HVS Evaluation of Flexible Overlays of Composite Pavements

Rowan University

Background

- Approximately 50% of the pavements in New Jersey (NJ) are in "Poor" condition.
- Approximately 50% of those pavement are composite pavements (*asphalt layer on top of a Portland Cement Concrete (PCC) layer*).

Background

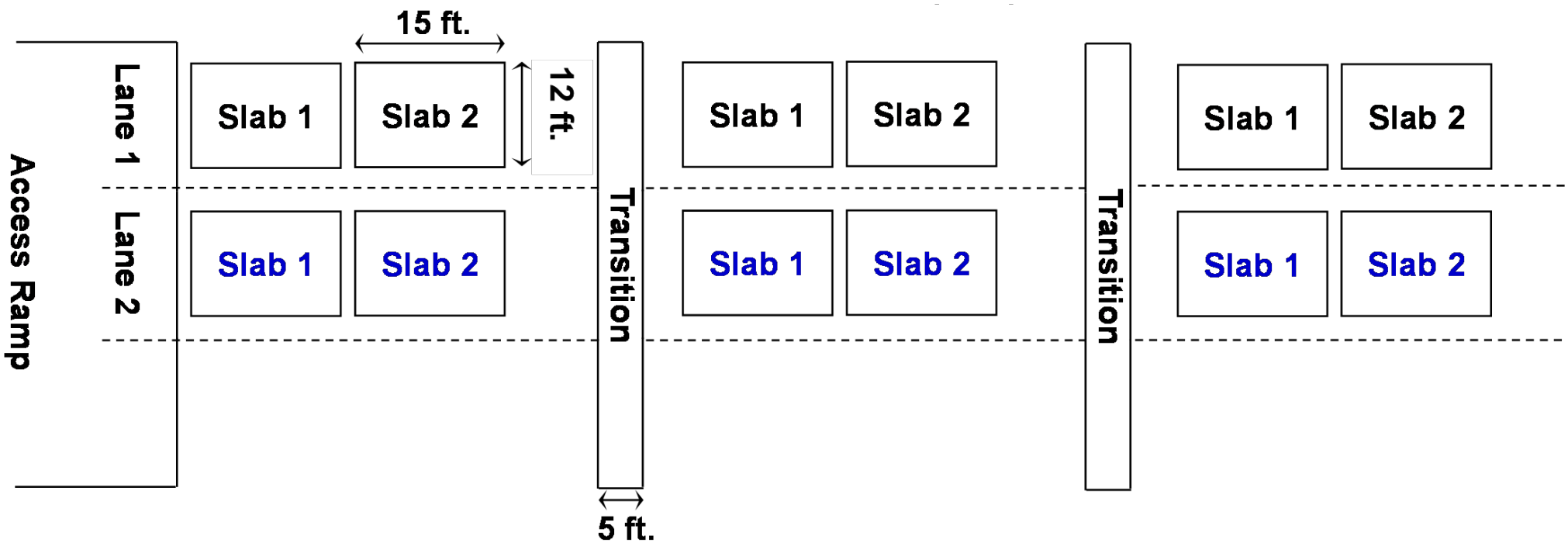
- To improve the conditions of NJ pavements, there is a need to investigate the potential for ***using thin asphalt overlays.***
- Overlays are used for rehabilitating and preserving PCC pavements.

