphalt)

Project Number	1212-30
Date	4/12/2011
Funding Category	2
Low Cost Option #	1
Chosen Option #	0

* Equivalent Annual Cost is included for information only.
 **Remaining Service Life Value is reported as a negative value.

District	Metro	Project Number	S.P. 1305-23
Performed By	D.Palmquist	Date	3/17/2011
Analysis Period	35	Funding Category	RS <input type="button" value="v"/>
Discount Rate	2.84	Low Cost Option #	1
		Chosen Option #	1

* Equivalent Annual Cost is included for information only.
 **Remaining Service Life Value is reported as a negative value.

Project Number	S.P. 1305-23		
Date	3/17/2011		
Funding Category	RS	▼	
Low Cost Option #	1/1/1900		
Chosen Option #	1/1/1900		

* Equivalent Annual Cost is included for information only.

Appendix 4

Scoping Cost Analysis T.H. 32												
(SP 1403-24)												
							4/8/2010	SKM				
							9/15/2010	SKM				
							11/2/2010	SKM				
	Givens:					INPUTS						
	Length =	18.526 miles				*Note: Aggregate shoulder quantities were not included in each option. Calculations are based on 35 yr. life cycle. Unit Prices are based off the 2009 Mn/DOT Avg. Bid Prices and the 2009 District 4 Contract Prices, as applicable.						
	Width of Road =	28 feet										
	1" Bituminous =	110 lbs/SY										
	Discount Rate =	2.84 %										
	Concrete Recon width=	27 feet										
Thickness												
(in.)	Bituminous Reclamation											
	Item	Course	Unit	Price/Unit	Total Cost	Description	Year	Cost/Mile	P/F	Present Worth	Annual Cost	
	10" Bit. Reclamation		SY	0.82	\$249,542.75	Initial Cost	0	\$327,439	1.000	\$327,439	\$14,885	
	Mill Bituminous 3.5"		SY	1.08	\$328,666.06	route & seal	3	\$2,000	0.919	\$1,839	\$84	
2	SPWEB340C	Wear	TON	44.97	\$1,505,381.85	chip seal	6	\$20,000	0.845	\$16,907	\$769	
2	SPWEB340C	Wear	TON	44.97	\$1,505,381.85	mill & 3" Overlay	25	\$120,000	0.497	\$59,584	\$2,709	
4	SPNWB330B	NonWear	TON	37.00	\$2,477,168.27	route & seal	27	\$2,000	0.469	\$939	\$43	
	Total Cost:				\$6,066,140.79	chip seal	29	\$20,000	0.444	\$8,878	\$404	
	Cost/Mile:				\$327,439.32	RSL	35	(\$40,000)	0.375	(\$15,010)	(\$682)	
	Total Present Worth:									\$400,576	\$18,210	
	Equivalent Annual Cost:									\$18,210		
	Mill & 5" Bituminous Overlay											
	Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost	
	Mill Bituminous 3"		SY	1.08	\$328,666.06	Initial Cost	0	\$220,885	1.000	\$220,885	\$10,041	
1.5	SPWEB340C	Wear	TON	44.97	\$1,129,036.39	route & seal	3	\$2,000	0.919	\$1,839	\$84	
1.5	SPWEB340C	Wear	TON	44.97	\$1,129,036.39	chip seal	6	\$20,000	0.845	\$16,907	\$769	
2	SPWEB340C	Wear	TON	44.97	\$1,505,381.85	2" mill & 4" overlay	20	\$148,000	0.571	\$84,532	\$3,843	
	Total Cost:				\$4,092,121	route & seal	22	\$2,000	0.540	\$1,080	\$49	
	Cost/Mile:				\$220,885	chip seal	24	\$20,000	0.511	\$10,213	\$464	
						RSL	35	\$0	0.375	\$0	\$0	
	Total Present Worth:									\$335,455	\$15,249	
	Equivalent Annual Cost:									\$15,249		
	7" Whitetopping											
	Item	Type	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost	
	Mill Bituminous 3"		SY	1.08	\$328,666.06	Initial Cost	0	\$404,784	1.000	\$404,784	\$18,401	
	Conc Pmnt Std Width		SY	4.50	\$1,369,441.92	Major CPR & plane	20	\$200,000	0.571	\$114,232	\$5,193	
7	Structural Concrete		CY	76.08	\$4,501,913.51	Bituminous Reconstruct	30	\$383,000	0.432	\$165,324	\$7,515	
	Dowel Bars	Epoxy	each	8.3	\$1,299,013.48	RSL	35	(\$306,400)	0.375	(\$114,978)	(\$5,227)	
	Total Cost:				\$7,499,035	Total Present Worth:					\$569,362	\$25,882
	Cost/Mile:				\$404,784	Equivalent Annual Cost:					\$25,882	
	Bituminous Reconstruct											
	Item	Type	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost	
1.5	SPWEB340C	Wear	TON	44.97	\$1,129,036.39	Initial Cost	0	\$382,565	1.000	\$382,565	\$17,391	
2	SPWEB340C	Wear	TON	44.97	\$1,505,381.85	route & seal	3	\$2,000	0.919	\$1,839	\$84	
2	SPWEB340C	NonWear	TON	44.97	\$1,505,381.85	chip seal	6	\$20,000	0.845	\$16,907	\$769	
14	Agg Base Class 5		CY	17.34	\$2,052,134.08	mill & 3" Overlay	25	\$120,000	0.497	\$59,584	\$2,709	
11	Select Granular		CY	9.63	\$895,462.86	route & seal	27	\$2,000	0.469	\$939	\$43	
	Total Cost:				\$7,087,397	chip seal	29	\$20,000	0.444	\$8,878	\$404	
	Cost/Mile:				\$382,565	RSL	35	(\$53,333)	0.375	(\$20,014)	(\$910)	
	Total Present Worth:									\$450,698	\$20,488	
	Equivalent Annual Cost:									\$20,488		
	7.5" Concrete Reconstruct											
	Item	Type	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost	
	Conc Pmnt Std Width		SY	4.50	\$1,320,533.28	Initial Cost	0	\$481,457	1.000	\$481,457	\$21,886	
7.5	Structural Concrete		CY	76.08	\$4,651,211.66	Minor CPR & plane	25	\$100,000	0.497	\$49,653	\$2,257	
	Dowel Bars	Epoxy	each	8.3	\$1,299,013.48	RSL	35	(\$67,000)	0.375	(\$25,142)	(\$1,143)	
5	Agg Base Class 5		CY	17.34	\$706,729.85	Total Present Worth:					\$505,968	\$23,001
12	Select Granular		CY	9.63	\$941,980.41	Equivalent Annual Cost:					\$23,001	
	Total Cost:				\$8,919,469							
	Cost/Mile:				\$481,457							

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5" Whitetopping											
	Item	Type	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
	Mill Bituminous 3"		SY	1.08	\$328,666.06	Initial Cost	0	\$265,236	1.000	\$265,236	\$12,057
	Conc Pmnt Std Width		SY	4.50	\$1,369,441.92	Major CPR & plane	15	\$200,000	0.657	\$131,401	\$5,973
5	Structural Concrete		CY	76.08	\$3,215,652.51	Bituminous Reconstruct	23	\$383,000	0.525	\$201,127	\$9,143
			Total Cost:		\$4,913,760	RSL	35	(\$200,000)	0.375	(\$75,051)	(\$3,412)
			Cost/Mile:		\$265,236		Total Present Worth:			\$522,713	\$23,762
							Equivalent Annual Cost:			\$23,762	


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District	Metro
Performed By	DAV
Analysis Period	35
Discount Rate	2.84

Project Number	1982-150
Date	4/6/2011
Funding Category	RS 
Low Cost Option #	1
Chosen Option #	A

District	Metro
Performed By	DAV
Analysis Period	35
Discount Rate	2.84

Project Number	1982-150
Date	4/6/2011
Funding Category	RS 
Low Cost Option #	1 & 2
Chosen Option #	1 & 2

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Cost Analysis/ TH 56(West Concord to Kenyon)

Givens:

Length =	9.149 miles		
Width of Road =	24 feet(Conc.)	24 feet(Bit.)	1/13/11 - TRM
1" Bituminous =	115 lbs/SY		
Interest Rate =	2.84 %		
Inflation Rate =	0 %		

MILL & 3.5" min. Bituminous Overlay

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
2" MILL BITUMINOUS		SY	0.80	\$103,054.34	Initial Cost	0	\$159,760	1.000	\$159,760	\$7,262
PATCH		Ton	100.00	\$36,596.00	Rout & seal	2	\$2,000	0.946	\$1,891	\$86
TACK COAT		GAL	1	\$25,763.58	Chipseal	4	\$20,000	0.894	\$17,881	\$813
3.5" SPWEB340B	Wear	TON	50.00	\$1,296,230.32	Mill & 3" Overlay	17	\$116,640	0.621	\$72,459	\$3,294
		Total Cost:		\$1,461,644	Rout & seal	19	\$2,000	0.587	\$1,175	\$53
		Cost/Mile:		\$159,760	Chipseal	21	\$20,000	0.555	\$11,108	\$505
					Mill & 3" Overlay	33	\$116,640	0.397	\$46,291	\$2,104
					Salvage Value	35	(\$101,088)	0.375	-\$37,934	-\$1,724
					Total Present Worth:				\$272,631	\$12,393
					Equivalent Annual Cost:				\$12,393	\$12,393

6" WHITETOPPING

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
3" MILL BITUMINOUS		SY	1.00	\$128,817.92	Initial Cost	0	\$300,567	1.000	\$300,567	\$13,663
Conc Std Width 6		SY	5.00	\$644,089.60	Minor CPR, plane	17	\$150,000	0.621	\$93,183	\$4,236
Structural Concrete		CY	65.77	\$1,412,059.10	4.5" Bit. Overlay	30	\$164,499	0.432	\$71,007	\$3,228
Reinforcement Bars	Epoxy	lb	0.80	\$45,525.42	Salvage Value	35	(\$116,117)	0.375	-\$43,574	-\$1,981
Dowel Bars	Epoxy	each	6.72	\$519,393.85	Total Present Worth:				\$421,183	\$19,146
		Total Cost:		\$2,749,886	Equivalent Annual Cost:				\$19,146	\$19,146
		Cost/Mile:		\$300,567						

RECLAMATION W/ 5" BITUMINOUS

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
2" MILL BITUMINOUS		SY	0.80	\$103,054.34	Initial Cost	0	\$233,376	1.000	\$233,376	\$10,609
RECLAMATION		SY	1.10	\$141,699.71	Rout & seal	4	\$2,000	0.894	\$1,788	\$81
Tack Coats		GAL	1.00	\$38,645.38	Chipseal	6	\$20,000	0.845	\$16,907	\$769
5" SPWEB340C	Wear	TON	50.00	\$1,851,757.60	Mill & 3" Overlay	22	\$116,640	0.540	\$62,992	\$2,864
		Total Cost:		\$2,135,157	Rout & seal	24	\$2,000	0.511	\$1,021	\$46
		Cost/Mile:		\$233,376	Chipseal	26	\$20,000	0.483	\$9,656	\$439
					Salvage Value	35	(\$27,445)	0.375	-\$10,299	-\$468
					Total Present Worth:				\$315,441	\$14,340
					Equivalent Annual Cost:				\$14,340	\$14,340

STABILIZED RECLAMATION W/ 4" BITUMINOUS

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
2" MILL BITUMINOUS		SY	0.80	\$103,054.34	Initial Cost	0	\$191,488	1.000	\$191,488	\$8,705
RECLAMATION		SY	1.10	\$141,699.71	Rout & seal	4	\$2,000	0.894	\$1,788	\$81
Tack Coats		GAL	1.00	\$25,763.58	Chipseal	6	\$20,000	0.845	\$16,907	\$769
4" SPWEB340C	Wear	TON	50.00	\$1,481,406.08	Mill & 3" Overlay	22	\$116,640	0.540	\$62,992	\$2,864
Emulsion		TON	470.00	\$626,634.77	Rout & seal	24	\$2,000	0.511	\$1,021	\$46
		Total Cost:		\$1,751,924	Chipseal	26	\$20,000	0.483	\$9,656	\$439
		Cost/Mile:		\$191,488	Salvage Value	35	(\$27,445)	0.375	-\$10,299	-\$468
					Total Present Worth:				\$273,553	\$12,435
					Equivalent Annual Cost:				\$12,435	\$12,435

Assumptions-

- Preventive Maintenance adds 1 year of life to thin overlays and 2 years to medium overlays and Reclaimed pavements
- Each successive overlay has 1 year less life than previous one on a section.
- Reclaim design calls for milling 3" of existing bituminous-reclaim 6" of existing bituminous with 6" existing aggregate base-overlay with 5" of new bituminous.
- Thin overlay -10 years life, medium overlay-15 years, heavy bit. overlay-17 years, reclamation overlay-20 years, whitetopping-30 years.
- Aggregate and shoulder quantities were not included in each option.
- Calculations are based on 35 year life cycle.
- Costs are based upon recent district project costs.

