

## CHECKLIST TO DESIGNATE AREAS OF EVALUATION FOR REQUESTS FOR PROPOSAL (RFP)

Research Administration Use Only

	REQUISITION NUMBER 2109	DUE DATE 12/19/2016	TIME DUE Noon est
MDOT PROJECT MANAGER <b>Melissa Howe</b>	JOB NUMBER (JN)		CONTROL SECTION (CS)

DESCRIPTION

Develop and Implement a Freeze Thaw Model Based Seasonal Load Restriction Decision Support Tool

Check all items to be included in RFP			Provide only checked items below in proposal
Check the appropriate Tier in the box below			
<input type="checkbox"/> <b>TIER I</b> (\$50,000-\$150,999)	<input checked="" type="checkbox"/> <b>TIER II</b> (\$150,000-\$1,000,000)	<input type="checkbox"/> <b>TIER III</b> (>\$1,000,000)	Best Value Scoring is listed in the RFP.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Understanding of Service
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Past Performance
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Qualifications of Team
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Quality Assurance/Quality Control
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Location:</b> The percentage of work performed in Michigan will be used for all selections unless the project is for on-site inspection or survey activities, then location should be scored using the distance from the consultant office to the on-site inspection or survey activity.
N/A	N/A	<input type="checkbox"/>	Presentation
N/A	N/A	<input type="checkbox"/>	Technical Proposal (if Presentation is required)

The prime consultant must be a Michigan university. The prime consultant/vendor is responsible for the successful completion of the service and is expected to perform at least 40 percent of the services, by dollar value. The basis of payment is Actual Costs as defined in standard MDOT contracts.

To submit a proposal, please follow the [MDOT Consultant Vendor Selection Guidelines for Research Administration-Revised September 2015](#).

### RFP SPECIFIC INFORMATION

Problem Title: Develop and Implement a Freeze Thaw Model Based Seasonal Load Restriction Decision Support Tool

OR Number: 16-009

This is Best Value Selection which means the budget amount submitted with the proposal is a component of the proposal score, not the determining factor of the selection.

## PROPOSAL SUBMITTAL INFORMATION

**PROPOSAL AND BID SHEET EMAIL ADDRESS –**

[mdot-rfp-response@michigan.gov](mailto:mdot-rfp-response@michigan.gov) with a CC to  
[mdot-research@michigan.gov](mailto:mdot-research@michigan.gov)

## GENERAL INFORMATION

Any questions relative to the Research Problem Statement must be submitted by e-mail to:

[mdot-research@michigan.gov](mailto:mdot-research@michigan.gov). Questions must be received by 4 business days prior to the RFP due date at 5:00 p.m. EST. All questions and answers will be placed on the MDOT RFP Web site as soon as possible after receipt of the questions and at least three (3) days prior to the due date listed above. The names of organizations submitting questions will not be disclosed.

MDOT is an equal opportunity employer and MDOT DBE firms are encouraged to apply. The participating DBE firm, as currently certified by MDOT's Office of Equal Opportunity, shall be listed in the Proposal.

### MDOT AND RESEARCH FORMS REQUIRED AS PART OF PROPOSAL SUBMISSION:

5100D- Request for Proposal Cover Sheet

Schedule of Research Activities Form- Appendix B

Deliverables Table- Appendix A

5100J- Consultant Data and Presignature sheet is required for signatory on this proposal

Research Proposal Budget Form Worksheet Appendix C (Universities)

5101S – Notice of Intent to Subcontract (if applicable)

Or

Bid Sheet and Budget Exhibits required in [Priced Proposal Guidelines](#) (Consultants)

**Proposals must be submitted for this project electronically. Proposal Submittal Requirements Can Be Found At the Following Link**  
[http://www.michigan.gov/documents/MDOT\\_Consultant-Vendor\\_Selection\\_Guidelines-0106\\_145222\\_7.pdf?20150707153457](http://www.michigan.gov/documents/MDOT_Consultant-Vendor_Selection_Guidelines-0106_145222_7.pdf?20150707153457)

**In PART IV – INSTRUCTION FOR SUBMITTING PROPOSALS**

**NOTIFICATION**

**E-VERIFY REQUIREMENTS**

E-Verify is an Internet based system that allows an employer, using information reported on an employee's Form I-9, Employment Eligibility Verification, to determine the eligibility of that employee to work in the United States. There is no charge to employers to use E-Verify. The E-Verify system is operated by the Department of Homeland Security (DHS) in partnership with the Social Security Administration. E-Verify is available in Spanish.