Study Objective

- Identify and predict the **expected life of thin asphalt overlay treatments**

Full Scale Pavement Sections

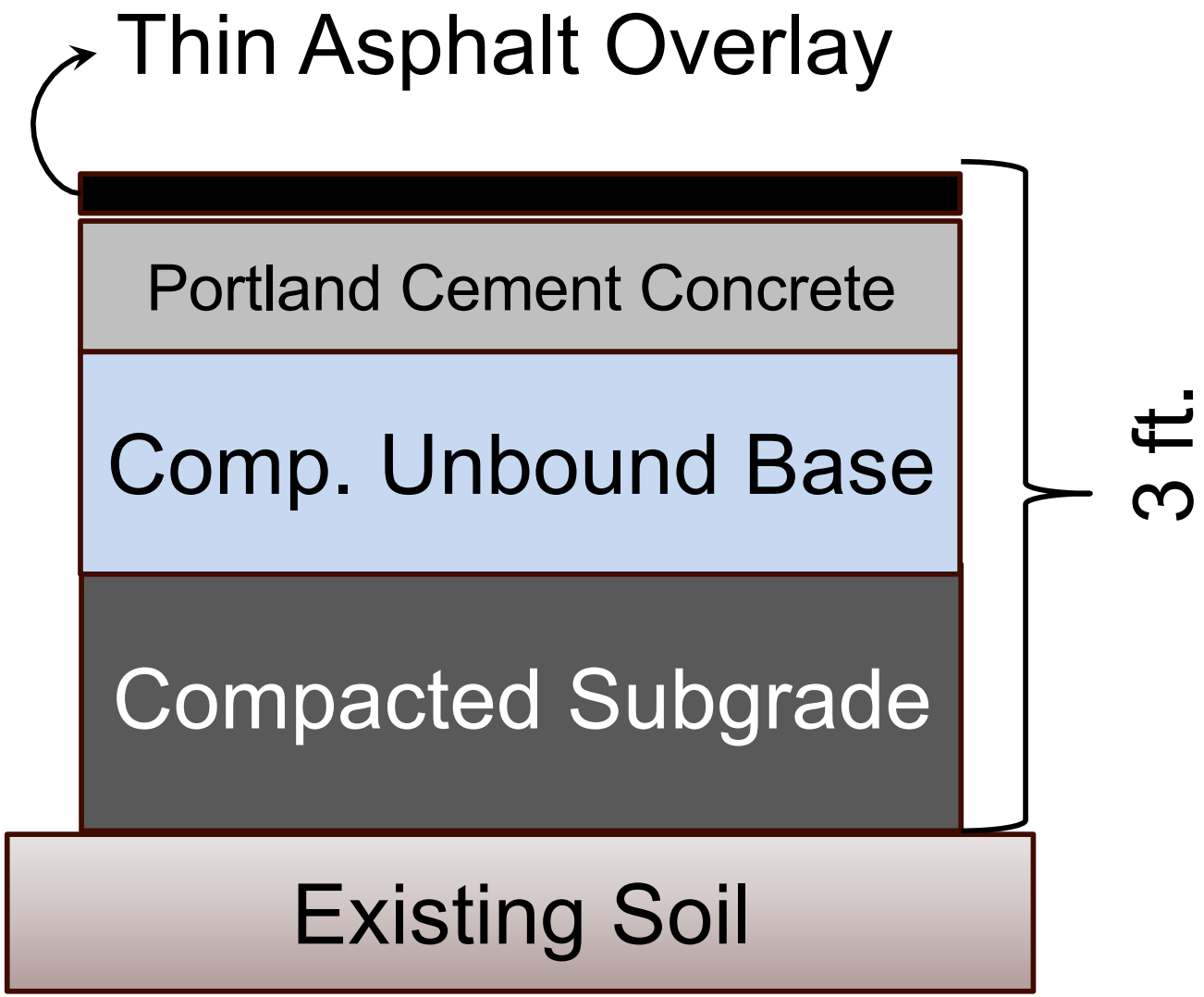
Plan View of the Full-Scale Pavement Sections Planned for this Project:



Full Scale Pavement Sections

Cross-Section View of the Full-Scale Pavement Sections Planned for this Project→

Thin asphalt layer
≈ 3 in.
PCC layer
≈ 8 in.