Cost Analysis/ TH 16(Houston to Rushford)

Givens:

Length = 10.252 miles
 Width of Road = 24 feet(Conc.) 24 feet(Bit.) 2/17/10-TRM
 1" Bituminous = 115 lbs/SY
 Interest Rate = 2.84 %
 Inflation Rate = 0 %

MILL & 3" min. Bituminous Overlay(15 Year Fix)

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
1.5" MILL BITUMINOUS		SY	0.50	\$72,174.08	Initial Cost	0	\$123,152	1.000	\$123,152	\$5,598
PATCH		Ton	100.00	\$41,008.00	Rout & seal	2	\$2,000	0.946	\$1,891	\$86
TACK COAT		GAL	\$1.00	\$28,869.63	Chipseal	4	\$20,000	0.894	\$17,881	\$813
3" SPWEB340B	Wear	TON	45.00	\$1,120,502.59	Mill & 3" Overlay	17	\$123,152	0.621	\$76,504	\$3,478
					Rout & seal	19	\$2,000	0.587	\$1,175	\$53
					Chipseal	21	\$20,000	0.555	\$11,108	\$505
					Mill & 3" Overlay	33	\$123,152	0.397	\$48,876	\$2,222
					Salvage Value	35	(\$106,732)	0.375	-\$40,052	-\$1,821
					Total Present Worth:				\$240,535	\$10,934
					Equivalent Annual Cost:				\$10,934	\$10,934

6" WHITETOPPING(20 Year Fix)

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
3" MILL BITUMINOUS		SY	1.12	\$161,669.94	Initial Cost	0	\$339,233	1.000	\$339,233	\$15,421
Conc Std Width 6		SY	7.00	\$1,010,437.12	Minor CPR	17	\$150,000	0.621	\$93,183	\$4,236
Structural Concrete		CY	71.31	\$1,715,577.88	3.5" Bit. Overlay	30	\$141,368	0.432	\$61,022	\$2,774
Reinforcement Bars	Epoxy	lb	0.82	\$52,289.30	Salvage Value	35	(\$94,245.33)	0.375	-\$35,366	-\$1,608
Dowel Bars	Epoxy	each	6.21	\$537,841.24						
					Total Present Worth:				\$458,072	\$20,823
					Equivalent Annual Cost:				\$20,823	\$20,823

MILL 3" & 4.5" min. Bituminous Overlay(20 Year Fix)

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
3" MILL BITUMINOUS		SY	1.25	\$180,435.20	Initial Cost	0	\$185,768	1.000	\$185,768	\$8,445
PATCH		Ton	100.00	\$0.00	Rout & seal	2	\$2,000	0.946	\$1,891	\$86
TACK COAT		GAL	\$1.00	\$43,304.45	Chipseal	4	\$20,000	0.894	\$17,881	\$813
4.5" SPWEB340B	Wear	TON	45.00	\$1,680,753.89	Mill & 3" Overlay	22	\$123,152	0.540	\$66,508	\$3,023
					Rout & seal	25	\$2,000	0.497	\$993	\$45
					Chipseal	27	\$20,000	0.469	\$9,390	\$427
					Salvage Value	35	(\$28,977)	0.375	-\$10,874	-\$494
					Total Present Worth:				\$271,557	\$12,345
					Equivalent Annual Cost:				\$12,345	\$12,345

Assumptions-

1. Preventive Maintenance adds 1 year of life to thin overlays and 2 years to medium overlays and Reclaimed pavements
2. Each successive overlay has 1 year less life than previous one on a section.
3. Thin overlay -10 years life, medium overlay-15 years, heavy bit. overlay-20 years, reclamation overlay-20 years, whitetopping-20 years.
4. Aggregate and shoulder quantities were not included in each option.
5. Calculations are based on 35 year life cycle.
6. Costs are based upon recent district project costs.

Cost Analysis/ TH 56(T.H. 63 to Leroy E. CL)

Givens:

Length = 6.368 miles
Width of Road = 24 feet(Conc.) 24 feet(Bit.) 6/07/11-TRM
1" Bituminous = 113 lbs/SY
Interest Rate = 2.84 %
Inflation Rate = 0 %

2" MILL & 3.5" min. Bituminous Overlay

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
2" MILL BITUMINOUS		SY	\$0.50	\$44,830.72	Initial Cost	0	\$153,072	1.000	\$153,072	\$6,958
PATCH		Ton	\$100.00	\$25,472.00	Rout & seal	2	\$2,000	0.946	\$1,891	\$86
TACK COAT		GAL	\$1.00	\$17,932.29	Chipseal	4	\$20,000	0.894	\$17,881	\$813
3.5" SPWEB340B	Wear	TON	\$50.00	\$886,527.49	Mill & 3" Overlay	17	\$123,152	0.621	\$76,504	\$3,478
					Rout & seal	19	\$2,000	0.587	\$1,175	\$53
					Chipseal	21	\$20,000	0.555	\$11,108	\$505
					Mill & 3" Overlay	33	\$123,152	0.397	\$48,876	\$2,222
					Remaining Life Value	35	(\$106,732)	0.375	-\$40,052	-\$1,821
									\$270,454	\$12,294
									\$12,294	\$12,294

7" WHITETOPPING-doweled

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
3" MILL BITUMINOUS		SY	\$1.12	\$100,420.81	Initial Cost	0	\$314,110	1.000	\$314,110	\$14,279
Conc Std Width 7		SY	\$5.00	\$448,307.20	Major CPR	20	\$150,000	0.571	\$85,674	\$3,895
Dowel Bars	Epoxy	each	\$5.20	\$279,743.69	3.5" Bit. Overlay	30	\$146,032	0.432	\$63,036	\$2,866
Structural Concrete		CY	\$65.77	\$1,140,093.03	Rout & seal	32	\$2,000	0.408	\$816	\$37
Reinforcement Bars	Epoxy	lb	\$0.80	\$31,687.17	Remaining Life Value	35	(\$97,355)	0.375	-\$36,533	-\$1,661
Total Cost:				\$2,000,252	Total Present Worth:				\$427,103	\$19,416
Cost/Mile:				\$314,110	Equivalent Annual Cost:				\$19,416	\$19,416

MILL & 4.5" min. Bituminous Overlay

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
1.5" MILL BITUMINOUS		SY	\$0.50	\$44,830.72	Initial Cost	0	\$194,256	1.000	\$194,256	\$8,831
PATCH		Ton	\$100.00	\$25,472.00	Rout & seal	2	\$2,000	0.946	\$1,891	\$86
TACK COAT		GAL	\$1.00	\$26,898.43	Chipseal	4	\$20,000	0.894	\$17,881	\$813
4.5" SPWEB340B	Wear	TON	\$50.00	\$1,139,821.06	Mill & 3" Overlay	22	\$123,152	0.540	\$66,508	\$3,023
					Rout & seal	24	\$2,000	0.511	\$1,021	\$46
					Chipseal	26	\$20,000	0.483	\$9,656	\$439
					Remaining Life Value	35	(\$28,977)	0.375	-\$10,874	-\$494
									\$280,340	\$12,744
									\$12,744	\$12,744

- Preventive Maintenance adds 1 year of life to thin overlays and 2 years to medium overlays and Reclaimed pavements
- Each successive overlay has 1 year less life than previous one on a section.
- Thin overlay -10 years life, medium overlay-15 years, heavy bit. overlay over bituminous-20 years, reclamation -20 years, whitetopping-20 years.
- Aggregate and shoulder quantities were not included in each option.
- Calculations are based on 35 year life cycle.
- Costs are based upon recent district project costs.

- RECLAMATION W/4.5" BITUMINOUS

* Equivalent Annual Cost is included for information only.

**Remaining Service Life Value is reported as a negative value.

Project Number	1212-30
Date	4/12/2011
Funding Category	2
Low Cost Option #	1
Chosen Option #	0

* Equivalent Annual Cost is included for information only.
 **Remaining Service Life Value is reported as a negative value.

District	7
Performed By	C. Bower
Analysis Period	50
Discount Rate	2.7

Project Number	4306-15
Date	12/5/2011
Funding Category	RD
Low Cost Option #	1
Chosen Option #	1

