

<b>IMPLEMENTATION PLAN AND PROJECT PROPOSAL</b>		LRRB INV #:
Version 1/23/2015		SP&R #:
		ARTS Project #:
<b>TITLE OF PROJECT:</b> <b>Cold In-Place Recycling (CIR) for Bituminous Over Concrete (BOC)</b>		
<b>PROJECT PROPOSED BY:</b> Terry Beaudry Grading and Base Engineer, OMRR		
<b>TOTAL BUDGET \$ <u>40,000</u></b>		<b>OVERALL PROJECT SCHEDULE</b>
<u>SOURCE</u>	<u>AMOUNT</u>	DATE PLAN COMPLETED: March 2016 <b>(allow time for review, approval and contract process)</b>
MnDOT State Research Funds...	\$	PROJECT START DATE: July, 2016
Office or District Funds.....	\$	PROJECT LENGTH (MONTHS): 60
Federal SP&R.....(____%)	\$	
LRRB.....	\$	
Other: _____	\$	
<b>PROJECT OVERVIEW AND GOALS</b>		
<p><b>Cold in place recycling (CIR) has been used for about 20 years in MN, but only on HMA over gravel roads. Iowa has reported success using CIR on Bituminous over concrete (BOC) with less reflective cracking and less severe reflective cracking. The purpose of this project is to validate the Iowa practice. Along with the potential of a better service life is that cost of CIR is much less than new HMA, therefore on a project basis 20-30% price reduction, may be realized. The project would investigate HMA thicknesses, design and build a CIR with HMA on the top, then follow up each year measuring surface rating and ride each year for several years. Two new control sections should also be built and compared to the CIR section: a section with removing all the HMA and placing new HMA, and a M/OL section.</b></p> <p><b>The overall goal is to assess whether CIR works well over concrete.</b></p>		
<b>MnDOT PROJECT MANAGER OR TECHNICAL LIAISON</b>		
Terry Beaudry Materials and Road Research Grading and Base Engineer Maplewood, MN 55109 <a href="mailto:terry.beaudry@state.mn.us">terry.beaudry@state.mn.us</a> 651-366-5456		
<b>APPROVALS</b>		
<b>OFFICE DIRECTOR OR DISTRICT ENGINEER</b> Office or District: <u>Office of Materials and Road Research</u> I hereby certify sufficient staff time will be scheduled for the Project Manager and staff to complete the project as outlined in the attached work plan, and commit any Office or District funds as listed above.	Signature of Office Director or District Engineer:  _____ Glenn Engstrom Date:	
<b>DIRECTOR OF RESEARCH SERVICES SECTION</b>  Approval of work plan and any MnDOT State Research Program funds as listed above.	Signature of the Director of Research Services:  _____ Linda Taylor Date:	

## IMPLEMENTATION PLAN AND PROJECT PROPOSAL

### INNOVATION ROADMAP INFORMATION

**1) What are the expected benefits to MnDOT from implementing the results of the project? What is the impact on the department?**

- Expected benefits:
  - Construction Savings (Materials, labor, equipment,time,quality)
  - Decrease Lifecycle Costs
  - Environmental Aspects (Pollution, hazardous waste reductions, recycling)
  - Increase Lifecycle
  - Operation and Maintenance Savings (Materials, labor, equipment, time)
  - Safety (Reduction of crash frequency and/or severity)
  - Technology (Technology transfer, new materials, new methods)
  - Road User Benefits (Time, dollars)
- I estimate a minimum of \$75,000/mile, and a longer life span.

Impact: Hiring out GPR to assess thickness and a consultant to perform a mix design, however these may also be performed in-house.

**2) What transportation problem is this project solving? What has been attempted in the past to solve this problem and what remains to be solved?**

Opportunity: CIR over concrete is an alternate design which cost less and performs better.

CIR has been used for about twenty years. Over those years we have improved our specifications and our results have improved. In recent years we have used CIR exclusively for HMA over gravel. This project would give us the opportunity to assess the use for BOC.

**3) Additional information about the project and goals:**

n/a

**4) How does the proposed project build upon previous research? If further research is proposed, why does similar previous research not solve the Minnesota transportation problem being addressed and why is further research needed?**

MnDOT has not performed CIR for BOC, therefore having this project should enhance our knowledge base.