Portland Cement Concrete Layer

- Cylinders were prepared with the mix
- 7 – day compressive strength test was conducted and passed
- 14 – day and 28 – day tests will be performed

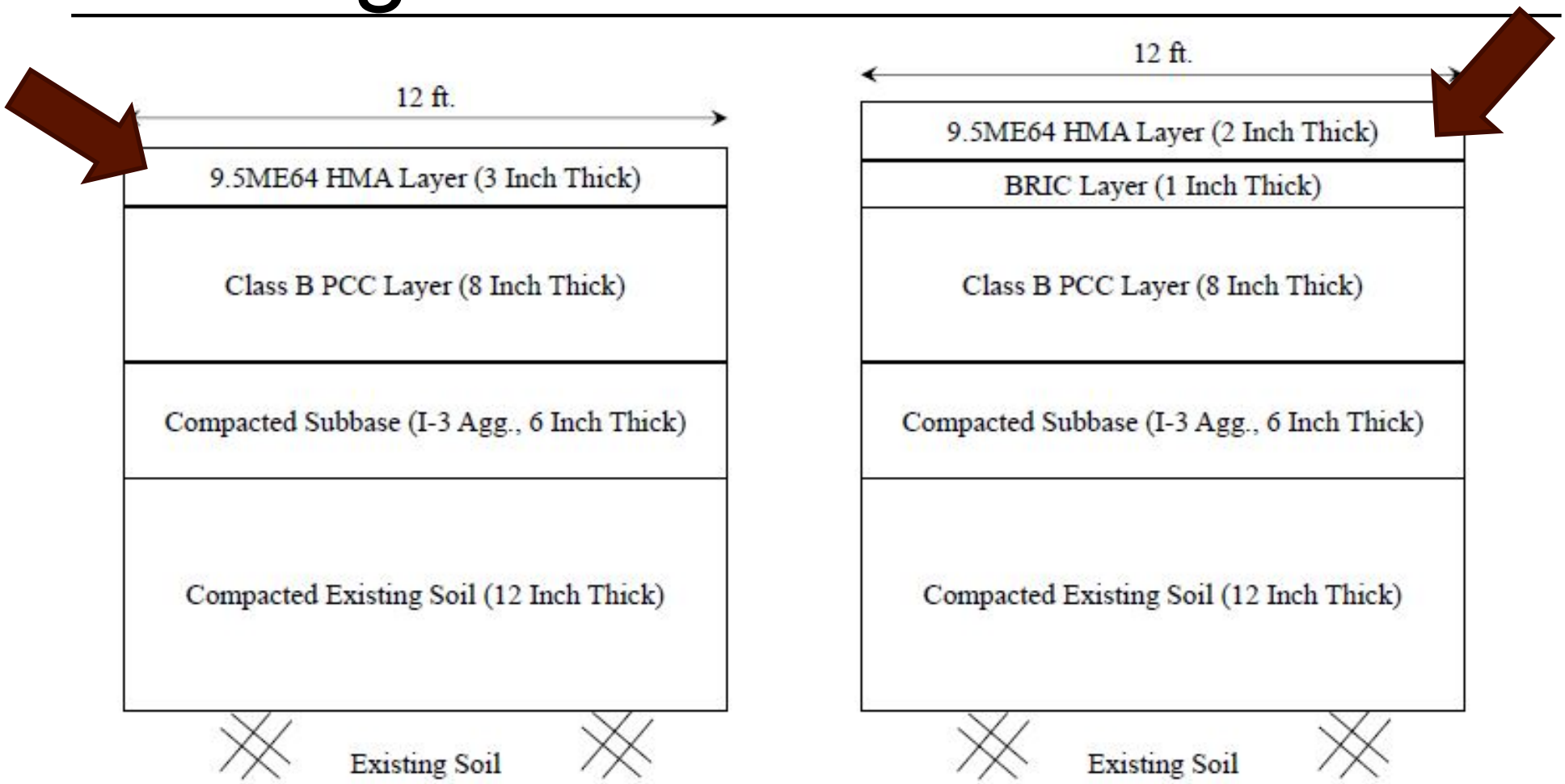
Portland Cement Concrete Layer

- Poured on Oct 4th, 5th, and 7th