District	7
Performed By	C. Bower
Analysis Period	50
Discount Rate	2.7

OPTION #1					OPTION #2					OPTION #3					OPTION #4				
DESCRIPTION					DESCRIPTION					DESCRIPTION					DESCRIPTION				
4" Bituminous Mill and Overlay					Reconstruct 6" PCC (Inplace Conc. 20' - O/L not possible)					Reconstruct 7" PCC (Inplace Conc. 20' - O/L not possible)					Rubblize Concrete, then 6" Bituminous Construction				
Year	#	Life	DESIGN LIFE	TYPE	Year	#	Life	DESIGN LIFE	TYPE	Year	#	Life	DESIGN LIFE	TYPE	Year	#	Life	DESIGN LIFE	TYPE
0			Initial Construction	\$ 159,719	0			Initial Construction	\$ 1,070,564	0			Initial Construction	\$ 1,070,565	0			Initial Construction	\$ 454,560
1				\$ -	1				\$ -	1				\$ -	1				\$ -
2				\$ -	2				\$ -	2				\$ -	2				\$ -
3	AA		Crack Treatment	\$ 5,000	3				\$ -	3				\$ -	3				\$ -
4				\$ -	4				\$ -	4				\$ -	4				\$ -
5				\$ -	5				\$ -	5				\$ -	5				\$ -
6				\$ -	6				\$ -	6				\$ -	6				\$ -
7	BD		Chip Seal	\$ 20,000	7				\$ -	7				\$ -	7				\$ -
8				\$ -	8				\$ -	8				\$ -	8	AA		Crack Treatment	\$ 5,000
9				\$ -	9				\$ -	9				\$ -	9				\$ -
10				\$ -	10				\$ -	10				\$ -	10				\$ -
11				\$ -	11				\$ -	11				\$ -	11				\$ -
12				\$ -	12				\$ -	12				\$ -	12	BD		Chip Seal	\$ 20,000
13				\$ -	13	BB		1st CPR (20 yr design)	\$ 26,355	13				\$ -	13				\$ -
14				\$ -	14				\$ -	14				\$ -	14				\$ -
15	BA		4" Mill and 4" Overlay	\$ 159,719	15				\$ -	15				\$ -	15				\$ -
16				\$ -	16				\$ -	16				\$ -	16				\$ -
17				\$ -	17				\$ -	17	BF		1st CPR (35 yr design)	\$ 18,640	17				\$ -
18	AA		Crack Treatment	\$ 5,000	18				\$ -	18				\$ -	18				\$ -
19				\$ -	19				\$ -	19				\$ -	19				\$ -
20				\$ -	20				\$ -	20				\$ -	20	AJ		2" Mill & 3" Overlay	\$ 125,632
21				\$ -	21				\$ -	21				\$ -	21				\$ -
22	BD		Chip Seal	\$ 20,000	22				\$ -	22				\$ -	22				\$ -
23				\$ -	23				\$ -	23				\$ -	23	AA		Crack Treatment	\$ 5,000
24				\$ -	24				\$ -	24				\$ -	24				\$ -
25				\$ -	25	BC		2nd CPR (20 yr design)	\$ 128,266	25				\$ -	25				\$ -
26				\$ -	26				\$ -	26				\$ -	26				\$ -
27				\$ -	27				\$ -	27	BG		2nd CPR (35 yr design)	\$ 72,000	27	BD		Chip Seal	\$ 20,000
28				\$ -	28				\$ -	28				\$ -	28				\$ -
29	BA		4" Mill and 4" Overlay	\$ 159,719	29				\$ -	29				\$ -	29				\$ -
30				\$ -	30				\$ -	30				\$ -	30				\$ -
31				\$ -	31				\$ -	31				\$ -	31				\$ -
32	AA		Crack Treatment	\$ 5,000	32				\$ -	32				\$ -	32				\$ -
33				\$ -	33				\$ -	33				\$ -	33				\$ -
34				\$ -	34				\$ -	34				\$ -	34				\$ -
35				\$ -	35	AY		Unbonded Concrete Overlay	\$ 396,367	35				\$ -	35	BH		3.5" Mill and 4" Overlay	\$ 164,224
36	BD		Chip Seal	\$ 20,000	36				\$ -	36				\$ -	36				\$ -
37				\$ -	37				\$ -	37				\$ -	37				\$ -
38				\$ -	38				\$ -	38				\$ -	38	AA		Crack Treatment	\$ 5,000
39				\$ -	39				\$ -	39				\$ -	39				\$ -
40				\$ -	40				\$ -	40	AS		Major CPR (15)	\$ 120,115	40				\$ -
41				\$ -	41				\$ -	41				\$ -	41				\$ -
42	BE		Reconstruct BAB	\$ 654,000	42				\$ -	42				\$ -	42	BD		Chip Seal	\$ 20,000
43				\$ -	43				\$ -	43				\$ -	43				\$ -
44				\$ -	44				\$ -	44				\$ -	44				\$ -
45	AA		Crack Treatment	\$ 5,000	45				\$ -	45				\$ -	45				\$ -
46				\$ -	46				\$ -	46				\$ -	46				\$ -
47				\$ -	47				\$ -	47				\$ -	47				\$ -
48				\$ -	48	BB		1st CPR (20 yr design)	\$ 26,355	48				\$ -	48				\$ -
49	BD		Chip Seal	\$ 20,000	49				\$ -	49				\$ -	49				\$ -
50			Remaining Service Life Value**	\$ (305,200)	50			Remaining Service Life Value**	\$ (226,495.43)	50			Remaining Service Life Value**	\$ (40,038.33)	50			Remaining Service Life Value**	\$ -
Total Present Worth				\$ 525,803	Total Present Worth				\$ 1,258,660	Total Present Worth				\$ 1,148,297	Total Present Worth				\$ 632,301
Eq. Annual Cost*				\$19,287	Eq. Annual Cost*				\$46,169	Eq. Annual Cost*				\$42,121	Eq. Annual Cost*				\$23,193
% of Low Cost				100%	% of Low Cost				239%	% of Low Cost				218%	% of Low Cost				120%

* Equivalent Annual Cost is included for information only.

** Remaining Service Life Value is reported as a negative value.

Original LCCA dated 1/24/08 was revised to meet state statutes.

* Equivalent Annual Cost is included for information

Cost Analysis/ TH 218(Iowa to I-90)

Givens:

Length = 12.195 miles
 Width of Road = 24 feet(Conc.) 24 feet(Bit.) 2/05/10-TRM
 1" Bituminous = 111 lbs/SY
 Interest Rate = 2.84 %
 Inflation Rate = 0 %

MILL 2" & 4" min. Bituminous Overlay(17 Year Fix)

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
2" MILL BITUMINOUS		SY	0.68	\$116,759.81	Initial Cost	0	\$157,050	1.000	\$157,050	\$7,139
PATCH		Ton	100.00	\$48,780.00	Rout & seal	2	\$2,000	0.946	\$1,891	\$86
TACK COAT		GAL	1.00	\$34,341.12	Chipseal	4	\$20,000	0.894	\$17,881	\$813
4" SPWEB340B	Wear	TON	45.00	\$1,715,338.94	Mill & 3" Overlay	19	\$123,152	0.587	\$72,337	\$3,288
Total Cost:				\$1,915,220	Rout & seal	21	\$2,000	0.555	\$1,111	\$50
Cost/Mile:				\$157,050	Chipseal	23	\$20,000	0.525	\$10,503	\$477
					Mill & 3" Overlay	33	\$123,152	0.397	\$48,876	\$2,222
					Remaining Life Value	35	(\$108,664)	0.375	-\$40,777	-\$1,854
					Total Present Worth:				\$268,871	\$12,223
					Equivalent Annual Cost:				\$12,223	\$12,223

7.5" Unbonded Overlay(20 Year Fix)

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
6" MILL BITUMINOUS		SY	2.00	\$343,411.20	Initial Cost	0	\$340,391	1.000	\$340,391	\$15,474
PASSRC		Ton	58.54	\$0.00	Minor CPR	20	\$150,000	0.571	\$85,674	\$3,895
Conc Std Width 7.5		SY	5.00	\$858,528.00	4.5" Bit. Overlay	33	\$164,499	0.397	\$65,285	\$2,968
Structural Concrete		CY	65.77	\$2,352,724.44	Remaining Life Value	35	(\$145,146)	0.375	-\$54,467	-\$2,476
Reinforcement Bars	Epoxy	lb	0.80	\$60,682.32	Total Present Worth:				\$436,883	\$19,860
Dowel Bars	Epoxy	each	5.20	\$535,721.47	Equivalent Annual Cost:				\$19,860	\$19,860
Total Cost:				\$4,151,067						
Cost/Mile:				\$340,391						

MILL 2" & 5" min. Bituminous Overlay(20 Year Fix)

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
2" MILL BITUMINOUS		SY	0.68	\$116,759.81	Initial Cost	0	\$193,622	1.000	\$193,622	\$8,802
PATCH		Ton	100.00	\$48,780.00	Rout & seal	2	\$2,000	0.946	\$1,891	\$86
TACK COAT		GAL	1.00	\$51,511.68	Chipseal	4	\$20,000	0.894	\$17,881	\$813
5" SPWEB340B	Wear	TON	45.00	\$2,144,173.68	Mill & 3" Overlay	22	\$123,152	0.540	\$66,508	\$3,023
Total Cost:				\$2,361,225	Rout & seal	25	\$2,000	0.497	\$993	\$45
Cost/Mile:				\$193,622	Chipseal	27	\$20,000	0.469	\$9,390	\$427
					Remaining Life Value	35	(\$28,977)	0.375	-\$10,874	-\$494
					Total Present Worth:				\$279,411	\$12,702
					Equivalent Annual Cost:				\$12,702	\$12,702

1. Preventive Maintenance adds 1 year of life to thin overlays and 2 years to medium and heavy BOB's and Reclaimed pavements
2. Each successive overlay has 1 year less life than previous one on a section.
3. Thin overlay -10 years life, medium overlay-15 years, heavy bit. overlay-17 years & 20 years, reclamation overlay-20 years, unbonded-20 years.
4. Aggregate and shoulder quantities were not included in each option.
5. Calculations are based on 35 year life cycle.
6. Costs are based upon recent district project costs.

Cost Analysis I-90 WB(Marion to Stewartville)

Givens:

Length = 13.52 miles

Width of Road = 24 feet(Conc.)

1" Bituminous = 115 lbs/SY

Interest Rate = 2.84 %

Inflation Rate = 0 %

***Note:** Aggregate and shoulder quantities were not included in each option.

***Note:** Calculations are based on 35 yr. life cycle.

REVISÉ TO MEET STATE STATUTES

MILL 3" & 3" min. Bituminous Overlay(15 Year Fix)											
Item	Course	Unit	Price/Unit	Total Cost		Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
1.5" MILL BITUMINOUS		SY	0.50	\$95,180.80		Initial Cost	0	\$123,152	1.000	\$123,152	\$5,598
PATCH		Ton	100.00	\$54,080.00		Rout & seal	2	\$2,000	0.946	\$1,891	\$86
TACK COAT		GAL	1	\$38,072.32		Mill & 3" Overlay	15	\$123,152	0.657	\$80,912	\$3,678
3" SPWEB440B	Wear	TON	45.00	<u>\$1,477,681.92</u>		Rout & seal	19	\$2,000	0.587	\$1,175	\$53
		Total Cost:		\$1,665,015		Mill & 3" Overlay	29	\$123,152	0.444	\$54,669	\$2,485
		Cost/Mile:		\$123,152		Remaining Life Value	35	(\$66,313)	0.375	<u>-\$24,884</u>	<u>-\$1,131</u>
						Total Present Worth:				\$236,914	\$10,770
						Equivalent Annual Cost:				\$10,770	\$10,770
MILL 3" & 4.5" min. Bituminous Overlay(20 Year Fix)											
Item	Course	Unit	Price/Unit	Total Cost		Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
3" MILL BITUMINOUS		SY	1.10	\$209,397.76		Initial Cost	0	\$182,248	1.000	\$182,248	\$8,285
PATCH		Ton	100.00	\$0.00		Rout & seal	3	\$2,000	0.919	\$1,839	\$84
TACK COAT		GAL	1	\$38,072.32		Mill & 3" Overlay	20	\$123,152	0.571	\$70,340	\$3,198
4.5" SPWEB440B	Wear	TON	45.00	<u>\$2,216,522.88</u>		Rout & seal	24	\$2,000	0.511	\$1,021	\$46
		Total Cost:		\$2,463,993		Remaining Life Value	35	\$0	0.375	<u>\$0</u>	<u>\$0</u>
		Cost/Mile:		\$182,248		Total Present Worth:				\$255,448	\$11,612
						Equivalent Annual Cost:				\$11,612	\$11,612
8.5" Unbonded Concrete Overlay(20 Year Fix)											
Item	Course	Unit	Price/Unit	Total Cost		Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
2" MILL BITUMINOUS		SY	0.58	\$110,409.73		Initial Cost	0	\$405,279	1.000	\$405,279	\$18,423
PASSRC		Ton	46.42	\$626,343.20		Minor CPR, plane	22	\$150,000	0.540	\$81,008	\$3,682
Conc Std Width 8		SY	5.00	\$951,808.00		Remaining Life Value	35	\$0	0.375	<u>\$0</u>	<u>\$0</u>
Structural Concrete		CY	65.77	\$2,955,991.46		Total Present Worth:				\$486,286	\$22,106
Reinforcement Bars	Epoxy	lb	0.80	\$67,275.52		Equivalent Annual Cost:				\$22,106	\$22,106
Dowel Bars	Epoxy	each	6.72	<u>\$767,537.97</u>							
		Total Cost:		\$5,479,366							
		Cost/Mile:		\$405,279							

1. Preventive Maintenance adds 1 year of life to thin overlays and 2 years to medium overlays and Reclaimed pavements
2. Each successive overlay has 1 year less life than previous one on a section.
3. Thin overlay -10 years life, medium overlay-15 years, heavy bit. overlay-20 years, reclamation overlay-20 years, unbonded-20 years.
4. Aggregate and shoulder quantities were not included in each option.
5. Calculations are based on 35 year life cycle.
6. Costs are based upon recent district project costs.

