

**PennDOT Special Provision  
Contractor Support of Demonstration Project**

**HOT MIX ASPHALT (HMA)  
(Type IV)**

**Intelligent Compaction Pooled Fund  
“Accelerated Implementation of Intelligent Compaction Technology for  
Embankment Subgrade Soils, Aggregate Base and Asphalt Pavement Materials”**

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**Description:** This Special Provision is to describe additional work (roller transportation/security, materials, equipment, and operators) by the Contractor to support this demonstration project, which will be conducted prior to and during placement and compaction of Hot Mix Asphalt materials. The purpose of the demonstration study is to demonstrate Intelligent Compaction (IC) technology and to evaluate the benefits and effectiveness of IC technology for compaction and for mapping the supporting material prior to HMA placement. The IC test results will not be used for approval or rejection of the project materials testing but will only be used to support the demonstration study.

IC for HMA is defined as the gathering of data from self-propelled double drum vibratory system involved with the measurement and recording of roller position, date/time, speed, vibration frequency, vibration amplitude, pass count, travel direction, and compaction measurement value. Real Time Kinematic (RTK) based Global Positions System (GPS) is to be used for determines the position of the rollers and mapping of IC measurements.

**I. Time Frame**

The IC research team will provide limited support for PennDOT to conduct a demonstration of IC technology for approximately two to three consecutive working days. The working days do not include days when work cannot occur due to weather conditions. The planned dates of the demonstration will be established during the IC demonstration project Web meeting at least two weeks in advance of the work.

**II. Equipment**

The IC research team will provide one IC roller and necessary Global Positioning System (GPS) equipment at no cost to the project. The only exception is the GPS rover unit which will be provided by the agency. The rover will be compatible with the RTK GPS equipment being used on the rollers. At the beginning of the project, the IC roller will be delivered by the manufacturer to a location designated by the Contractor. The IC roller will be equipped with the following equipment, software and capabilities:

1. A drum mounted measurement system capable of producing a “Roller Measurement Value” (RMV) that is an indication of the stiffness of the materials being rolled and compacted
2. Thermal gauges for surface temperature measurement
3. GPS technology that will provide color-coded mapping of roller passes, mat temperature and RMV

The Contractor will be responsible for onsite transportation of the roller to the designated construction site(s). If necessary, the roller will be transported by the Contractor to a secure area during non-working hours. Additionally, it is estimated that the Contractor will supply up to 300 gallons of diesel fuel.

The agency may elect to perform density and/or other in-situ testing for evaluating the correlation between these test results and RMV. If so, either the Contractor or the agency will provide the testing equipment and an operator. It is anticipated that 10 -6 in. cores will be needed to be taken and tested by the Contractor for the IC research. The location(s) of the cores will be jointly established by the IC research team and the Contractor.

The Contractor may also request additional nuclear and/or non-nuclear density testing alternatives for correlation on the project. The Contractor is responsible for providing the density testing equipment and operators as applicable.

### **III. Operators**

The Contractor will provide an experienced operator to use the IC roller during the demonstration. The operator provided by the Contractor will consist of qualified and skilled individuals that are familiar with the operation of the equipment for compaction equipment for HMA. Generally, the IC roller will be used to replace one of the conventional rollers (typically the breakdown roller) during the rolling operation. The operator will need to be available for training by the IC roller manufacturer for at least one to two hours at the beginning of the demonstration study.

### **IV. Additional Time for Compaction and Testing**

The IC demonstration will consist of monitoring the compaction process (with and without the IC rollers) and performing in situ testing during and after the compaction process is completed. Generally, the research on the compaction process itself will be performed during typical compaction operations that will keep pace with normal production schedules. Standard contract specifications apply to the acceptance of the materials or operations.

## V. Evaluation (Mapping) of Underlying Material Support Characteristics

As part of the demonstration effort, the support characteristics of the underlying materials may be evaluated, if possible. Prior to the placement of the HMA materials, the existing pavement that will be directly below the initial HMA layer is suggested to be “mapped” using an IC roller. The mapping will consist of measuring the stiffness the underlying materials in order to establish the existing stiffness of the materials and to identify areas of non-uniformity.

