Motor Vehicle Detection System (MVDS) – Site Test

This test will confirm that the MVDS equipment at the site is fully operational, per manufacturer's specifications, prior to network connectivity.

MVDS: General Information

Project Number: _____ Project Name: _____

Project Stationing: _____ Date of Test: _____

Device Name: _____ Manufacturer: _____

Serial #: _____ Model #: _____

Username (If Required): _____ Password (If Required): _____

Communication Method: _____ IP Address: _____

Subnet Mask: _____ Inspector: _____

MVDS: General Requirements

Requirement	Pass	Fail	Notes
Verify location of MVDS installation is as per the plans. MVDS offset from edge of travel lane: _____ Latitude: _____ Longitude: _____	☐	☐	
Verify height of pole and mounting height of MVDS	☐	☐	
Verify that NHDOT-approved MVDS hardware is installed.	☐	☐	

MVDS: AC Power – Device Specific

Requirement	Pass	Fail	Notes
Verify voltage in MVDS load center is within +/- 5% of 120 VAC or 240 VAC.	☐	☐	
Verify that the manufacturer's recommended power/communication cable is being used and is of adequate length.	☐	☐	

MVDS: Calibration

Requirement	Pass	Fail	Notes
Follow the directions on the accompanying Test sheets			
Complete MVDS Operations Test for Volume.	☐	☐	
Complete MVDS Operations Test for Speed.	☐	☐	
Complete MVDS Operations Test for Classification.	☐	☐	

MVDS: Record Settings / Configuration

Requirement	Included	Notes
Sensor ID	☐	
Sensor Serial Number	☐	
Sensor IP Address	☐	
Lane Configuration	☐	
Polling Cycle / Frequency (1 minute)	☐	
Speed to MPH	☐	
Fine Tune / Sensitivity Readings	☐	
Save to File	☐	

Overall MVDS Site Test: ☐ Pass   ☐ Fail

Inspector Name: _____ Organization: _____ Signature: _____

Witness Name: _____ Organization: _____ Signature: _____

Date: _____
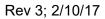
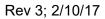# Motor Vehicle Detection System (MVDS) – Communications & Systems Test

This test will confirm that the installed equipment is fully operational utilizing New Hampshire's Advanced Transportation Management System (ATMS) at the NHDOT TMC.

MVDS: General Information

Project Number: _____   Project Name: _____

Project Stationing: _____   Date of Test: _____

Device Name: _____   Manufacturer: _____

Serial #: _____   Model #: _____

Username (If Required): _____   Password (If Required): _____

Communication Method: _____   IP Address: _____

Subnet Mask: _____   Inspector: _____

MVDS: Prerequisites*

Requirement	Pass	Fail	Notes
Contractor has coordinated with the TMC, and has established connectivity to the MVDS unit from the TMC.	☐	☐	
Contractor has verified all device components are configured with supplied IP's, VLANs, configurations, and interface login credentials, and has properly labeled all ports in device web interfaces.	☐	☐	
Contractor must be ready, with all necessary parties and preparation, to start the testing at the designated start time.	☐	☐	

*-Failure to meet any of the prerequisite requirements shall be grounds for immediate testing termination

MVDS: Communications

Requirement	Pass	Fail	Notes
If wireless communications is utilized, document the signal strength. _____dB	☐	☐	
Verify communications to the MVDS (Ping).	☐	☐	
Verify device status appears on New Hampshire's ATMS.	☐	☐	
Generate a manual communications failure at the MVDS cabinet, and verify both ATMS and manufacturer software display the error. Verify the MVDS responds after communications have been restored.	☐	☐	
Verify ATMS regains communication to the MVDS after power has been disconnected in the field for 2 minutes then restored.	☐	☐	

MVDS: Central Control

Requirement	Pass	Fail	Notes
Perform a full diagnostic scan in ATMS and manufacturer software and confirm no errors shown.	☐	☐	
Disconnect power to the device, and verify a power supply error is displayed in ATMS and/or manufacturer software. Verify the error no longer exists after power is restored.	☐	☐	
Open the cabinet door and verify an intrusion alarm is displayed in ATMS and/or manufacturer software.	☐	☐	
Verify that correct volume data is being communicated to the TMC from the MVDS. Data must be identical to those collected in the field by the device.	☐	☐	
Verify that correct speeds are being communicated to the TMC from the MVDS. Data must be identical to those collected in the field by the device.	☐	☐	
Verify that correct occupancies are being communicated to the TMC from the MVDS. Data must be identical to those collected in the field by the device.	☐	☐	
Log into all site device component web interfaces. Verify no errors reported in the software or in web interfaces. Verify web interfaces display all information needed for remote monitoring of device status. Verify all ports are properly addressed and labeled in interfaces.	☐	☐	

Overall MVDS Systems Test: ☐ Pass ☐ Fail

Inspector Name: _____ Organization: _____ Signature: _____

Witness Name: _____ Organization: _____ Signature: _____

Date: _____

MVDS Operations Test – Volume

Site: _____

Date: _____   Time: _____

Objective

To verify and demonstrate the functionality and accuracy of volume for the detector locations.

Prerequisites

Detector and cabinet installation must be complete. Lane must be open to traffic. TSMO inspector must be present during testing.

Test Equipment

A stop watch and traffic count board.

Success Criteria

Volume obtained from each detector for each lane of traffic will be within +/- 10 percent of each sample size. Sample size will be ten minutes, or 50 vehicles, whichever comes first. Traffic will be running at typical free-flowing speed and condition.