Scoping Cost Analysis T.H. 29											
(SP 5609-09)											
Givens:											
Length =		14.197 miles		INPUTS							
Width of Road =		24 feet		*Note: Aggregate and shoulder quantities were not included in each option.							
1" Bituminous =		110 lbs/SY		Calculations are based on 35 yr. life cycle.							
Discount Rate =		2.84 %		Unit Prices are based off the 2009 Mn/DOT Avg. Bid Prices and the 2009 District 4 Contract Prices, as applicable.							
Thickness											
Bituminous Reclamation											
(in.)	Item	Course	Unit	Price/Unit	Total Cost	Description	Year	Cost/Mile	P/F	Present Worth	Annual Cost
	Mill Bituminous 4"		SY	1.42	\$283,849.14	Initial Cost	0	\$240,960	1.000	\$240,960	\$10,954
	12" Bit. Reclamation		SY	0.82	\$163,912.88	rout & seal	3	\$2,000	0.919	\$1,839	\$84
2	SPWEB340C	Wear	TON	49.45	\$1,087,322.11	chip seal	6	\$20,000	0.845	\$16,907	\$769
2	SPWEB340C	Wear	TON	49.45	\$1,087,322.11	mill & 3" Overlay	23	\$103,000	0.525	\$54,089	\$2,459
1.5	SPNWB330B	NonWear	TON	48.42	\$798,505.61	rout & seal	25	\$2,000	0.497	\$993	\$45
			Total:		\$3,420,912	chip seal	27	\$20,000	0.469	\$9,390	\$427
			Cost/Mile:		\$240,960	RSL	35	(\$20,600)	0.375	(\$7,730)	(\$351)
								Total Present Worth:		\$316,447	\$14,385
								Equivalent Annual Cost:		\$14,385	
Mill & Pave 3"											
	Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
	Mill Bituminous 3"		SY	1.08	\$215,885.26	Initial Cost	0	\$102,443	1.000	\$102,443	\$4,657
1.5	SPWEB340B	Wear	TON	37.55	\$619,245.88	rout & seal	3	\$2,000	0.919	\$1,839	\$84
1.5	SPWEB340B	Wear	TON	37.55	\$619,245.88	chip seal	6	\$20,000	0.845	\$16,907	\$769
			Total Cost:		\$1,454,377	mill & 3" Overlay	15	\$103,000	0.657	\$67,672	\$3,076
			Cost/Mile:		\$102,443	rout & seal	17	\$2,000	0.621	\$1,242	\$56
						chip seal	19	\$20,000	0.587	\$11,748	\$534
						mill & 3" Overlay	29	\$103,000	0.444	\$45,723	\$2,079
						RSL	35	(\$48,100)	0.375	(\$18,050)	(\$821)
								Total Present Worth:		\$229,523	\$10,434
								Equivalent Annual Cost:		\$10,434	
6" Whitetopping											
	Item	Type	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
	Mill Bituminous 4"		SY	1.42	\$283,849.14	Initial Cost	0	\$261,888	1.000	\$261,888	\$11,905
	Conc Pvmnt Std Width		SY	4.50	\$899,521.92	Major CPR & plane	15	\$200,000	0.657	\$131,401	\$5,973
6	Structural Concrete		CY	76.08	\$2,534,652.88	Bituminous Reconstruct	23	\$328,000	0.525	\$172,245	\$7,830
			Total Cost:		\$3,718,024	RSL	35	(\$170,560)	0.375	(\$64,004)	(\$2,910)
			Cost/Mile:		\$261,888			Total Present Worth:		\$501,530	\$22,799
								Equivalent Annual Cost:		\$22,799	
Bituminous Reconstruct											
	Item	Type	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
2	SPWEB340C	Wear	TON	49.45	\$1,087,322.11	Initial Cost	0	\$327,705	1.000	\$327,705	\$14,897
2	SPWEB340C	Wear	TON	49.45	\$1,087,322.11	rout & seal	6	\$2,000	0.845	\$1,691	\$77
1.5	SPNWB330B	NonWear	TON	48.42	\$798,505.61	chip seal	8	\$20,000	0.799	\$15,986	\$727
8	Agg Base Class 5		CY	17.34	\$770,257.29	mill & 3" Overlay	25	\$103,000	0.497	\$51,143	\$2,325
17	Select Granular		CY	9.63	\$909,016.87	rout & seal	27	\$2,000	0.469	\$939	\$43
			Total Cost:		\$4,652,424	chip seal	29	\$20,000	0.444	\$8,878	\$404
			Cost/Mile:		\$327,705	RSL	35	(\$34,400)	0.375	(\$12,909)	(\$587)
								Total Present Worth:		\$393,433	\$17,885
								Equivalent Annual Cost:		\$17,885	
7.5" Concrete Reconstruct, 27' width											
	Item	Type	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
	Conc Pvmnt Std Width		SY	4.50	\$899,521.92	Initial Cost	0	\$435,753	1.000	\$435,753	\$19,809
7.5	Structural Concrete		CY	76.08	\$3,168,316.10	Joint Reseal & Minor CPR	17	\$100,000	0.621	\$62,122	\$2,824
	Dowel Bars	Epoxy	each	8.30	\$995,470.92	Minor CPR	27	\$100,000	0.469	\$46,949	\$2,134
5	Agg Base Class 5		CY	17.34	\$481,410.81	RSL	35	\$0	0.375	\$0	\$0
12	Select Granular		CY	9.63	\$641,658.97			Total Present Worth:		\$544,823	\$24,767
								Equivalent Annual Cost:		\$24,767	
			Total Cost:		\$6,186,379						
			Cost/Mile:		\$435,753						

Amended Scoping Cost Analysis TH 94
S.P. 5680-126

Givens:

Length =

13.408 miles

Width of Road =

24 feet

1" Bituminous =

110 lbs/SY

Discount Rate =

2.84 %

Updated

3/31/2010

5/7/2010

skm

INPUTS

*Note: Aggregate and shoulder quantities were not included in each option.

Calculations are based on 35 yr. life cycle.

Unit Prices are based off the 2009 Mn/DOT Avg. Bid Prices and

the 2009 District 4 Contract Prices, as applicable.

Thickness

(in.) mill 3.5" /fill 3.5"

Item	Course	Unit	Price/Unit	Total Cost	Description	Year	Cost/Mile	P/F	Present Worth	Annual Cost
3.5	mill pavement	SY	1.25	\$235,980.80	Initial Cost	0	\$160,438	1.000	\$160,438	\$7,293
3.5	SPWEB540E	Wear	52.70	\$1,915,172.98	2" mill and overlay	9	\$93,000	0.777	\$72,281	\$3,286
					1.5" overlay	15	\$62,000	0.657	\$40,734	\$1,852
					4.5" mill and overlay	20	\$206,000	0.571	\$117,659	\$5,349
					1.5" mill and fill	32	\$70,000	0.408	\$28,570	\$1,299
					RSL	35	(\$35,000)	0.375	(\$13,134)	(\$597)
					Total Present Worth:					\$406,549
					Equivalent Annual Cost:					\$18,481

(in.) mill 5" /fill 5"

Item	Course	Unit	Price/Unit	Total Cost	Description	Year	Cost/Mile	P/F	Present Worth	Annual Cost
5	mill pavement	SY	1.75	\$330,373.12	Initial Cost	0	\$228,694	1.000	\$228,694	\$10,396
5	SPWEB540E	Wear	52.70	\$2,735,961.40	patch	6	\$20,000	0.845	\$16,907	\$769
					patch	11	\$20,000	0.735	\$14,698	\$668
					unbonded	20	\$397,000	0.571	\$226,751	\$10,308
					minor cpr	33	\$100,000	0.397	\$39,687	\$1,804
					RSL	35	(\$93,250)	0.375	(\$34,953)	(\$1,591)
					Total Present Worth:					\$491,744
					Equivalent Annual Cost:					\$22,354

mill 1.5" and overlay 3"

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
1.5	mill bituminous	SY	0.58	\$330,373.12	Initial Cost	0	\$130,599	1.000	\$130,599	\$5,937
3	SPWEB540E	Wear	52.70	\$1,641,576.84	3" mill and overlay	8	\$138,000	0.799	\$110,302	\$5,014
					1.5" overlay	15	\$62,000	0.657	\$40,734	\$1,852
					6" mill and overlay	21	\$275,000	0.555	\$152,732	\$6,943
					1.5" mill and fill	35	\$70,000	0.375	\$26,268	\$1,194
					RSL	35	(\$70,000)	0.375	(\$26,268)	(\$1,194)
					Total Present Worth:					\$434,367
					Equivalent Annual Cost:					\$19,746

7" UBOL

Item	Type	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
1	mill bituminous 5"	SY	1.75	\$330,373.12	Initial Cost	0	\$396,808	1.000	\$396,808	\$18,038
	PASSRC	TON	28.25	\$407,598.33	Major CPR & plane	20	\$200,000	0.571	\$114,232	\$5,193
	Conc Pvmt Std Width	SY	4.50	\$849,530.88	RSL	35	\$0	0.375	\$0	\$0
7	Structural Concrete	CY	76.08	\$2,792,754.11	Total Present Worth:					\$511,040
	Dowel Bars	Epoxy each	8.3	\$940,147.51	Equivalent Annual Cost:					\$23,231
					Total Cost:					\$5,320,404
					Cost/Mile:					\$396,808

Bituminous Reconstruct

Item	Type	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
2	SPWEB540F	Wear	TON	\$1,183,679.69	Initial Cost	0	\$494,771	1.000	\$494,771	\$22,492
2	SPWEB540F	Wear	TON	\$1,183,679.69	rout & seal	3	\$2,000	0.919	\$1,839	\$84
4	SPNWB540B	NonWear	TON	\$2,367,359.39	chip seal	6	\$20,000	0.845	\$16,907	\$769
12	Agg Base Class 5	CY	17.34	\$1,091,175.22	mill & 3" Overlay	25	\$138,000	0.497	\$68,522	\$3,115
16	Select Granular	CY	9.63	\$807,998.26	rout & seal	27	\$2,000	0.469	\$939	\$43
Total Cost:				\$6,633,892	RSL	35	\$0	0.375	\$0	\$0
Cost/Mile:				\$494,771	Total Present Worth:		\$582,977		\$26,501	
					Equivalent Annual Cost:					

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
1.5	SPWEB540E	Wear	TON	\$820,788.42	Initial Cost	0	\$61,216	1.000	\$61,216	\$2,783
					thin overlay	9	\$62,000	0.777	\$48,187	\$2,191
					thin overlay	18	\$62,000	0.604	\$37,452	\$1,703
					thin overlay	27	\$62,000	0.469	\$29,108	\$1,323
					RSL	35	\$0	0.375	\$0	\$0
Total Cost:				\$820,788	Total Present Worth:		\$175,964		\$7,999	
Cost/Mile:				\$61,216	Equivalent Annual Cost:					

Thin Overlay

Mn/DOT DISTRICT 2 REHABILITATION WORKSHEET

(General Pre-Scoping / Planning Estimate)