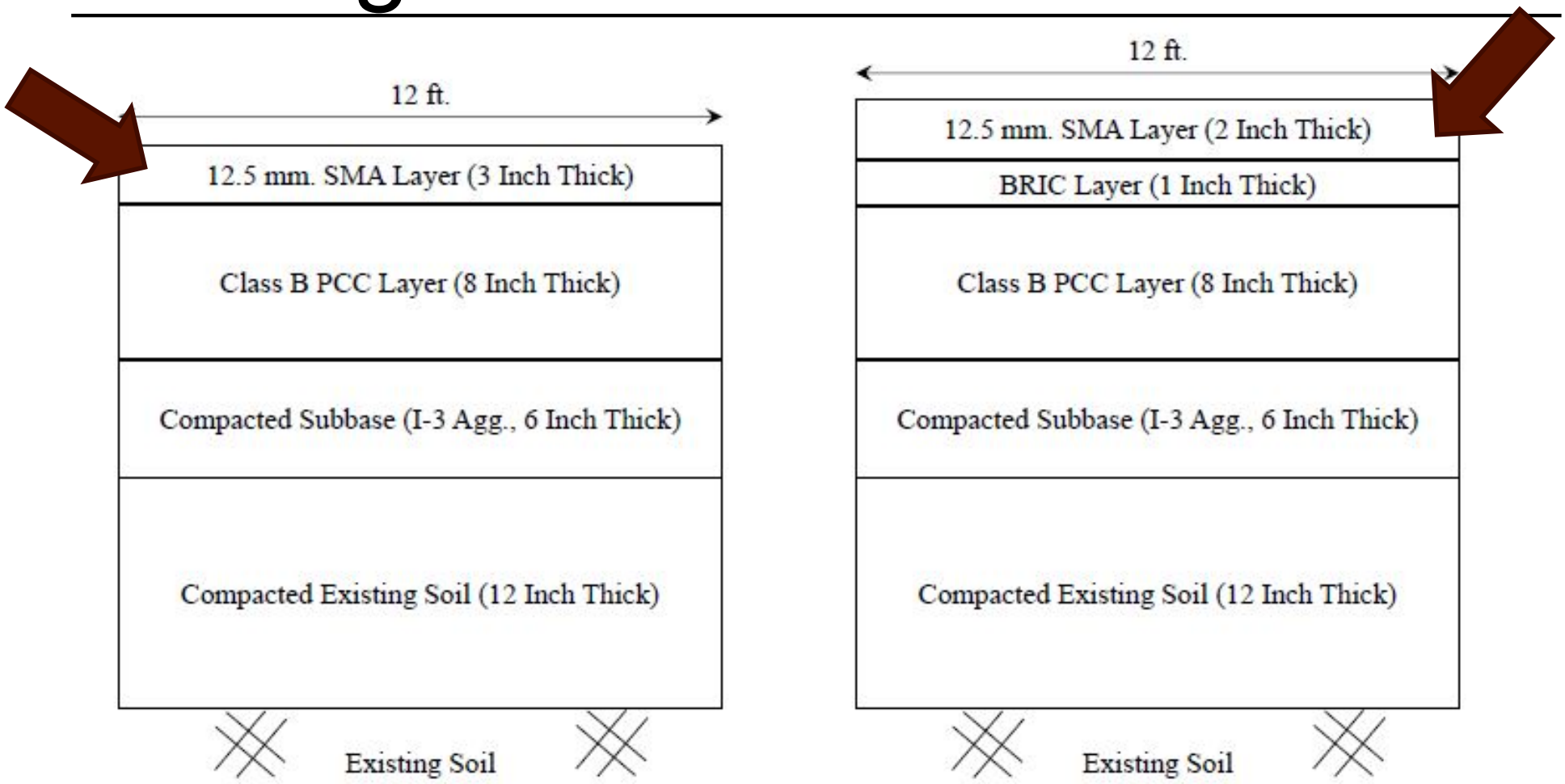
Thin Asphalt Overlays

- Six full-scale pavement sections will be constructed in the RU-APTF
- Four thin asphalt overlay mixes;
  - Traditional Superpave Mix
  - Stone Matrix Asphalt (SMA) Mix
  - High Performance Thin Overlay
  - Binder Rich Intermediate Course (BRIC)