The State of Michigan is requiring, under Public Act 200 of 2012, Section 381, that as a condition of each contract or subcontract for construction, maintenance, or engineering services that the pre-qualified contractor or subcontractor agree to use the E-Verify system to verify that all persons hired during the contract term by the contractor or subcontractor are legally present and authorized to work in the United States.

Information on registration for and use of the E-Verify program can be obtained via the Internet at the DHS Web site: <http://www.dhs.gov/E-Verify>.

The documentation supporting the usage of the E-Verify system must be maintained by each consultant and be made available to MDOT upon request.

It is the responsibility of the prime consultant to include the E-Verify requirement documented in this NOTIFICATION in all tiers of subcontracts.

9/13/12

# Michigan Department of Transportation

## SCOPE OF SERVICE FOR RESEARCH SERVICES

**TITLE:** Develop and Implement a Freeze Thaw Model Based Seasonal Load Restriction Decision Support Tool  
**OR#:** 16-009

**LOCATION:** Statewide

**WORK DESCRIPTION:** Research on Develop and Implement a Freeze Thaw Model Based Seasonal Load Restriction Decision Support Tool

**ANTICIPATED START DATE:** April 1, 2017

**ANTICIPATED COMPLETION DATE:** March 31, 2019

**BUDGET:** The budget for this project cannot exceed \$210,000.00

### **MDOT RESEARCH PROJECT ADMINISTRATION MANAGER:**

Melissa Howe  
6333 Lansing Road  
Lansing, Michigan 48917  
E-MAIL: [mdot-research@michigan.gov](mailto:mdot-research@michigan.gov)

### **GENERAL INFORMATION:**

#### 1. PROBLEM TO ADDRESS

MDOT and Local Agencies in Michigan are given the authority in Public Act 300 of 1949 to establish seasonal load restrictions (SLR) during the periods of March, April, May, and at other times as conditions exist due to the weakened condition of the pavement structure during the thawing of the frost, and subsequent saturation of the pavement support layers and subgrade. Setting of SLRs preserve the public's investment in the existing pavement structure. The tradeoff of this is the opportunity cost to industry in Michigan due to the increased trucking costs of hauling multiple, lighter loads on the highway system, or delaying delivery until conditions exist to permit the movement of oversize/overweight goods. This research seeks to build on the foundation of research from "MDOT's

research project Predictive Modeling of Freezing and Thawing of Frost-Susceptible Soils Report Number: RC 1619” to establish a thawing model and a process for setting and removing seasonal load restrictions in a manner that will give industry the most amount of time to prepare for the restrictions and minimize the time to lift the restrictions. This decision support tool will be achieved by leveraging existing research, technology, and resources that MDOT already has in place. An ancillary benefit of this research could be the use of the data and model to determine more accurate pavement designs for frost conditions that vary depending on location in the state.

## 2. RESEARCH OBJECTIVES

1. Evaluate existing thaw depth models and determine if existing thaw depth models suffice for application as a decision support tool for Michigan or if a refined model would be prudent.
2. Establish a data format for soil and air temperature used for analysis by the decision support tool. Identify the multiple sources for this temperature data
3. Building on this project and the research of RC 1619, develop a thaw depth model that utilizes the existing data sources in objective 2.
4. Identify locations for potential virtual Road Weather Information System (RWIS) sites and collect necessary data to implement those locations.
5. Develop a user friendly decision support tool that could be easily utilized by public and private sector in estimating potential thaw conditions and setting of SLRs for any location on the MDOT road network.
6. Recommend processes for predicting the time to post and remove SLR signs to protect the pavement structures from excessive damage during the spring thaw season.
7. Identify opportunities to collect, present, and apply data and develop models to refine pavement designs.
8. Develop professional training materials and course for training MDOT staff in the use of the decision support tool.