TH 75 State Project 6012-44

Funding category		RS	Alternate #1	Alternate #2	Alternate #3	Alternate #4
Description ---->			3" MILL & OVERLAY	NEW CONC.	NEW BIT	
		YR				
First Cost \$ / Mile			\$149,626	\$589,625	\$647,236	
Rehab Life in Yrs			35	35	35	35
Interest %			2.84%	2.84%	2.84%	3.10%
Notes: Last Revised 11/25/08 (A, F, G, H, I, J, K, L) Last Revised 3/31/10 (B, C, D, E) 2-Lane Highway		1	\$0	\$0	\$0	\$0
		2	\$0	\$0	\$0	\$0
Improvements		3	\$0	\$0	\$0	\$0
		4	\$0	\$0	\$0	\$0
Cost / mile		5	\$0	\$0	\$0	\$0
A Reclaim		6	\$0	\$0	\$0	\$0
B 1 1/2" Overlay		7	\$0	\$0	\$0	\$0
C 1 1/2" Mill & 1 1/2" Overlay		8	\$0	\$0	\$0	\$0
D 2" Mill & Overlay		9	\$0	\$0	\$0	\$0
E 3" Mill & 3" Overlay		10	G \$45,500	G \$45,500		\$0
F Route and Seal		11	\$0	\$0	\$0	\$0
G Chip seal		12	\$0	\$0	\$0	\$0
H Joint seal & minor CPR		13	\$0	\$0	\$0	\$0
I Minor CPR w/ full depth repair		14	\$0	\$0	\$0	\$0
J Major CPR & gridding		15	\$0	\$0	\$0	\$0
K Microsurface		16	\$0	\$0	\$0	\$0
L New Concrete		17	\$0	H \$91,120	\$0	\$0
M 5.5" mill, conc rehab, 5" new		18	\$0	\$0	\$0	\$0
		19	\$0	\$0	\$0	\$0
		20	M \$425,510	D \$0	\$100,000	\$0
		21	\$0	\$0	\$0	\$0
		22	\$0	\$0	\$0	\$0
		23	\$0	\$0	\$0	\$0
		24	\$0	\$0	\$0	\$0
		25	\$0	\$0	\$0	\$0
		26	\$0	\$0	\$0	\$0
		27	\$0	I \$201,000	G \$45,500	\$0
		28	\$0	\$0	\$0	\$0
		29	\$0	\$0	\$0	\$0
		30	C \$68,000	\$0	\$0	\$0
		31	\$0	\$0	\$0	\$0
		32	\$0	\$0	\$0	\$0
		33	\$0	\$0	E \$141,200	\$0
		34	\$0	\$0	\$0	\$0
		35	\$0	\$0	\$0	\$0
		36	\$0	\$0	\$0	\$0
		37	\$0	\$0	\$0	\$0
		38	\$0	\$0	\$0	\$0
		39	\$0	\$0	\$0	\$0
		40	\$0	\$0	\$0	\$0
		41	\$0	\$0	\$0	\$0
		42	\$0	\$0	\$0	\$0
		43	\$0	\$0	\$0	\$0
		44	\$0	\$0	\$0	\$0
		45	\$0	\$0	\$0	\$0
		46	\$0	\$0	\$0	\$0
		47	\$0	\$0	\$0	\$0
		48	\$0	\$0	\$0	\$0
		49	\$0	\$0	\$0	\$0
Total Cost (Present Worth)			\$456,400	\$740,597	\$816,139	\$0
Annual Cost (Present Worth)			\$20,747	\$33,667	\$37,101	\$1,000,000
% Above Low Option			100%	162%	179%	4820%

Data Furnished By:

Completed By:

Date:

KO

6/7/2010

Cost Analysis/ TH 246(T.H. 3 to CSAH 26)

Givens:

Length = 12.232 miles
 Width of Road = 24 feet(Conc.) 24 feet(Bit.) 2/01/10-TRM
 1" Bituminous = 115 lbs/SY
 Interest Rate = 2.84 %
 Inflation Rate = 0 %

MILL & 3" min. Bituminous Overlay(15 Year Fix)

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
1.5" MILL BITUMINOUS		SY	0.57	\$98,169.14	Initial Cost	0	\$124,138	1.000	\$124,138	\$5,643
PATCH		Ton	100.00	\$48,928.00	Rout & seal	2	\$2,000	0.946	\$1,891	\$86
TACK COAT		GAL	1	\$34,445.31	Chipseal	4	\$20,000	0.894	\$17,881	\$813
3" SPWEB340B	Wear	TON	45.00	\$1,336,908.67	Mill & 3" Overlay	17	\$124,138	0.621	\$77,117	\$3,506
					Rout & seal	19	\$2,000	0.587	\$1,175	\$53
					Chipseal	21	\$20,000	0.555	\$11,108	\$505
					Mill & 3" Overlay	33	\$124,138	0.397	\$49,267	\$2,240
					Remaining Life Value	35	(\$107,586)	0.375	-\$40,372	-\$1,835
					Total Present Worth:				\$242,203	\$11,010
					Equivalent Annual Cost:				\$11,010	\$11,010

5.5" WHITETOPPING(20 Year Fix)

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
3" MILL BITUMINOUS		SY	1.12	\$192,893.75	Initial Cost	0	\$289,384	1.000	\$289,384	\$13,155
Conc Std Width 5.5		SY	5.00	\$861,132.80	Minor CPR	21	\$150,000	0.555	\$83,308	\$3,787
Structural Concrete		CY	65.77	\$1,730,440.10	3.5" Bit. Overlay	33	\$142,354	0.397	\$56,496	\$2,568
Reinforcement Bars	Epoxy	lb	0.80	\$60,866.43	Remaining Life Value	35	(\$125,606)	0.375	-\$47,135	-\$2,143
Dowel Bars	Epoxy	each	6.72	\$694,417.49						
					Total Present Worth:				\$382,055	\$17,368
					Equivalent Annual Cost:				\$17,368	\$17,368

RECLAMATION W/ 8.5" BITUMINOUS(20 Year Fix)

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
2.5" MILL BITUMINOUS		SY	0.65	\$111,947.26	Initial Cost	0	\$350,891	1.000	\$350,891	\$15,951
RECLAMATION		SY	1.10	\$189,449.22	Rout & seal	4	\$2,000	0.894	\$1,788	\$81
Tack Coats		GAL	1.00	\$34,445.31	Chipseal	6	\$20,000	0.845	\$16,907	\$769
8.5" SPWEB340C	Wear	TON	47.00	\$3,956,259.37	Mill & 3" Overlay	22	\$124,138	0.540	\$67,041	\$3,048
					Rout & seal	24	\$2,000	0.511	\$1,021	\$46
					Chipseal	26	\$20,000	0.483	\$9,656	\$439
					Remaining Life Value	35	(\$29,209)	0.375	-\$10,961	-\$498
					Total Present Worth:				\$436,344	\$19,836
					Equivalent Annual Cost:				\$19,836	\$19,836

Assumptions-

- Preventive Maintenance adds 1 year of life to thin overlays and 2 years to medium overlays and Reclaimed pavements
- Each successive overlay has 1 year less life than previous one on a section.
- Reclaim design calls for milling 2.5" of existing bituminous-reclaim 5" of existing bituminous with 5" existing aggregate base-overlay with 8.5" of new bituminous.
- Thin overlay -10 years life, medium overlay-15 years, heavy bit. overlay-17 years, reclamation overlay-20 years, whitetopping-20 years.
- Aggregate and shoulder quantities were not included in each option.
- Calculations are based on 35 year life cycle.
- Costs are based upon recent district project costs.

District	2
Performed By	J Bltmann
Analysis Period	35
Discount Rate	2.84

Project Number	6802-28
Date	5/24/2011
Funding Category	RS
Low Cost Option #	1
Chosen Option #	

District	2
Performed By	J Bltmann
Analysis Period	35
Discount Rate	2.84

Project Number	6802-28
Date	5/24/2011
Funding Category	RS
Low Cost Option #	
Chosen Option #	1/1/1900

OPTION #1				OPTION #2				OPTION #3				OPTION #4				OPTION #5			
DESCRIPTION				DESCRIPTION				DESCRIPTION				DESCRIPTION				DESCRIPTION			
FDR w/New Structure 4.5" OL				New Concrete Structure 6.5"				New Concrete Structure 6.0"				3" Mill & 4.5" Overlay				1.5" Mill & 3" Overlay			
Year	#	Life	TYPE	Year	#	Life	TYPE	Year	#	Life	TYPE	Year	#	Life	TYPE	Year	#	Life	TYPE
0	1		\$ 293,700	0	1		\$ 622,400	0	1		\$ 567,700	0	1		\$ 251,900	0	1		\$ 190,900
1	1		\$ -	1	1		\$ -	1	1		\$ -	1	1		\$ -	1	1		\$ -
2	1		\$ -	2	1		\$ -	2	1		\$ -	2	1		\$ -	2	1		\$ -
3	1		\$ -	3	1		\$ -	3	1		\$ -	3	1		\$ -	3	1		\$ -
4	1		\$ -	4	1		\$ -	4	1		\$ -	4	1		\$ -	4	1		\$ -
5	1		\$ -	5	1		\$ -	5	1		\$ -	5	1		\$ -	5	1		\$ -
6	1		\$ -	6	1		\$ -	6	1		\$ -	6	1		\$ -	6	1		\$ -
7	1		\$ -	7	1		\$ -	7	1		\$ -	7	1		\$ -	7	1		\$ -
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35	1		\$ -	35	1		\$ -	35	1		\$ -	35	1		\$ -	35	1		\$ -
Total Present Worth				Total Present Worth				Total Present Worth				Total Present Worth				Total Present Worth			
\$ 401,211				\$ 677,628				\$ 640,966				\$ 446,685				\$ 419,345			
\$18,238				\$30,802				\$29,138				\$20,306				\$19,063			
100%				169%				160%				111%				105%			
Equivalent Annual Cost is included for information only.				Equivalent Annual Cost is included for information only.				Equivalent Annual Cost is included for information only.				Equivalent Annual Cost is included for information only.				Equivalent Annual Cost is included for information only.			

