NEW ENGLAND TRANSPORTATION CONSORTIUM
QUARTERLY PROJECT PROGRESS REPORT

A. PROJECT NUMBER AND TITLE:

NETC 10-3 "Low Temperature and Moisture Susceptibility of RAP Mixtures with Warm Mix Technology"

B. PRINCIPAL INVESTIGATOR(s) & UNIVERSITY(s):

Professor Walaa S. Mogawer, PE, F.ASCE, Highway Sustainability Research Center (HSRC), University of Massachusetts

C. WEB SITE ADDRESS (*If one exists***):**

http://www.uvm.edu/~transctr/?Page=netc/netc_fy/netc_fy2010.php#netc103

D. START DATE (*Per NETC Agreement***):**

9/16/2013

E. END DATE (*Per NETC Agreement***):**

9/15/2015

F. **ANTICIPATED COMPLETION DATE:**
If different from the END DATE in paragraph E., the reason must be given. It is the responsibility of the Principal Investigator to insure that the project, including review of the draft report by the Project Technical Committee and the printing of the Final Report, is completed prior to the Agreement End Date. Costs incurred after the Agreement End Date cannot be reimbursed. ***Requests for extensions of the Agreement End Date must contain the reasons for the request and be submitted so as to arrive in the Coordinator's office at least 90 days prior to the Agreement End Date.***

9/15/2015

G. PROJECT OBJECTIVES:

The research project will evaluate the moisture susceptibility and low temperature cracking properties of RAP mixtures produced with WMA technologies. Plant mixtures produced with varying RAP contents and warm mix technologies will be sampled. Laboratory testing will include an evaluation of mixtures susceptibility to moisture damage using one or more of the following tests: (1) AASHTO T324 "Hamburg Wheel-Track Testing of Compacted Hot Mix Asphalt (HMA)", (2) AASHTO T-283 "Resistance of Compacted Hot Mix Asphalt (HMA) to Moisture-Induced Damage", and (3) ratio of wet to dry dynamic modulus measured at 20ºC. The test(s) selection will be based, as described later in the proposal, on the literature review conducted under Task 1. Also, the low temperature cracking susceptibility will be evaluated using the following two tests: (1) AASHTO TP10-93 "Standard Test Method for Thermal Stress Restrained Specimen Tensile Strength (TSRST)" and (2) AASHTO T322 "Standard Method of Test for Determining the Creep Compliance and Strength of Hot Mix Asphalt (HMA) Using the Indirect Tensile Test Device." Additional testing will include evaluating the effect of

the different WMA technologies on the workability of the mixtures and evaluating the degree of blending between the RAP binder and the virgin binder using a procedure developed by Bonaquist.

H. REPORT PERIOD:

2014 Quarter 4 – October through December

I. ACCOMPLISHMENTS THIS PERIOD:

1. Tilcon CT produced 12.5mm mixtures required for this study on 10/11/14. UMass Dartmouth was on-site during production to sample each mixture and document production parameters (RAP moisture content, etc.). The following mixtures were produced and obtained:

Mixture	**WMA: SonneWarmix**		
1	0% Binder Replaced	Typical WMA Dose	*0% RAP*
2	1.5% Binder Replaced	Typical WMA Dose	*27% RAP*
3	2.5% Binder Replaced	Typical WMA Dose	*45% RAP*
4	1.5% Binder Replaced	Typical WMA Dose +0.25%	*27% RAP*
5	2.5% Binder Replaced	Typical WMA Dose +0.25%	*45% RAP*
Mixture	**WMA: Foam**		
6	0% Binder Replaced	Typical WMA Dose	*0% RAP*
7	1.5% Binder Replaced	Typical WMA Dose	*27% RAP*
8	2.5% Binder Replaced	Typical WMA Dose	*45% RAP*
9	1.5% Binder Replaced	Typical WMA Dose +0.25%	*27% RAP*
10	2.5% Binder Replaced	Typical WMA Dose +0.25%	*45% RAP*

2. UMass Dartmouth began verifying the volumetric properties of each produced mixture. The mixtures verified did not meet the volumetric properties. The contractor assured UMass Dartmouth that these mixtures will be reproduced again during spring 2015.

J. PROBLEMS ENCOUNTERED (If any):

1. In September 2014, UMass Dartmouth formally requested a no additional cost time extension for this project of twelve month (new end date 9/15/2016). The basis of the request is that the contractors have not produced or provided the mixtures required for this study. UMass Dartmouth is waiting for a response on this time extension request.

2. One contractor produced the necessary mixtures to conduct the study, however, these mixtures did not meet the volumetric requirements and accordingly no further testing will be performed on these mixtures. The contactor will reproduce these mixtures again during spring 2015.

K. TECHNOLOGY TRANSFER ACTIVITIES:

List any reports, papers, presentations published/presented during the report period or anticipated for the next quarter.

None during the current period.

L. STATUS BY TASK: *Show Work Task Number, description and % complete for each task including those completed, those underway, and those not started.*

Task 1: Literature Review (55%)
Task 2: Determine Critical Information (50%)
Task 3: WMA Technologies Selection Process (25%)
Task 4: Identify Moisture Susceptibility Test (0%)
Task 5: Development of a Testing Matrix (60%)
Task 6: Obtain Plant Produced Samples (15%)
Task 7: Laboratory Testing of Plant Produced Samples (0%)
Task 8: Prepare a Final Report (0%)
Task 9: Execute Implementation Plan (0%)

M. PERCENT COMPLETION OF TOTAL PROJECT: 30%

N. ACTIVITIES PLANNED FOR NEXT QUARTER:

UMass Dartmouth will seek additional contractors that can produce the required mixtures as a backup for the current two contractors.

O. FINANCIAL STATUS:
As of: *12/31/14*
Total Project Budget: $ 150,157.70
Total Expenditures: $ 13,611.77

Note: This report should not require more than 2-3 pages & should be e-mailed to the NETC Coordinator so as to arrive no later than three (3) working days after the end of each calendar quarter.