**5) How will the results of the completed project be put into practice and deployed by MnDOT? Who needs to make a formal decision to implement and deploy, and who would be responsible for implementation and deployment?**

The decision to deploy belongs to Pavement Design Engineer, Pavement Engineer, district materials engineers.

The project will develop the following end-user products:

- Manual, handbook or field guide
- Best practices guidance
- Develop curriculum for technical training
- Deliver technical training or workshop
- Develop a new design process or method
- Improve or modify an existing design method
- Technical standard or practice
- Life-cycle costs or B/C ratio of investments
- Decision-making process or framework
- Use CIR in lieu of current practice of either removing all HMA over concrete and replacing with new or M/OL over old HMA.

Technical advisory panel or project steering committee:

- Gerard Geib
- Thomas Wood
- Melissa Cole
- A county engineer
- A city engineer
- Joel Ullring
- a materials engineer
- a soils engineer
- a project or resident engineer

MnDOT specialty offices:

- Office of Materials and Road Research

MnDOT Districts and District functional groups:

- Materials, soils, resident and project engineers

Additional key practitioners or management champions:

- State Materials and State Pavement Engineer

Management group:

- CMG, PCMG, informed by State Materials and State Pavement Engineer

Practitioner committee:

- materials engineers (MEO)
- city/county engineers (CEAM / MCEA)
- Informed by Grading and Base Engineer

Other cooperating program or agency:

- LRRB

Other stakeholders:

Others who may be interested, not listed above:

MnIT involvement (software, data management, or technology devices): n/a

Items for State contract or Approved Products list: n/a

Intellectual Property or licensing: n/a

## 6) What future efforts or steps will be needed to derive full benefits from the expected results of this project?

MnDOT is committed to the following future steps:

- Revise Pavement Design Manual
- Revise Pavement Management Decision Tree
- Present Results at internal meetings and at pavement conferences

## 7) Communication Plan

Catch phrase for marketing:

**CIR over BOC is the Best**

Target audience for early communication (in addition to those named above):

- Materials Research and MEO group

Early Communication plan:

- Small group discussions
- Facilitated focus groups
- Webinar
- Email exchange
- MnDOT 'Newslines' article

Target audience for rolling out the innovation: District materials engineers, city/county engineers

Roll-out message, methods and activities:

- Materials research staff will do the following:
  - Presentation to a conference
  - Presentation to a technical group
  - Internal office meeting
  - Email blast
  - Web site
  - Powerpoint slide show
  - Videoconference
  - Webinar
  - Brochure or one-pager
  - MEO meeting

Roll-out timing and responsibilities:

- Ongoing – meetings and conferences as the schedules and agendas become available.

**NOTE TO USERS:** It is usually not practical to use research funds to pay MnDOT salaries, except for projects using SP&R or LRRB funds where personnel from the Office of Materials and Road Research serve as the principal investigator. Contact MnDOT Research Services Section for additional information.

Additional information about funding eligibility for the Implementation Program:

**1. Address Problem or Need**

The proposal needs to clearly state the transportation problem being solved or need that is being satisfied

**2. Research Link**

The Implementation proposal must include a reference link to a national, state or local research project that has been completed. If the reference link is not provided, this could reduce SP&R participation. Examples of research can be linked to any of the following federal, state or local programs:

- a. Federal Program
  - i. NCHRP project or other Federal Cooperative Research Programs
  - ii. Pooled Fund Project (MnDOT lead, MnDOT participation in pooled fund project/program, or single state project)
- b. State Research
  - i. MnDOT Research Project
  - ii. Other State DOT Research Project
  - iii. Intelligent Transportation System (ITS) Inst. or MN Guidestar Program
  - iv. MnDOT's Maintenance New Technology Research and Equipment Committee (NTREC) program
  - v. MnDOT's Cold Weather Test Facility - (MnROAD)
- c. Local Research
  - i. Local Road Research Board (LRRB) research projects

**3. Demonstrate Application for department**

The proposal needs to indicate how the results of the implementation project will be used or applied within the department. If possible, state how the results could lead to full implementation in day-to-day practice and whether there is commitment to support implementation statewide

**4. Internal Champion** – implementation proposals must identify a MnDOT staff person as the champion to move forward for funding consideration.