Where the demonstration is being conducted on a new construction project, mapping will be conducted on the in-place materials (soils and/or aggregate) base materials. Where the demonstration is being conducted on a project where an HMA overlay is being placed over an existing asphalt pavement, mapping will be conducted on the existing asphalt pavement or on the pavement after milling operations are completed. Mapping needs to be conducted prior to placement of the tack coat.

Where the demonstration is being conducted on a project where an HMA overlay is being placed over an existing Portland Cement Concrete pavement that has been rubblized or cracked and sealed, etc., mapping will be conducted on the finished surface. Mapping needs to be conducted prior to placement of prime or tack coat applications.

1. Mapping of in-place subgrade soils/aggregate base material: After placement, shaping and compaction of the subgrade soils, aggregate base materials, the aggregate base layer will be “mapped” with the tandem drum IC roller. The mapping area is estimated to be 2000-3000 feet in length and will be identified by the IC research team in cooperation with the Contractor. The estimated time for mapping of the areas to be evaluated during the research will be approximately eight hours.
2. Mapping of the in-place, existing asphalt pavement: After any milling and/or patching is performed in the research area, the existing asphalt pavement will be “mapped” with the tandem drum IC roller. The mapping area is estimated to be 3000-4000 feet in length and will be identified by the IC research team in cooperation with the Contractor. The estimated time for mapping of the areas to be evaluated during the research will be approximately four to eight hours.
3. Mapping of in-place rubblized or cracked and sealed Portland Cement Concrete Pavement: After the shaping and compaction of the materials the PCC surface will be “mapped” with the tandem drum IC roller. The mapping area is estimated to be 3000-4000 feet in length and will be identified by the IC research team in cooperation with the Contractor. The estimated time for mapping of the areas to be evaluated during the research will be approximately four to eight hours.

## **VI. Communication with Agency and Research Team**

At least once a day, the agency and the IC research team members will meet with the Contractor's project manager to plan and coordinate the demonstration work. At the time of the meeting, the agency and IC research team will provide clear instruction on the anticipated testing operations. The Contractor is requested to keep the agency and IC research team aware of project changes that may effect the IC operations. The Contractor field staff is encouraged to visit with the IC research team to discuss the IC operations. The agency may also provide the Contractor the results of testing as requested.

## **VII. Global Positioning System**

Intelligent Compaction rollers are dependant on availability of a Global Positioning System (GPS) to track roller positions during operations in order to display color-coded maps of roller pass counts, roller-integrated measurement values (RMV), and other measurements such as surface temperatures.

The use the Universal Transverse Mercator (UTM) Coordinates is the preferred coordinate system for the research project. The UTM zone for Pennsylvania area will be 17N or 18N depending on the location of the project. A RTK GPS base station that acquires northing, easting, and elevation data and broadcasts differential correction data to the rollers and hand-held rovers will be utilized. The GPS base station utilized will have a tolerance of less than 40 mm in both horizontal and vertical directions.

## **VIII. Open House**

As part of the IC demonstration project, the agency may elect to sponsor, plan and conduct an open house. The purpose of the open house would be to conduct a short classroom discussion and to allow participants a "hands-on" display of the IC roller. The IC research team will provide the necessary support for the open house.

## **IX. Method of Measurement** *(The DOT needs to decide if their will be additional payment or not for the IC work and revised this and the next section accordingly.)*

This work will be not be measured as the payment will be lump sum for providing assistance for and performance of the research project.

## **X. Basis of Payment**

Payment will be full compensation for roller transportation and security as well as materials, fuel, equipment, and operators, any delay during testing program, site preparation, use of GPS system or any other services required for progress of the

Intelligent Compaction demonstration program at the contract lump sum price for IC  
Compaction Research.

<b>Pay Item</b>	<b>Unit</b>
IC Compaction Research.....	LS