District	3 - Baxter
Performed By	D. Nelson
Analysis Period	35
Discount Rate	2.84

Project Number	7305-118 TH 23
Date	5/16/2011
Funding Category	RS
Low Cost Option #	3
Chosen Option #	3

District	3 - Baxter
Performed By	D. Nelson
Analysis Period	35
Discount Rate	2.84


OPTION #1										OPTION #2										OPTION #3										OPTION #4									
DESCRIPTION										DESCRIPTION										DESCRIPTION										DESCRIPTION									
3" Mill & Fill ML, 1.5" Mill & Fill Shldr										5" Concrete Whitetopping ML, 3" Bit Shldr										3" Mill & Fill ML, 1.5" Mill & Fill Shldr										5" Concrete Whitetopping ML, 3" Bit Shldr									
DESIGN LIFE		TYPE		DESIGN LIFE		TYPE		DESIGN LIFE		TYPE		DESIGN LIFE		TYPE		DESIGN LIFE		TYPE		DESIGN LIFE		TYPE		DESIGN LIFE		TYPE		DESIGN LIFE		TYPE		DESIGN LIFE		TYPE		DESIGN LIFE		TYPE	
Year	#	Life	Cost/Mile	Year	#	Life	Cost/Mile	Year	#	Life	Cost/Mile	Year	#	Life	Cost/Mile	Year	#	Life	Cost/Mile	Year	#	Life	Cost/Mile	Year	#	Life	Cost/Mile	Year	#	Life	Cost/Mile	Year	#	Life	Cost/Mile	Year	#	Life	Cost/Mile
0	BB	3" Mill & Fill ML, 1.5" Mill & Fill	\$ 163,398	0	AX	Concrete Whitetopping	\$ 275,194	0	BB	3" Mill & Fill ML, 1.5" Mill & Fill	\$ 163,398	0	AX	Concrete Whitetopping	\$ 275,194	0	BB	3" Mill & Fill ML, 1.5" Mill & Fill	\$ 163,398	0	AX	Concrete Whitetopping	\$ 275,194	0	AX	Concrete Whitetopping	\$ 275,194	0	AX	Concrete Whitetopping	\$ 275,194	0	AX	Concrete Whitetopping	\$ 275,194	0	AX	Concrete Whitetopping	\$ 275,194
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4	AB	Surface Treatment	\$ 25,000	4			\$ -	4			\$ -	4			\$ -	4			\$ -	4			\$ -	4			\$ -	4			\$ -	4			\$ -	4			\$ -
5			\$ -	5			\$ -	5	AA	Crack Treatment	\$ 4,000	5	AA	Crack Treatment	\$ 4,000	5			\$ -	5			\$ -	5			\$ -	5			\$ -	5			\$ -	5			\$ -
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9	AA	Crack Treatment	\$ 4,000	9			\$ -	9	AB	Surface Treatment	\$ 25,000	9	AB	Surface Treatment	\$ 25,000	9			\$ -	9			\$ -	9			\$ -	9			\$ -	9			\$ -	9			\$ -
10			\$ -	10	AP	Minor CPR (6'X6')	\$ 40,000	10			\$ -	10			\$ -	10			\$ -	10			\$ -	10			\$ -	10			\$ -	10			\$ -	10			\$ -
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14	BC	3.0" Mill & Fill - ML Only	\$ 135,194	14			\$ -	14			\$ -	14			\$ -	14			\$ -	14			\$ -	14			\$ -	14			\$ -	14			\$ -	14			\$ -
15			\$ -	15			\$ -	15	BC	3.0" Mill & Fill - ML Only	\$ 135,194	15	BC	3.0" Mill & Fill - ML Only	\$ 135,194	15			\$ -	15			\$ -	15			\$ -	15			\$ -	15			\$ -	15			\$ -
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18	AB	Surface Treatment	\$ 25,000	18			\$ -	18			\$ -	18			\$ -	18			\$ -	18			\$ -	18			\$ -	18			\$ -	18			\$ -	18			\$ -
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22			\$ -	22	BF	Rem and Rep Conc Surf	\$ 325,967	22			\$ -	22			\$ -	22			\$ -	22			\$ -	22			\$ -	22			\$ -	22			\$ -	22			\$ -
23	AA	Crack Treatment	\$ 4,000	23			\$ -	23			\$ -	23			\$ -	23			\$ -	23			\$ -	23			\$ -	23			\$ -	23			\$ -	23			\$ -
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27	BD	1.5" ML Mill & Fill, 1.5" OL Full V	\$ 157,027	27			\$ -	27			\$ -	27			\$ -	27			\$ -	27			\$ -	27			\$ -	27			\$ -	27			\$ -	27			\$ -
28			\$ -	28			\$ -	28			\$ -	28			\$ -	28			\$ -	28			\$ -	28			\$ -	28			\$ -	28			\$ -	28			\$ -
29			\$ -	29			\$ -	29			\$ -	29	BD	1.5" ML Mill & Fill, 1.5" OL Full V	\$ 157,027	29			\$ -	29			\$ -	29			\$ -	29			\$ -	29			\$ -	29			\$ -
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31	AB	Surface Treatment	\$ 25,000	31			\$ -	31			\$ -	31			\$ -	31			\$ -	31			\$ -	31			\$ -	31			\$ -	31			\$ -	31			\$ -
32			\$ -	32	AP	Minor CPR (6'X6')	\$ 40,000	32			\$ -	32			\$ -	32			\$ -	32			\$ -	32			\$ -	32			\$ -	32			\$ -	32			\$ -
33			\$ -	33			\$ -	33			\$ -	33	AA	Crack Treatment	\$ 4,000	33			\$ -	33			\$ -	33			\$ -	33			\$ -	33			\$ -	33			\$ -
34			\$ -	34			\$ -	34			\$ -	34			\$ -	34			\$ -	34			\$ -	34			\$ -	34			\$ -	34			\$ -	34			\$ -
35		Remaining Service Life Value**	\$ (52,342)	35			\$ -	35			\$ (133,350)	35			\$ (84,553)	35			\$ -	35			\$ -	35			\$ -	35			\$ -	35			\$ -	35			\$ (108,656)
Total Present Worth										Total Present Worth										Total Present Worth										Total Present Worth									
Eq. Annual Cost*										Eq. Annual Cost*										Eq. Annual Cost*										Eq. Annual Cost*									
\$ 361,979										\$ 447,748										\$ 329,745										\$ 494,825									
110%										136%										100%										150%									

* Equivalent Annual Cost is included for information only.

**Remaining Service Life Value is reported as a negative value.

* Equivalent Annual Cost is included for information

District	3
Performed By	CD
Analysis Period	35
Discount Rate	2.84

Project Number	7380-222		
Date	6/15/2011		
Funding Category	RS		
Low Cost Option #	1		
Chosen Option #	1		

[illegible]

Cost Analysis/ TH 30/S.P. 7403-29(T.H. 13 to Ellendale)

Givens:

Length = 8.959 miles
 Width of Road = 24 feet(Conc.) 24 feet(Bit.) 3/02/10-TRM
 1" Bituminous = 115 lbs/SY
 Interest Rate = 2.84 %
 Inflation Rate = 0 %

REVISED TO MEET MN STATE STATUTE 174.185

MILL & 3" min. Bituminous Overlay(15 Year Fix)

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
1.5" MILL BITUMINOUS		SY	0.50	\$63,071.36	Initial Cost	0	\$123,152	1.000	\$123,152	\$5,598
PATCH		Ton	100.00	\$35,836.00	Rout & seal	2	\$2,000	0.946	\$1,891	\$86
TACK COAT		GAL	\$1.00	\$25,228.54	Chipseal	4	\$20,000	0.894	\$17,881	\$813
3" SPWEB340B	Wear	TON	45.00	\$979,182.86	Mill & 3" Overlay	17	\$123,152	0.621	\$76,504	\$3,478
				Total Cost:	Rout & seal	19	\$2,000	0.587	\$1,175	\$53
				Cost/Mile:	Chipseal	21	\$20,000	0.555	\$11,108	\$505
					Mill & 3" Overlay	33	\$123,152	0.397	\$48,876	\$2,222
					Remaining Life Value	35	(\$106,732)	0.375	-\$40,052	-\$1,821
					Total Present Worth:				\$240,535	\$10,934
					Equivalent Annual Cost:				\$10,934	\$10,934

5.5" WHITETOPPING(20 Year Fix)

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
3" MILL BITUMINOUS		SY	1.12	\$141,279.85	Initial Cost	0	\$325,277	1.000	\$325,277	\$14,787
Conc Std Width 5.5		SY	7.00	\$882,999.04	Minor CPR	20	\$150,000	0.571	\$85,674	\$3,895
Structural Concrete		CY	71.31	\$1,374,172.43	3.5" Bit. Overlay	33	\$141,368	0.397	\$56,105	\$2,550
Reinforcement Bars	Epoxy	lb	0.82	\$45,694.48	Remaining Life Value	35	(\$124,736)	0.375	-\$46,808	-\$2,128
Dowel Bars	Epoxy	each	6.21	\$470,007.77	Total Present Worth:				\$420,248	\$19,104
				Total Cost:	Equivalent Annual Cost:				\$19,104	\$19,104
				Cost/Mile:						
				\$2,914,154						
				\$325,277						

MILL 3" & 4.5" Bituminous Overlay(20 Year Fix)

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
3" MILL BITUMINOUS		SY	1.10	\$138,756.99	Initial Cost	0	\$183,656	1.000	\$183,656	\$8,349
PATCH		Ton	100.00	\$0.00	Rout & seal	2	\$2,000	0.946	\$1,891	\$86
TACK COAT		GAL	\$1.00	\$37,842.82	Chipseal	4	\$20,000	0.894	\$17,881	\$813
4" SPWEB340B	Wear	TON	45.00	\$1,468,774.30	Mill & 3" Overlay	22	\$123,152	0.540	\$66,508	\$3,023
				Total Cost:	Rout & seal	25	\$2,000	0.497	\$993	\$45
				Cost/Mile:	Chipseal	27	\$20,000	0.469	\$9,390	\$427
					Remaining Life Value	35	(\$28,977)	0.375	-\$10,874	-\$494
					Total Present Worth:				\$269,445	\$12,249
					Equivalent Annual Cost:				\$12,249	\$12,249

Assumptions-

- Preventive Maintenance adds 1 year of life to thin overlays and 2 years to medium overlays and Reclaimed pavements
- Each successive overlay has 1 year less life than previous one on a section.
- Thin overlay -10 years life, medium overlay-15 years, heavy bit. overlay-20 years, reclamation overlay-20 years, whitetopping-20 years.
- Aggregate and shoulder quantities were not included in each option.
- Calculations are based on 35 year life cycle.
- Costs are based upon recent district project costs.

Cost Analysis/ TH 30 From N. Jct. T.H. 218 to 1 Mi. E. CSAH 45-S.P. 7404-09

Givens:

Length = 7.572 miles
 Width of Road = 24 feet(Conc.) 24 feet(Bit.) 6/07/11-TRM
 1" Bituminous = 113 lbs/SY
 Interest Rate = 2.84 %
 Inflation Rate = 0 %

1.5" MILL & 3" min. Bituminous Overlay

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
1.5" MILL BITUMINOUS		SY	\$0.50	\$53,306.88	Initial Cost	0	\$133,184	1.000	\$133,184	\$6,054
PATCH		Ton	\$100.00	\$30,288.00	Rout & seal	2	\$2,000	0.946	\$1,891	\$86
TACK COAT		GAL	\$1.00	\$21,322.75	Chipseal	4	\$20,000	0.894	\$17,881	\$813
3" SPWEB340B	Wear	TON	\$50.00	\$903,551.62	Mill & 3" Overlay	17	\$133,184	0.621	\$82,736	\$3,761
				Total Cost:	Rout & seal	19	\$2,000	0.587	\$1,175	\$53
				\$1,008,469	Chipseal	21	\$20,000	0.555	\$11,108	\$505
				Cost/Mile:	Mill & 3" Overlay	33	\$133,184	0.397	\$52,857	\$2,403
				\$133,184	Remaining Life Value	35	(\$115,426)	0.375	-\$43,314	-\$1,969
					Total Present Worth:				\$257,517	\$11,706
					Equivalent Annual Cost:				\$11,706	\$11,706

5.5" WHITETOPPING-undoweled

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
3" MILL BITUMINOUS		SY	\$1.12	\$119,407.41	Initial Cost	0	\$270,180	1.000	\$270,180	\$12,282
Conc Std Width 5.5		SY	\$5.00	\$533,068.80	Major CPR	20	\$150,000	0.571	\$85,674	\$3,895
Structural Concrete		CY	\$65.77	\$1,355,650.82	3.5" Bit. Overlay	30	\$146,032	0.432	\$63,036	\$2,866
Reinforcement Bars	Epoxy	lb	\$0.80	\$37,678.27	Rout & seal	32	\$2,000	0.408	\$816	\$37
				Total Cost:	Remaining Life Value	35	(\$97,355)	0.375	-\$36,533	-\$1,661
				\$2,045,805	Total Present Worth:				\$383,173	\$17,419
				Cost/Mile:	Equivalent Annual Cost:				\$17,419	\$17,419
				\$270,180						

MILL & 4.5" min. Bituminous Overlay

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
1.5" MILL BITUMINOUS		SY	\$0.50	\$53,306.88	Initial Cost	0	\$194,256	1.000	\$194,256	\$8,831
PATCH		Ton	\$100.00	\$30,288.00	Rout & seal	2	\$2,000	0.946	\$1,891	\$86
TACK COAT		GAL	\$1.00	\$31,984.13	Chipseal	4	\$20,000	0.894	\$17,881	\$813
4.5" SPWEB340B	Wear	TON	\$50.00	\$1,355,327.42	Mill & 3" Overlay	22	\$133,184	0.540	\$71,926	\$3,270
				Total Cost:	Rout & seal	24	\$2,000	0.511	\$1,021	\$46
				\$1,470,906	Chipseal	26	\$20,000	0.483	\$9,656	\$439
				Cost/Mile:	Remaining Life Value	35	(\$31,337)	0.375	-\$11,759	-\$535
				\$194,256	Total Present Worth:				\$284,872	\$12,950
					Equivalent Annual Cost:				\$12,950	\$12,950

1. Preventive Maintenance adds 1 year of life to thin overlays and 2 years to medium overlays and Reclaimed pavements
2. Each successive overlay has 1 year less life than previous one on a section.
3. Thin overlay -10 years life, medium overlay-15 years, heavy bit. overlay-20 years, reclamation -20 years, whitetopping-20 years.
4. Aggregate and shoulder quantities were not included in each option.
5. Calculations are based on 35 year life cycle.