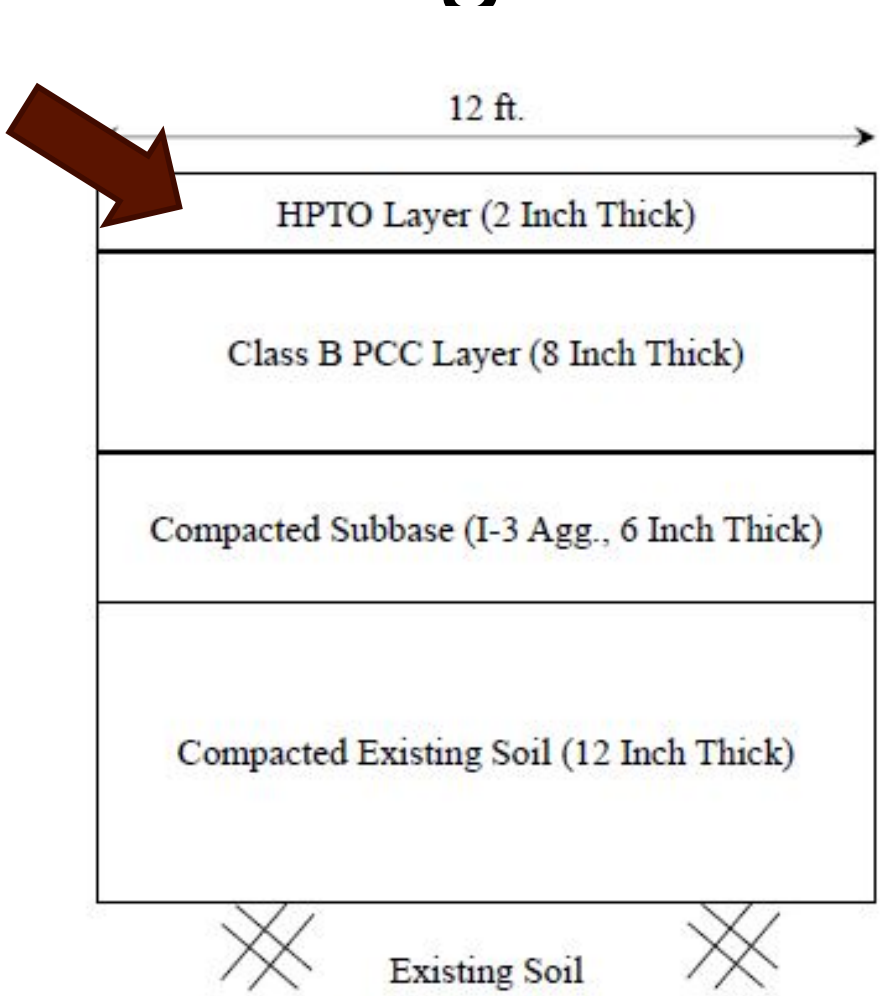
Testing Sections

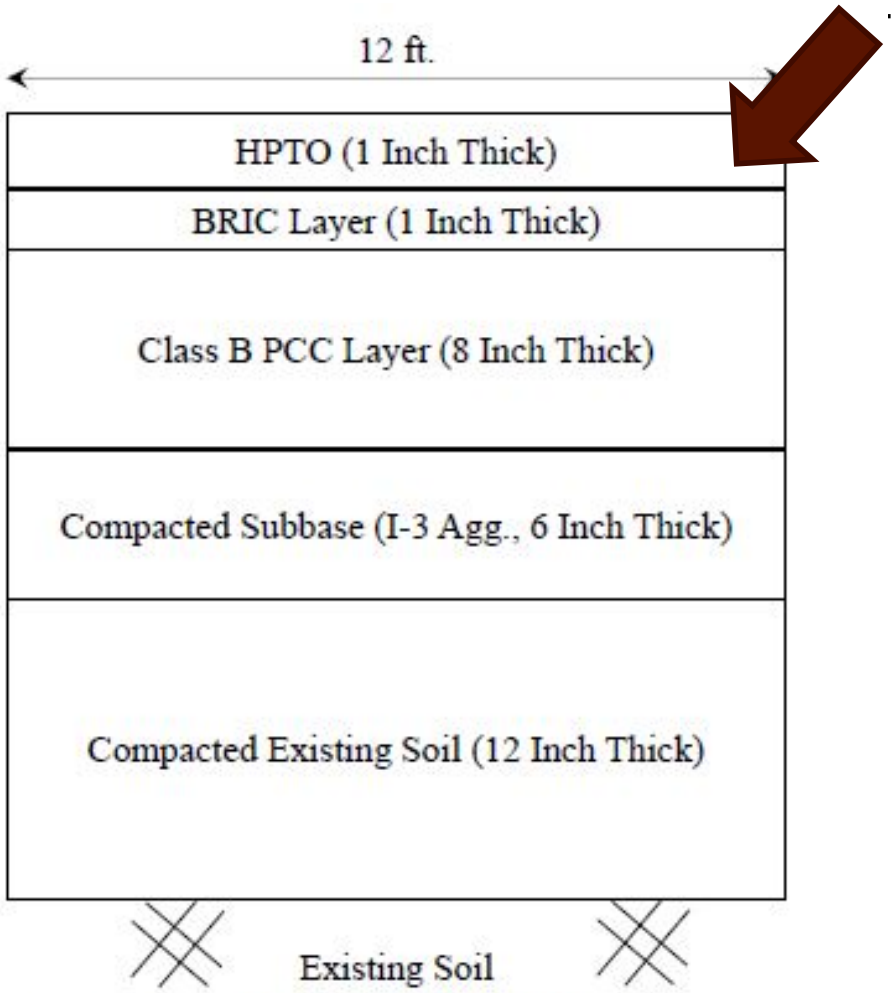


Testing Sections



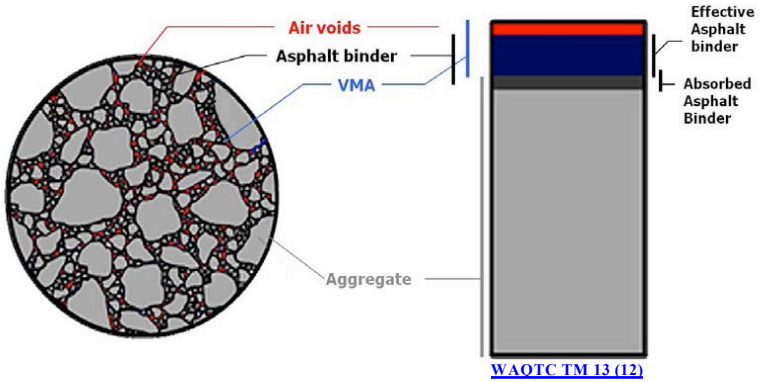
Testing Sections





Laboratory Experiments

- Mixture Tests
  - Volumetrics
    - Total Air Voids (VTM)
    - Aggregate Gradation
  - Binder Content
    - Binder Content (Extraction & Recovery of Binder)
  - Performance Tests
    - Overlay Tester (OT)
    - Asphalt Pavement Analyzer (APA)
    - Tensile Strength Ratio (TSR)