Test Instructions

1. Record the observed actual hand count volume and detector counts for ten minutes, or 50 vehicles, whichever comes first.
2. Record the lane number according to the proximity of the device. Closest lane to the device is lane #1.
3. Record the volume of vehicles detected by the sensor over the test period.
4. Subtract hand count volume from detector count volume and then divide by the hand count volume. Multiply by 100 to get the percent accuracy.
5. Indicate pass if result is +/- 10 percent.
6. Adjust sensitivity and repeat if percent accuracy is out of range.

MVDS: Volume Test Results

Lane #	1	2	3	4	5	6	7	8
Test Duration (min:sec)								
Observed Hand Count Volume								
Detector Count Volume (from Laptop)								
% Accuracy = (100 x (detector count – hand count)/(hand count))								
Pass or Fail (Pass if accuracy is < +/- 10%*								
Sensitivity Setting								

*-Or per the manufacturers specifications.

Overall MVDS Volume Test: ☐ Pass   ☐ Fail

Inspector Name: _____ Organization: _____ Signature: _____

Witness Name: _____ Organization: _____ Signature: _____

Date: _____

MVDS Operations Test – Speed

Site: _____

Date: _____ Time: _____

Objective
To verify and demonstrate the functionality and accuracy of speed for detector locations.

Prerequisites
Detector and cabinet installation must be complete. Lane must be open to traffic. TSMO Inspector must be present during testing.

Test Equipment
A calibrated radar gun, a stop watch, 2-way radios, and a laptop.

Procedure
1. Ensure that Detector unit is functioning, and that rolling average speed is being recorded.
2. Set the interval on the detector unit to 3 minutes.
3. Record the individual speeds of 16 consecutive vehicles using radar gun. If measuring consecutive vehicles is not possible, measure speeds for as many vehicles in the lane as possible, for 16 vehicles or 3 minute time period, whichever comes first.
4. Simultaneously to recording the 16th vehicle, or completing the 3 minute time period, immediately record the current Detector Mean Speed as indicated at that moment by the Detector unit.
5. Compute the mean (Average) speed of the 16 vehicles, based on radar gun readings.
6. Compute the Modified Radar Gun Mean Speed (= radar gun mean speed / cosine theta), if needed, if radar gun is not shooting head-on at vehicles.
7. Compare the Modified Radar Gun Mean Speed to the Detector Mean Speed. Pass if difference < 5 mph. If test does not pass, adjust the sensitivity of the sensor and retest.
8. Repeat for each lane.

Overall MVDS Speed Test: ☐ Pass ☐ Fail

Inspector Name: _____ Organization: _____ Signature: _____

Witness Name: _____ Organization: _____ Signature: _____

Date: _____

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MVDS: Speed Test Results								
Lane #	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Vehicle 1 Radar Speed (mph)								
Vehicle 2 Radar Speed (mph)								
Vehicle 3 Radar Speed (mph)								
Vehicle 4 Radar Speed (mph)								
Vehicle 5 Radar Speed (mph)								
Vehicle 6 Radar Speed (mph)								
Vehicle 7 Radar Speed (mph)								
Vehicle 8 Radar Speed (mph)								
Vehicle 9 Radar Speed (mph)								
Vehicle 10 Radar Speed (mph)								
Vehicle 11 Radar Speed (mph)								
Vehicle 12 Radar Speed (mph)								
Vehicle 13 Radar Speed (mph)								
Vehicle 14 Radar Speed (mph)								
Vehicle 15 Radar Speed (mph)								
Vehicle 16 Radar Speed (mph)								
Radar Gun Mean Speed (mph)								
Cosine Theta								
Modified Radar Gun Mean Speed (mph)								
Detector Mean Speed (mph)								
% Accuracy = (100 * Radar Mean Speed – Detector Mean Speed) / Radar Mean Speed								
Pass or Fail (Pass if % Accuracy < +/- 10%)								
Sensitivity Setting								
Does Controller Properly Record Occupancy?								

MVDS Operations Test – Classification

Site: _____

Date: _____ Time: _____

Objective
Verify and demonstrate the functionality and accuracy of vehicle classification for the detector locations.

Prerequisites
Detector and cabinet installation must be complete. Lane must be open to traffic. TSMO Inspector must be present during testing.

Test Equipment
A stop watch, a traffic count board, and a laptop.

Success Criteria
Classifications obtained from each detector for each lane of traffic will be within +/- 20 percent of each sample size (MVDS Spec 3.7.1). Sample size will be at least three minutes, and include at least 5 vehicles in each classification type (see table below). Traffic will be running at typical free-flowing speed and condition.

Test Instructions
1. Record the observed actual hand count classifications and sensor counts for at least three (3) minutes, capturing at least 5 vehicles of each classification type.
2. Record the classification of vehicles detected by the sensor over the test period.
3. Subtract hand count classification counts from detector count volume and then divide by the hand count classification count. Multiply by 100 to get the percent accuracy.
4. Indicate pass if result is +/- 20%.
5. Adjust sensitivity and repeat if % accuracy is out of range.

Classification Measurements	
# of Axles	**Vehicle Length (Approximate)**
2	**20 Feet**
3	**30 – 40 Feet**
> 3	**> 50 Ft**

Use the chart above to determine the number of axles by vehicle length. Use the chart on the next page to complete the test for each travel lane.

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MVDS: Classification Test Results									
Lane #		1	2	3	4	5	6	7	8
Time (min:sec)									
Observed Classification Counts	2 Axle								
	3 Axle								
	> 3 Axle								
Classification (From Laptop)	2 Axle								
	3 Axle								
	> 3 Axle								
% Accuracy = (laptop - observed) / (observed)	2 Axle								
	3 Axle								
	> 3 Axle								
Pass/Fail	Pass if all < +/- 20%								
Sensitivity Setting									

Overall MVDS Classification Test: ☐ Pass ☐ Fail

Inspector Name: _____ Organization: _____ Signature: _____

Witness Name: _____ Organization: _____ Signature: _____

Date: _____