Amended Scoping Cost Analysis TH 9 (SP 7501-30)

3/31/2010

Givens:

Length = 11.16 miles
Width of Road = 24 feet
1" Bituminous = 110 lbs/SY
Interest Rate = 2.84 %
Inflation Rate = 0 %

*Note: Aggregate and shoulder quantities were not included in each option.
Calculations are based on 35 yr. life cycle.
Unit Prices are based off the 2009 Mn/DOT Avg. Bid Prices and
the 2009 District 4 Contract Prices, as applicable.

1.5" MILL AND 3" OVERLAY

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
1.5" MILL BITUMINOUS		SY	0.58	\$91,137.02	Initial Cost	0	\$95,403	1.000	\$95,403	\$4,337
3" SPWEB340B	Wear	TON	37.55	\$973,555.55	Route & seal	2	\$2,000	0.946	\$1,891	\$86
					chip seal	5	\$20,000	0.869	\$17,387	\$790
					Mill & 2" Overlay	14	\$69,000	0.676	\$46,621	\$2,119
					Route & seal	16	\$2,000	0.639	\$1,278	\$58
					chip seal	18	\$20,000	0.604	\$12,081	\$549
					Mill & 1.5" Overlay	25	\$52,000	0.497	\$25,820	\$1,174
					Route & seal	27	\$2,000	0.469	\$939	\$43
					chip seal	29	\$20,000	0.444	\$8,878	\$404
					Salvage Value	35	\$0	0.375	\$0	\$0
				Total Cost:						
				Cost/Mile:						
									Total Present Worth:	\$210,297
									Equivalent Annual Cost:	\$9,560


1.5" MILL AND 4.5" OVERLAY

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
1.5" MILL BITUMINOUS		SY	0.58	\$91,137.02	Initial Cost	0	\$139,021	1.000	\$139,021	\$6,320
4.5" SPWEB340B	Wear	TON	37.55	\$1,460,333.32	Route & seal	2	\$2,000	0.946	\$1,891	\$86
					Chip seal	5	\$20,000	0.869	\$17,387	\$790
					Mill & 2" Overlay	17	\$69,000	0.621	\$42,864	\$1,949
					Route & seal	19	\$2,000	0.587	\$1,175	\$53
					Chip seal	21	\$20,000	0.555	\$11,108	\$505
					Mill & 1.5" Overlay	28	\$52,000	0.457	\$23,739	\$1,079
					Route & seal	30	\$2,000	0.432	\$863	\$39
					Chip seal	32	\$20,000	0.408	\$8,163	\$371
					Salvage Value	35	(\$15,600)	0.375	-\$5,854	-\$266
				Total Cost:						
				Cost/Mile:						
									Total Present Worth:	\$240,357
									Equivalent Annual Cost:	\$10,926

MILL to concrete & 4.5" Bituminous Overlay

Item	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
4.5" MILL BITUMINOUS	SY	1.58	\$248,269.82	Initial Cost	0	\$153,101	1.000	\$153,101	\$6,960
4.5" SPWEB340B	TON	37.55	<u>\$1,460,333.32</u>	route & seal	2	\$2,000	0.946	\$1,891	\$86
	Total Cost:		<u>\$1,708,603</u>	chip seal	5	\$20,000	0.869	\$17,387	\$790
	Cost/Mile:		\$153,101	Mill & 2" Overlay	20	\$52,000	0.571	\$29,700	\$1,350
				route & seal	22	\$2,000	0.540	\$1,080	\$49
				chip seal	25	\$20,000	0.497	\$9,931	\$451
				Mill & 1.5" Overlay	31	\$52,000	0.420	\$21,826	\$992
				Route & seal	33	\$2,000	0.397	\$794	\$36
				Salvage Value	35	(\$31,200)	0.375	-\$11,708	-\$532
Total Present Worth:								\$224,002	\$10,183
Equivalent Annual Cost:								\$10.183	

[illegible]

Project Number	7505-21		
Date	4/22/2011		
Funding Category	RS		
Low Cost Option #	1		
Chosen Option #	1		

Cost Analysis/ US 63(JCT CR-78 to US 61 in Lake City)

Givens:

Length = 6.655 miles
 Width of Road = 24 feet(Conc.) 24 feet(Bit.) 8/12/10 - TRM
 1" Bituminous = 115 lbs/SY
 Interest Rate = 2.84 %
 Inflation Rate = 0 %

MILL & 3" min. Bituminous Overlay

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
1.5" MILL BITUMINOUS	SY		0.60	\$56,221.44	Initial Cost	0	\$136,704	1.000	\$136,704	\$6,214
PATCH	Ton		100.00	\$26,620.00	Rout & seal	2	\$2,000	0.946	\$1,891	\$86
TACK COAT	GAL		1	\$18,740.48	Chipseal	4	\$20,000	0.894	\$17,881	\$813
3" SPWEB340B	Wear	TON	50.00	\$808,183.20	Mill & 3" Overlay	17	\$136,704	0.621	\$84,923	\$3,860
					Rout & seal	19	\$2,000	0.587	\$1,175	\$53
					Chipseal	21	\$20,000	0.555	\$11,108	\$505
					Mill & 3" Overlay	33	\$136,704	0.397	\$54,254	\$2,466
					Salvage Value	35	(\$118,477)	0.375	-\$44,459	-\$2,021
									Total Present Worth:	\$263,476
									Equivalent Annual Cost:	\$11,977

5" undoweled WHITETOPPING

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
3" MILL BITUMINOUS	SY		1.00	\$93,702.40	Initial Cost	0	\$243,796	1.000	\$243,796	\$11,083
Conc Std Width 6	SY		5.00	\$468,512.00	Minor CPR, plane	17	\$150,000	0.621	\$93,183	\$4,236
Structural Concrete	CY		65.77	\$1,027,134.47	4.5" Bit. Overlay	22	\$161,000	0.540	\$86,948	\$3,953
Reinforcement Bars	Epoxy	lb	0.80	\$33,115.28	Salvage Value	35	(\$30,188)	0.375	-\$11,328	-\$515
									Total Present Worth:	\$412,599
									Equivalent Annual Cost:	\$18,756

RECLAMATION W/ 5" BITUMINOUS

Item	Course	Unit	Price/Unit	Total Cost	Strategy	Year	Cost/Mile	P/F	Present Worth	Annual Cost
2" MILL BITUMINOUS	SY		0.80	\$74,961.92	Initial Cost	0	\$241,472	1.000	\$241,472	\$10,977
RECLAMATION	SY		1.10	\$103,072.64	Rout & seal	4	\$2,000	0.894	\$1,788	\$81
Tack Coats	GAL		1.00	\$28,110.72	Chipseal	6	\$20,000	0.845	\$16,907	\$769
5" SPWEB340C	Wear	TON	52.00	\$1,400,850.88	Mill & 3" Overlay	22	\$136,704	0.540	\$73,827	\$3,356
					Rout & seal	24	\$2,000	0.511	\$1,021	\$46
					Chipseal	26	\$20,000	0.483	\$9,656	\$439
					Salvage Value	35	(\$32,166)	0.375	-\$12,070	-\$549
									Total Present Worth:	\$332,601
									Equivalent Annual Cost:	\$15,120

Assumptions-

1. Preventive Maintenance adds 1 year of life to thin overlays and 2 years to medium overlays and Reclaimed pavements
2. Each successive overlay has 1 year less life than previous one on a section.
3. Reclaim design calls for milling 3" of existing bituminous-reclaim 4.5" of existing bituminous with 6" existing aggregate base-overlay with 5" of new bituminous.
4. Thin overlay -10 years life, medium overlay-15 years, heavy bit. overlay-17 years, reclamation overlay-20 years, whitetopping-30 years.
5. Aggregate and shoulder quantities were not included in each option.
6. Calculations are based on 35 year life cycle.
7. Costs are based upon recent district project costs.

Life Cycle Cost Analysis - Rehabilitation (Cost/Mile)

S.P. - 8001-38

Soils Engineer: Chad DeMenge

Major Fixes are greater than \$25,000.00

T.H. 10

Interest Rate: 2.84

Inflation Rate: 0.00

Discount Rate: 2.84

Date 7/1/10

Option 1 2.0" Mill and 2.0" Overlay					Option 2 2.0" Bit Mill, 3.0" Conc Mill, 5.0" Overlay					Option 3 2.0" Bit Mill, 3.0" Conc Mill and 5.0" Concrete				
Year	Description of Work	Future Value	Present Value	Annualized	Description of Work	Future Value	Present Value	Annualized	Description of Work	Future Value	Present Value	Annualized		
0	2.0" Mill and 2.0" Overlay	107184	107184	6046	2.0" Bit Mill, 3.0" Conc Mill, 5.0"	270380	270380	15252	2.0" Bit Mill, 3.0" Conc Mill and 5.0"	472626	472626	26660		
1		0	0	0		0	0	0		0	0	0		
2		0	0	0		0	0	0		0	0	0		
3		0	0	0		0	0	0		0	0	0		
4		0	0	0		0	0	0		0	0	0		
5		0	0	0		0	0	0		0	0	0		
6		0	0	0		0	0	0		0	0	0		
7		0	0	0		0	0	0		0	0	0		
8		0	0	0		0	0	0		0	0	0		
9		0	0	0		0	0	0		0	0	0		
10		0	0	0		0	0	0		0	0	0		
11		0	0	0		0	0	0		0	0	0		
12	7.0" Concrete Reconstruction	500576	357705	20178	7.0" Concrete Reconstruction	500576	285910	16128	7.0" Concrete Reconstruction	500576	285910	16128		
13		0	0	0		0	0	0		0	0	0		
14		0	0	0		0	0	0		0	0	0		
15		0	0	0		0	0	0		0	0	0		
16		0	0	0		0	0	0		0	0	0		
17		0	0	0		0	0	0		0	0	0		
18		0	0	0		0	0	0		0	0	0		
19		0	0	0		0	0	0		0	0	0		
20		0	0	0		0	0	0		0	0	0		
21		0	0	0		0	0	0		0	0	0		
22		0	0	0		0	0	0		0	0	0		
23		0	0	0		0	0	0		0	0	0		
24		0	0	0		0	0	0		0	0	0		
25		0	0	0		0	0	0		0	0	0		
26		0	0	0		0	0	0		0	0	0		
27		0	0	0		0	0	0		0	0	0		
28		0	0	0		0	0	0		0	0	0		
29	Joint Reseal and Minor CPR	100000	44392	2504		0	0	0		0	0	0		
30		0	0	0		0	0	0		0	0	0		
31		0	0	0		0	0	0		0	0	0		
32		0	0	0		0	0	0		0	0	0		
33		0	0	0		0	0	0		0	0	0		
34		0	0	0		0	0	0		0	0	0		
35		0	0	0		0	0	0		0	0	0		
36		0	0	0		0	0	0		0	0	0		
37		0	0	0		0	0	0		0	0	0		
38		0	0	0		0	0	0		0	0	0		
39	Minor CPR	80000	26839	1514	Joint Reseal and Minor CPR	100000	34502	1946	Joint Reseal and Minor CPR	100000	34502	1946		
40		0	0	0		0	0	0		0	0	0		
41		0	0	0		0	0	0		0	0	0		
42		0	0	0		0	0	0		0	0	0		
43		0	0	0		0	0	0		0	0	0		
44		0	0	0		0	0	0		0	0	0		
45		0	0	0		0	0	0		0	0	0		
46		0	0	0		0	0	0		0	0	0		
47		0	0	0		0	0	0		0	0	0		
48		0	0	0	Minor CPR	80000	20860	1177	Minor CPR	80000	20860	1177		
49		0	0	0		0	0	0		0	0	0		
50	Salvage Value	-12308	-3034	-171	Salvage Value	-67692	-16689	-941	Salvage Value	-267923	-66055	-3726		
Totals		\$775,452	\$533,085	\$30,070.76		\$983,264	\$594,362	\$31,379.67		\$985,279	\$747,842	\$42,184.94		
		Annualized		100%			Annualized		100%			Annualized		100%