## 3. URGENCY AND IMPLEMENTATION BENEFIT TO MDOT

MDOT will utilize this tool as part of our effort to determine the setting and lifting of the Seasonal Load Restrictions. Additionally, this research will be beneficial in refining pavement designs for variable frost conditions statewide. This research will create a systematic procedure to determine when SLRs should be implemented and removed. Additionally, the research could be utilized to develop a more refined pavement design for longer pavement life and reduced life-cycle costs leading to better use of transportation funds.

## 4. RISKS OR OBSTACLES TO RESEARCH

1. Number of parameters needed for an accurate thaw model.
2. Insufficient physical RWIS infrastructure to provide an accurate model for a decision support tool.

## 5. DESIRED QUALIFICATIONS IN AN INVESTIGATOR(S)

- 1) Knowledge of Graphic Information Systems (GIS)
- 2) Familiarity w/ Predictive Modeling, RWIS Information [data], and Excel spreadsheets
- 3) Knowledge of seasonal load restrictions (SLR) and the impact of freeze/thaw on pavements
- 4) Capability to perform statistical analysis
- 5) Experience at developing real time web based software

At least one college series of statistics courses and working experience in statistical analyses

### **CONSULTANT RESPONSIBILITIES:**

1. Review of literature and State-of-the-Practice. This will include interviews with MDOT staff and local agency staff to identify the state of the current business practices for setting load restrictions.
2. Identify data sources and refine formatting, presentation, and Graphic Information Systems (GIS) plotting of data.
3. Development of a thaw depth predictive model.
4. Develop a web based software tool that will access and process data from environmental sensing stations in real time providing accurate seasonal load restriction recommendations. Identify a process, based on MDOT and Local Agency input, for determining placement of SLRs.
5. Recommendation on the validity and incorporation of virtual RWIS information into the decision support tool.
6. Make recommendations on the necessary data to collect from the freeze thaw data tracking systems that could help with the refinement of pavement designs.
7. Develop a decision support tool that is an Excel based statistical model to estimate the cumulative thawing degree day and thaw depths using location specific data.
8. Professional training for MDOT staff on the application of the model.

Failure of any of the above will be found in noncompliance with the contract.

### **DELIVERABLES:**

1. Decision support tool that is an Excel based statistical model to estimate the cumulative thawing degree day and thaw depths using location specific data.
2. Recommend procedural guidelines for posting and removing SLRs according the result of the statistical model.
3. Recommend an implementation plan for the incorporation of the decision support tool into MDOT's business processes.
4. PowerPoint presentation explaining assumptions and use of the models with example problems and addressing the benefits of implementation.
5. Quarterly progress reports, delivered according to the format specified in the Research & Implementation Manual, Chapter 4.3.4.1 and Form 5305.

6. Purchase of all necessary equipment to pilot the system.
7. Develop and deliver necessary materials, as well as plan, coordinate and hold a training event for rollout of this decision support tool.
8. Deliver real-time web based load rating prediction software. The vendor shall grant to MDOT, all Michigan state and local governmental agencies and the United States government a worldwide, irrevocable, nonexclusive, fully paid up, and royalty-free license to reproduce, publish, or otherwise use and to authorize others to use the work, including any software developed that is a result of the services performed under this authorization for governmental purposes, whether or not a patent or copyright is obtained.

### **MDOT RESPONSIBILITIES:**

MDOT will provide access to the sites and data generated from the Environmental Sensing Stations from the Road weather Information Systems and any other pertinent data that MDOT has access to. MDOT crews can assist in obtaining soil borings/samples. MDOT will provide access to training facilities, along with periodic review of documentation and processes.

### **COORDINATION PROCEDURES**

Work will be completed in compliance with the Research Implementation Manual

### **CONSULTANT PAYMENT**

All billings for services must be directed to the Department and follow the current Research Implementation Manual. This document contains instructions and forms that must be followed and used for billing. Payment may be delayed or decreased if the instructions are not followed.

Payment to the Consultant for services rendered shall not exceed the maximum amount unless an increase is approved in accordance with the contract with the Consultant.

