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*):

5/31/17

F. ANTICIPATED COMPLETION DATE:

5/31/17

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:

2017 Quarter 2 – April to June

I. ACCOMPLISHMENTS THIS PERIOD:

1. UMass Dartmouth received the following plant produced mixtures from the second contractor (Palmer Paving, Springfield MA) in mid-May 2017:

- SSC 12.5mm 75 Gyration WMA with 29% RAP (1.5% Binder Replacement) Foaming WMA
- SSC 12.5mm 75 Gyration WMA with 39% RAP (2.0% Binder Replacement) Foaming WMA
- SSC 12.5mm 75 Gyration WMA with 48% RAP (2.5% Binder Replacement) Foaming WMA

These mixtures were tested this quarter. The following tests were completed on each mixture using multiple replicates:

Volumetric verification (density, VMA. VFA, etc.)
Moisture susceptibility testing using the Hamburg wheel tracking device (HWTD) in accordance with AASHTO T324 at 45°C
Low temperature cracking using the disk-shaped compact tension (DCT) test at -18°C
Constructed performance space diagram (HWTD vs. DCT) for each mixture
Moisture susceptibility (TSR) in accordance with AASHTO T283
Low temperature cracking using the thermal stress restrained specimen test (TSRST)
Mixture dynamic modulus and subsequent construction of mixture master curve
Dynamic modulus (E*) ratio evaluation of moisture susceptibility

Summary sheets of results were constructed and data was analyzed

2. UMass Dartmouth began work on the DRAFT final report.

J. PROBLEMS ENCOUNTERED (If any):

The research team has been consistently making arrangements with contractors to provide plant produced mixtures as stated in the scope of work. UMass Dartmouth is consistently following up with the second contractor to produce more of the mixtures noted in the test matrix.

K. TECHNOLOGY TRANSFER ACTIVITIES:

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

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 (100%)
Task 2: Determine Critical Information (100%)
Task 3: WMA Technologies Selection Process (100%)
Task 4: Identify Moisture Susceptibility Test (100%)
Task 5: Development of a Testing Matrix (100%)
Task 6: Obtain Plant Produced Samples (100%)
Task 7: Laboratory Testing of Plant Produced Samples (100%)
Task 8: Prepare a Final Report (100%)
Task 9: Execute Implementation Plan (100%)

M. PERCENT COMPLETION OF TOTAL PROJECT: 100%

N. ACTIVITIES PLANNED FOR NEXT QUARTER:

Project ended 5/31/2017.

O. FINANCIAL STATUS:
As of: *06/30/17*
Total Project Budget: $ 150,157.70
Total Expenditures: $ 140,904.44

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.