**5. Other Considerations:**

*Equipment purchases*

- a. Should be kept to a minimum and only include items necessary to support the implementation project.
- b. Can be used as seed money to demonstrate the viability of the equipment. Pilot project proposed should be limited to a specific area or location.
- c. Not intended as a funding source for full deployment of equipment through the state.
- d. Can't be used to supplement equipment budget.

*Construction Project*

- e. Extremely difficult to use research dollars to fund construction projects.

**PROJECT WORK PLAN INFORMATION**

**BACKGROUND:** Include any background information or history pertinent to the project that has not been provided above.

**SCOPE:** Briefly summarize the scope of work of this project. This includes an overall description of how the project will be conducted. Please summarize coordination with other projects or other work that is necessary for completion of this project, such as specialized help or input including data, materials, equipment, facilities, etc.

Scope:

- Take cores and GPR, obtain mix design and monitor/inspect as with any other CIR project.
- Monitor surface rating and ride for five years, both this section and control section(s).
- Issue a yearly status report for five years on the performance.

Construction project cost will be less than normal project cost when removing all HMA. If this is a substitute for a 3" M/OL project cost would be similar. If this is a substitute for a 2" M/OL project cost would be 50% higher. GPR plus a mix design would be about \$20,000. Investigative and writing report would be performed in-house, because of the long span time frame.

(no equipment purchases as part of the project)

Would need to hire a consultant for GPR and mix design from prequalified list.

**TASKS:** List the major tasks in the sequence necessary to complete the project, including the elements listed below.

**Scope:** For each task, give a task title, describe the work that will be included in the task and who will perform the work (consultants, contractors, university researchers, MnDOT personnel, or others). Purchase orders for equipment can be included here as a task to be completed by MnDOT. For each task there should be at least one deliverable, such as a report, test results, equipment, software, etc.

**Schedule:** Indicate a realistic duration for each task, and proposed start and end dates. The contract execution date will be unknown at the time this work plan is prepared, so it is important to note any "hard schedule" requirements for task start or ending dates, such as for seasonally-dependent work.

**Budget:** For each task, provide the total cost to complete the task. Tasks performed by MnDOT personnel may have zero-dollar budgets for the purpose of this work plan.

Task 1: Take cores and GPR, obtain mix design and monitor/inspect as with any other CIR project.

Task 2: Monitor surface rating and ride for five years, both this section and control section(s).

Task 3: Issue a yearly status report for five years on the performance.

Task 4: Final report

**SCHEDULE SUMMARY:** List each task, start and end dates, or attach a Gantt chart.

Sample acquisition, ground penetrating radar, and mix design would take 3-4 weeks.

Evaluation of design would take two weeks.

Evaluation of test section each year would take a week.

Writing interim report after construction, then after each year's pavement performance would take a week each.

Final Report would take four weeks.

### DETAILED BUDGET FOR ENTIRE PROJECT

DOLLAR AMOUNT (OMIT CENTS)

SALARIES (NAME/ROLE)	FY 2017	FY 2018	FY 2019/20	TOTALS
Terry Beaudry	0	0	0	0
TOTAL SALARIES (OMRR only – see note above)				\$0
<b>DIRECT COSTS</b>				
CONSULTANT, CONTRACTOR AND TESTING COSTS (list each contract and its expected cost)				
Consultant (GPR and Mix Design)	\$20,000	\$4,000	\$16,000	\$40,000
TOTAL DIRECT COSTS				\$40,000
<b>TOTAL PROJECT COSTS</b>				\$40,000

#### BUDGET BY SUMMARY TASK AND CONSULTANT/VENDOR:

(List task number and dollar value for each task in the work plan. If the project includes consultant contract or vendor P.O., provide breakdown of task budget. Insert additional rows as necessary.)

Task Number	Task Description	Consultant, Vendor or Contractor Name	Cost
1	GPR, cores and Mix Design	TBD (pre-qual listed)	\$20,000
2	Construct test sections	TBD	\$?
3	Evaluate test section and annual report	Terry Beaudry	\$8,000
4	Final report and presentations	Terry Beaudry	\$12,000
<b>TOTAL PROJECT COSTS</b>			\$40,000

COMMENTS/JUSTIFICATION