Direct expenses, if applicable, will not be paid in excess of that allowed by the Department for its own employees in accordance with the State of Michigan's Standardized Travel Regulations. Supporting documentation must be submitted with the billing for all eligible expenses on the project in accordance with the Reimbursement Guidelines. The only hours that will be considered allowable charges for this contract are those that are directly attributable to the activities of this project.

The use of overtime hours is not acceptable unless prior written approval is granted by the MDOT project manager. Reimbursement for overtime hours that are allowed will be limited to time spent on this project in excess of forty hours per person per week. Any variations to this rule should be included in the priced proposal submitted by the Consultant and must have prior written approval by the MDOT project manager.

The basis of payment is Actual Costs for Universities and Actual Costs plus Fixed Fee for Consultants as defined in standard MDOT contracts.

## **PROPOSAL INFORMATION AND SCORING**

Formal proposals are required and shall include the information as outlined in these Guidelines. This section is the information required in the proposal that will be used to score the qualifications of each consultant's proposal. The section numbering correlates to the score sheet. Therefore, the consultant should format their proposals consistent with the outline provided.

### **1. UNDERSTANDING OF SERVICE: 40 POINTS**

Describe understanding of the service intended to be proposed. This information is to be based on the scope of services.

**Problem Statement and Background Summary-** demonstrates good understanding of problem, looks objectively at problem, specifies problem limits and restricts scope appropriately, and cites relevant literature.

**Research Plan-** cites specific objectives clearly, technical approach responds to all written and implied requirements, difficult areas are identified and details to overcome are given, represents novel idea or technical approach, plan is feasible, and effort is consistent with scope of problem.

**Products and Implementation-** proposal clearly defines products to be delivered at completion, includes practical, realistic implementation plan.

**MDOT Involvement-** MDOT involvement is not excessive and is clearly defined and quantified.

### **2. QUALIFICATIONS OF TEAM: 30 POINTS –**

Describe the structure of the project team including the roles of all key personnel and subcontractors. For each subcontractor describe role in service and include what percent of the task that the subcontractor is expected to provide. Provide résumés for each of the key staff of the prime and subcontractor.

**Facilities-** proposer has adequate access to equipment and/or laboratory required in study.

**Staffing-** personnel availability is clearly defined, shows a depth of qualified personnel, proposer has ability to manage a project of this size an sufficient resources to complete study, qualifications are directly related to the requirements of the project, plans for specific key personnel assignment included, and there is a reasonable balance between subcontractor and prime contractor.

**Statistical Qualification-** The required knowledge level for a research team in statistical analyses, if defined, will be in the RFP under the heading DESIRED QUALIFICATIONS IN AN INVESTIGATOR(S).

Proposals not documenting statistical training and experience levels required in the RFP may be classified as non-responsive.

**Research Proposal Budget Form Worksheet**

Project Title \_\_\_\_\_  
 Research Organization \_\_\_\_\_  
 Date \_\_\_\_\_

									FY1	FY2	FY3	FY4	TOTAL	
<b>SALARIES &amp; WAGES -- MUST COMPLY WITH OMB CIRCULAR A-21</b>														
Specify number of hours to be worked and hourly rate for each individual below: Examples of role of individual are Principal Investigator, Technician, Grad Student, etc. Annual wage increases must not exceed 2%														
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b>Sub-Total Salary &amp; Wages</b>									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	

**FRINGE BENEFITS -- MUST COMPLY WITH OMB CIRCULAR A-21**

Indicate Employee, appropriate negotiated rate for each and description of who the rate applies to.  
 ( e.g. - Sam Smith, 25%, Summer Faculty. The rate is negotiated between the university and it's cognizant agency

<b>Name</b>									
(Rate Description)									
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b>Name</b>									
(Rate Description)									
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b>Name</b>									
(Rate Description)									
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b>Name</b>									
(Rate Description)									
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b>Name</b>									
(Rate Description)									
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b>Name</b>									
(Rate Description)									
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b>Name</b>									
(Rate Description)									
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b>Sub-Total Fringe Benefits</b>					\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

**SUBCONTRACTOR -- MUST COMPLY WITH OMB CIRCULAR A-21**

A copy of the subcontractor's budget must be attached. An MDOT approved subcontract is required for subcontractor costs in excess of \$25,000 prior to payment of invoices that contain subcontractor work. List all subcontractors on a separate line.