Instrumentation

- Procurement Status

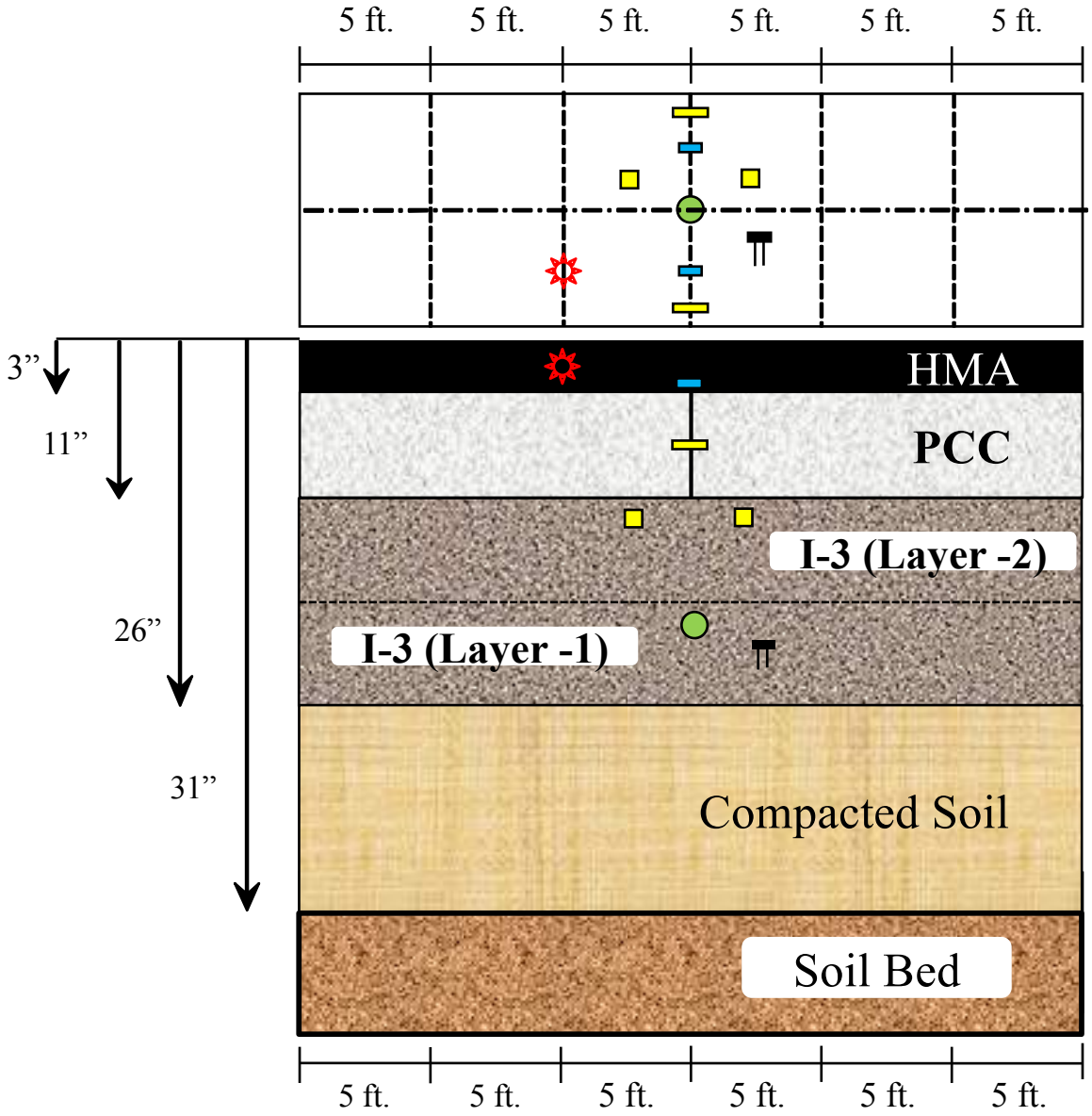
Sensor/DAQ	Status
NI cDAQ System	Delivered
Pressure Cells	Installed
Soil Compression Gauges	Installed
Thermocouple	Installed*
Asphalt Strain Gauges	Delivered
LVDTs	Installed

* Installed in I-3 Only

Instrumentation

- Installation of Sensors
  - Army Corps of Engineers (USACE) assisted Rowan team with the preparation and installation of the sensors
  - Rowan team installed pressure cells and thermocouples with help of USACE in I-3 subbase layer
  - Rowan team installed compression gauges with help of USACE in second layer of I-3