Option 1															Option 2															Option 3															Design Life = 20														
4" BIT M&OL															4"Mill, 4"CIR, 4" BIT OL															Mill & 6" CONC OL															Design Life = 20														
Year	Proposed Fixes	Cost/Mile	P/F	Present Worth	Annual Cost	Year	Proposed Fixes	Cost/Mile	P/F	Present Worth	Annual Cost	Year	Proposed Fixes	Cost/Mile	P/F	Present Worth	Annual Cost	Year	Proposed Fixes	Cost/Mile	P/F	Present Worth	Annual Cost																																				
g 0	4" BIT M&OL	\$ 216,820	1.000	\$ 216,820	\$ 9,856	H 0	4"Mill, 4"CIR, 4"	\$ 300,362	1.000	\$ 300,362	\$13,654	I 0	Mill & 6" CONC	\$ 392,573	1.000	\$ 392,573	\$17,846	0	Mill & 6" CONC	\$ 392,573	1.000	\$ 392,573	\$17,846																																				
1			0.972			1			0.972			1			0.972			1			0.972																																						
2			0.946			2			0.946			2			0.946			2			0.946																																						
3			0.919			3			0.919			3			0.919			3			0.919																																						
4			0.894			4			0.894			4			0.894			4			0.894																																						
A 5	Route & Seal	\$ 7,000	0.869	\$ 6,085	\$ 277	A 5	Route & Seal	\$ 7,000	0.869	\$ 6,085	\$ 277	5			0.869			5			0.869																																						
6			0.845			6			0.845			6			0.845			6			0.845																																						
B 7	Seal Coat	\$ 18,000	0.822	\$ 14,796	\$ 673	b 7	Seal Coat	\$ 18,000	0.822	\$ 14,796	\$ 673	7			0.822			7			0.822																																						
8			0.799			8			0.799			8			0.799			8			0.799																																						
9			0.777			9			0.777			9			0.777			9			0.777																																						
10			0.756			10			0.756			10			0.756			10			0.756																																						
11			0.735			11			0.735			11			0.735			11			0.735																																						
12			0.715			12			0.715			12			0.715			12			0.715																																						
13			0.695			13			0.695			13			0.695			13			0.695																																						
14			0.676			14			0.676			14			0.676			14			0.676																																						
J 15	1.5" BIT OL	\$ 89,021	0.657	\$ 58,487	\$ 2,659	15			0.657			C 15	Minor CPR (no d	\$ 50,000	0.657	\$ 32,850	\$ 1,493	15	Minor CPR (no d	\$ 50,000	0.657	\$ 32,850	\$ 1,493																																				
16			0.639			16			0.639			16			0.639			16			0.639																																						
17			0.621			17			0.621			17			0.621			17			0.621																																						
A 18	Route & Seal	\$ 7,000	0.604	\$ 4,228	\$ 192	18			0.604			18			0.604			18			0.604																																						
19			0.587			19			0.587			19			0.587			19			0.587																																						
B 20	Seal Coat	\$ 18,000	0.571	\$ 10,281	\$ 467	O 20	2" BIT M&OL	\$ 130,087	0.571	\$ 74,301	\$3,378	D 20			0.571			20			0.571																																						
21			0.555			21			0.555			21			0.555			21			0.555																																						
22			0.540			22			0.540			22			0.540			22			0.540																																						
23			0.525			a 23	Route & Seal	\$ 7,000	0.525	\$ 3,676	\$ 167	23			0.525			23			0.525																																						
24			0.511			24			0.511			24			0.511			24			0.511																																						
o 25	2" BIT M&OL	\$ 130,087	0.497	\$ 64,593	\$ 2,936	b 25	Seal Coat	\$ 18,000	0.497	\$ 8,938	\$ 406	D 25	Major CPR (no d	\$ 100,000	0.497	\$ 49,653	\$ 2,257	25	Major CPR (no d	\$ 100,000	0.497	\$ 49,653	\$ 2,257																																				
26			0.483			26			0.483			26			0.483			26			0.483																																						
27			0.469			27			0.469			27			0.469			27			0.469																																						
A 28	Route & Seal	\$ 7,000	0.457	\$ 3,196	\$ 145	28			0.457			28			0.457			28			0.457																																						
29			0.444			29			0.444			29			0.444			29			0.444																																						
B 30	Seal Coat	\$ 18,000	0.432	\$ 7,770	\$ 353	30			0.432			30			0.432			30			0.432																																						
31			0.420			31			0.420			31			0.420			31			0.420																																						
32			0.408			32			0.408			32			0.408			32			0.408																																						
33			0.397			33			0.397			33			0.397			33			0.397																																						
34			0.386			34			0.386			34			0.386			34			0.386																																						
L 35	SALVAGE VALUE	\$ 43,362	0.375	\$ 16,272	\$ 740	N 35	NO RESIDUAL		0.375			N 35	NO RESIDUAL		0.375			35	NO RESIDUAL		0.375																																						
Total Present Worth: \$ 402,528					\$18,298	Total Present Worth: \$ 408,157					\$18,554	Total Present Worth: \$ 475,077					\$21,596	Total Present Worth: \$ 475,077					\$21,596																																				
Equivalent Annual Cost: \$ 18,298					\$18,298	Equivalent Annual Cost: \$ 18,554					\$18,554	Equivalent Annual Cost: \$ 21,596					\$21,596	Equivalent Annual Cost: \$ 21,596					\$21,596																																				



Memo

TO: Lee Berget
District Engineer

FROM: Graig Gilbertson
Materials Engineer

DATE: Nov. 21, 2011

SUBJECT: LCCA Exception for Pavement Preservation Project
In reconditioning (RD), resurfacing (RS), or road repair (RX)
funding categories

S.P. 7501-30

A Life Cycle Cost Analysis was performed in accordance with
Tech Memo No. 10-04-MAT-01.

Both PCC and HMA alternatives were considered.

The alternative with the lowest Total Present Worth was: 1.5" mill and 3" overlay

The alternative selected by the District is: 4.5" mill and 4.5" overlay

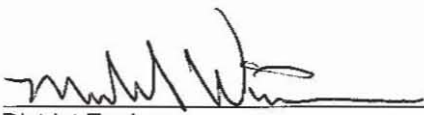
The justification for not selecting the lowest cost alternative is:

District wanted longer term fix. The short term repair also left

more subjectivity to the LCCA because it is possible that once pavement is removed problem not

accounted for will require supplemental agreement.

I concur with the selected alternative,


District Engineer

11-23-11
Date



Memo

TO: Lee Berget
District Engineer

FROM: Graig Gilbertson
Materials Engineer

DATE: Nov. 21, 2011

SUBJECT: LCCA Exception for Pavement Preservation Project
In reconditioning (RD), resurfacing (RS), or road repair (RX)
funding categories

S.P. 5680-126

A Life Cycle Cost Analysis was performed in accordance with
Tech Memo No. 10-04-MAT-01.

Both PCC and HMA alternatives were considered.

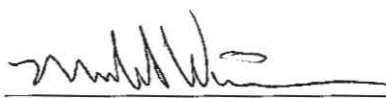
The alternative with the lowest Total Present Worth was: 1.5" overlay

The alternative selected by the District is: 3.5" mill and 3.5" overlay

The justification for not selecting the lowest cost alternative is:

District preferred alternative that would more efficiently address maintenance concerns by milling off
areas of where pavement is deteriorating as opposed to covering up the deterioration. The thin
pavement will give shorter life than mill and fill option.. We try to keep our maintenance people off the
interstate as much as possible.

I concur with the selected alternative,


District Engineer

11-23-11
Date

LCCA EXCEPTION

SP 2503-30

A Life Cycle Cost Analysis was performed in accordance with Tech Memo No. 07-17-MAT-01.

Both PCC and HMA alternatives were considered.

The lowest LCCA fix is Mill & 1.5" Bituminous Overlay

The Preservation fix selected by our District is Stabilized Full Depth Reclamation

LCCA is a project specific tool used in selecting preservation treatments. The District program is selected based on: Total project costs, preservation performance, material availability, available funding, traffic impacts, safety needs and other considerations.

Factors considered in this Preservation Project selection include:

The bituminous pavement condition on this section is poor with a low structural rating. The section has a RQI rating of 2.2 and SR rating of 2.1. The road has a good layer of aggregate base beneath it and is a good candidate to reclaim.

This choice will also provide a fix with a large RSL (Remaining Service Life). The District is attempting to do a variety of fixes with staggered or various RSL and this project will contribute to this.

I concur with the selected Preservation Project:

FOR Meghan S Paulson
Transportation District Engineer
Nelrae Succio



Memo

TO: Jon Huseby
District Engineer

FROM: Keith Voss *Keith Voss*
Materials Engineer

DATE: 11-21-2011

SUBJECT: LCCA Exception for Pavement Preservation Project
In reconditioning (RD), resurfacing (RS), or road repair (RX)
funding categories

S.P. 8707-51

A Life Cycle Cost Analysis was performed in accordance with
Tech Memo No. 10-04-MAT-01.

Both PCC and HMA alternatives were considered.

The alternative with the lowest Total Present Worth was: 4" Bituminous Mill & Overlay

The alternative selected by the District is: 4" Mill, 4" CIR, & 4" Bituminous Overlay

The justification for not selecting the lowest cost alternative is:

This project was funded by the Upper Sioux Community who obtained funding thru the federal Indian

Reservation Road (IRR) & ARRA programs. The project was let and awarded by the Upper Sioux

Community. In consultation with MnDOT, the Upper Sioux decided on the fix that would meet their long

term vision of TH-67. That vision was a pavement fix that was both long lasting and environmental

conscience. This Cold In-Place (CIR) meets both those requirements.

I concur with the selected alternative,

Jon Huseby
District Engineer

11/22/2011
Date