<b>Subcontractor Name &amp; Amt.</b>									\$0.00
<b>Subcontractor Name &amp; Amt.</b>									\$0.00
<b>Sub-Total Subcontractor</b>					\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

**TRAVEL -- MUST COMPLY WITH OMB CIRCULAR A-21**

Must be in accordance with IDS contract requirements.

**In-State Travel (Destinations within Michigan)**

Provide a separate table itemizing costs.

									\$0.00
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**Out-of-State Travel (Prior approval required)**

Provide a separate table itemizing costs.

									\$0.00
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<b>Sub-Total Travel</b>					\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
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**SUPPLIES -- MUST COMPLY WITH OMB CIRCULAR A-21 (Few items not allowed are: computers, printers, monitors, fax machines, printer paper, toner cartridges, pens, pencils, legal pads, clips, rubber bands, post-it notes, books, notebooks, binders, folders, diskettes, postage stamps, chairs, office furniture, calendars, paper punches, business cards, staplers, waste cans, etc.)**

Provide details if cost exceeds \$2,000. Individual line items in excess of \$1,000 require a detailed explanation regardless of total cost

(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
<b>Sub-Total Supplies</b>		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

**CAPITAL EQUIPMENT -- MUST COMPLY WITH OMB CIRCULAR A-21 - Purchased specifically for this project**

List items with a value in excess of \$500. Equipment in excess of \$5,000 requires prior approval.

(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
<b>Sub-Total Equipment</b>		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

**OTHER EXPENSES -- MUST COMPLY WITH OMB CIRCULAR A-21 (Few items not allowed are: memberships in professional & scientific organizations, local telephone lines, cell phones, etc.)**

Any project expense which does not fall into another category. Provide detailed explanation of the expense and applicable breakdown of costs (e.g. graduate student tuition).

(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
<b>Sub-Total Other Expenses</b>		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

**Total Sub-Totals** \$0.00 \$0.00 \$0.00 \$0.00 \$0.00

**INDIRECT COSTS -- MUST COMPLY WITH OMB CIRCULAR A-21**

Indirect cost rates are negotiated between the university and it's cognizant agency. Indicate the type of negotiated indirect rate used and the percentage (e.g. On Campus Research, 52%)

(Type)		(%)								
			FY1	FY2	FY3	FY4				
Enter \$ Amt per FY							\$0.00	\$0.00	\$0.00	\$0.00
<b>Total Indirect Costs</b>							\$0.00	\$0.00	\$0.00	\$0.00

**TOTAL PROJECT COSTS** \$0.00 \$0.00 \$0.00 \$0.00 \$0.00

**UNIVERSITY MATCHING FUNDS** \$0.00

**TOTAL MDOT PROJECT COSTS** \$0.00 \$0.00 \$0.00 \$0.00 \$0.00

**3. RELEVANT PAST PERFORMANCE: 30 POINTS**

The project manager will contact references and review relevant performance evaluations from the past 5 years.

**Record of past accomplishment-** proposer satisfactorily completed past projects, was cooperative and flexible, and ended past projects according to the original budget and time schedule.

**4. QUALITY ASSURANCE/QUALITY CONTROL (QAQC) PLAN: 5 POINTS**

The proposer provided an outline of a QA/QC process. The QA/QC Manager is experienced with MDOT standards and practices.

**5. LOCATION: 5 POINTS**

The percentage of work hours performed in Michigan will be used for all selections unless the project is for on-site inspection or survey activity. The combination of location and percentage of work performed in Michigan should not exceed 5 points.

Percentage of Work To Be Done in Michigan Score	
95% to 100%	5
80% to 94%	4
50% to 79%	3
25% to 49%	2
10% to 24%	1
Less than 10%	0

**6. PRICE: 40 POINTS**

Cost score is based on the lowest cost proposed divided by the current proposer cost multiplied by 40. Lowest bid shall receive 40 points.

**TOTAL POINTS: 150**