• Instrumentation

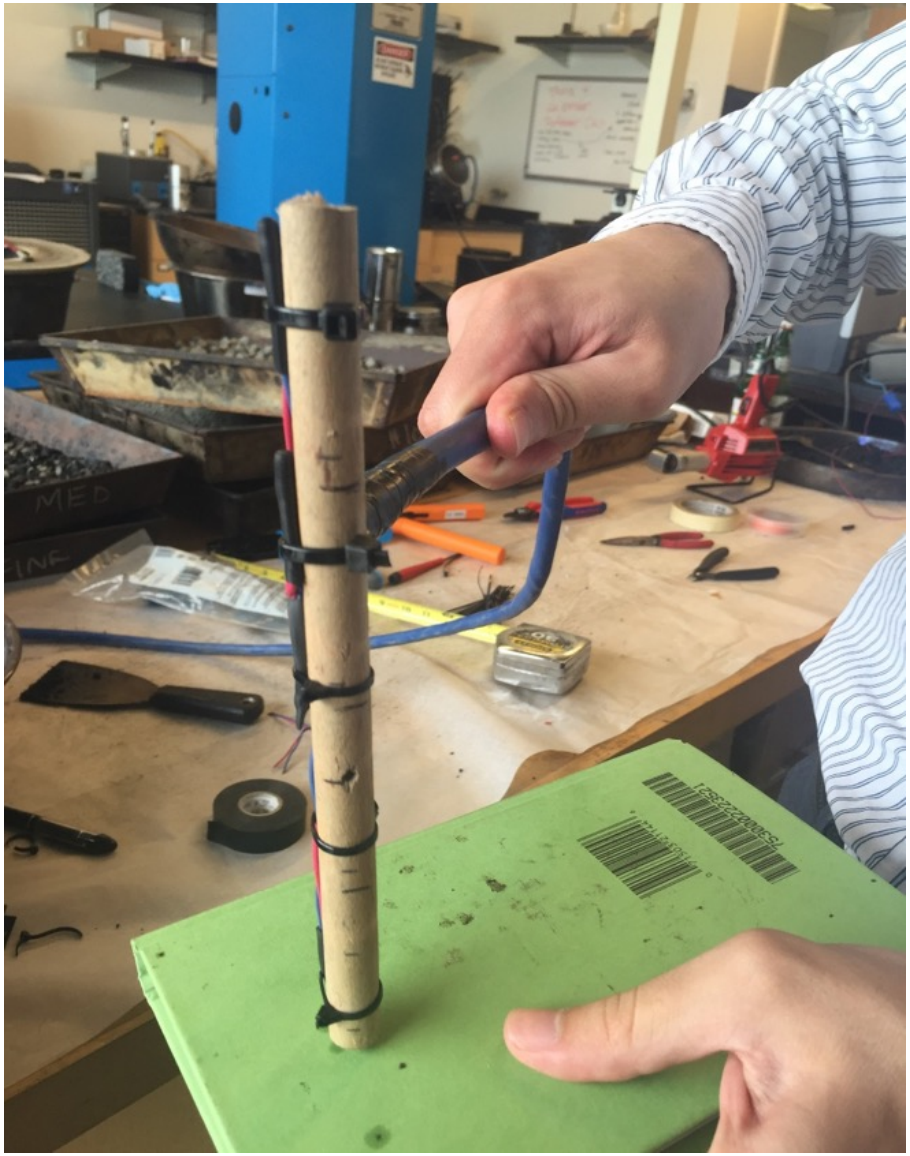


Sensor Layout

- Longitudinal Asphalt Strain Gauges (Total: 2)
- Pressure Cell (Total: 2, 2 600KPa and 1 250KPa)
- Macrosensors LVDT (Total: 2)
- CTL Soil Compression Gauge (Total: 2)
- HMA Temperature Sensors (Total: 3 T-type Thermocouples)
- Type T thermocouples will be used for temperature measurements.

Pressure Sensor Installation

Thermocouple Installation



- Compression Gauge Installation

Questions?